Selecting Landscape Shrubs

with Special Comments on Invasive and Native Plants

HOME ▪ HORTICULTURE



Figure 1. Shrubs have many roles in this home's front landscape. They are used extensively in the foundation planting around the base of the home. They create a background for other plantings and provide a screen or barrier along the property lines. Low-growing shrubs are used to edge the landscape beds in front of the garage. The two shrubs at the entrance of the driveway provide an accent for this area. Shrubs also are used to provide a haven to attract wildlife to the bird bath to the right of the home.

Shrubs are considered to be the "workhorses" of the landscape. Some people tend to think of shrubs as bland, green masses that fill landscape spaces, but there are thousands of varieties of shrubs, all with their own unique and interesting qualities. Shrubs come in every form and size imaginable. They exhibit a host of different leaf shapes and textures. Some display seasonal interest with prolific blooms, leaf color, bark texture, or fruit. With so many choices available, selecting the right shrub for your landscape can seem a little daunting.

Selecting the wrong plant can increase your maintenance chores through excessive pruning, extra watering, and additional spraying to control insects and diseases. Selecting the right plant can reduce these chores and increase the time you have to enjoy your landscape.

This publication will provide information to help you make the right shrub choices. Whether you are planning a new landscape or renovating an established one, this publication contains plant characteristics and cultural information on many kinds of shrubs that grow well in Mississippi.

What Is a Shrub?

For the purposes of this publication, a shrub is a woody plant with multiple stems or trunks that grows 20 feet tall or less when mature. There are, of course, exceptions to this definition. Obviously, some of the plants listed, under optimum conditions, may exceed 20 feet in height. Also, shrubs can be trained to a single trunk in some cases. Conversely, some trees can have multiple trunks. Common sense is the best guide to distinguish a shrub from other plant groups such as trees or ground covers.

Shrub Selection Checklist

When choosing a plant for your landscape, there are many things to consider. It is always better to evaluate your landscape situation before you go shopping, so you can fit the plant to the site rather than trying to change the site to fit the plant.

Use the checklist below to help you assess the landscape location where the shrub will be planted. Then select plants from the table that fit your particular landscape situation. Explanations of the topics follow the checklist.

- Function or role
- Height and width
- Amount of light
- Climatic zone
- Soil conditions
  - Fertility needs
  - Soil pH
  - Light (sandy), medium, heavy (clay)
  - Available water (quality of drainage)
- Form
- Texture
- Seasonal interest or color
- Risk analysis

Function or Role

Determine what function or role the shrub will have in your landscape. For example, do you need a low evergreen shrub to go around the base of your deck? Or do you need a shrub that could screen an unsightly view? Maybe you need a shrub to accent the entrance to the driveway. Common examples of functions or roles that shrubs play in our landscapes include:

- Foundation plants (Figure 1)
- Hedge, screen, and background plants (Figures 1 and 2)
- Energy conservation, which includes managing wind, heat, and cold (Figure 3)
- Erosion control
- Container plants (Figure 4)
- Border and edging plants (Figures 1 and 2)
- Specimen plants
- Accent plants (Figure 1)
- Sound barriers (Figure 2)
- Wildlife habitats (Figures 1 and 2)

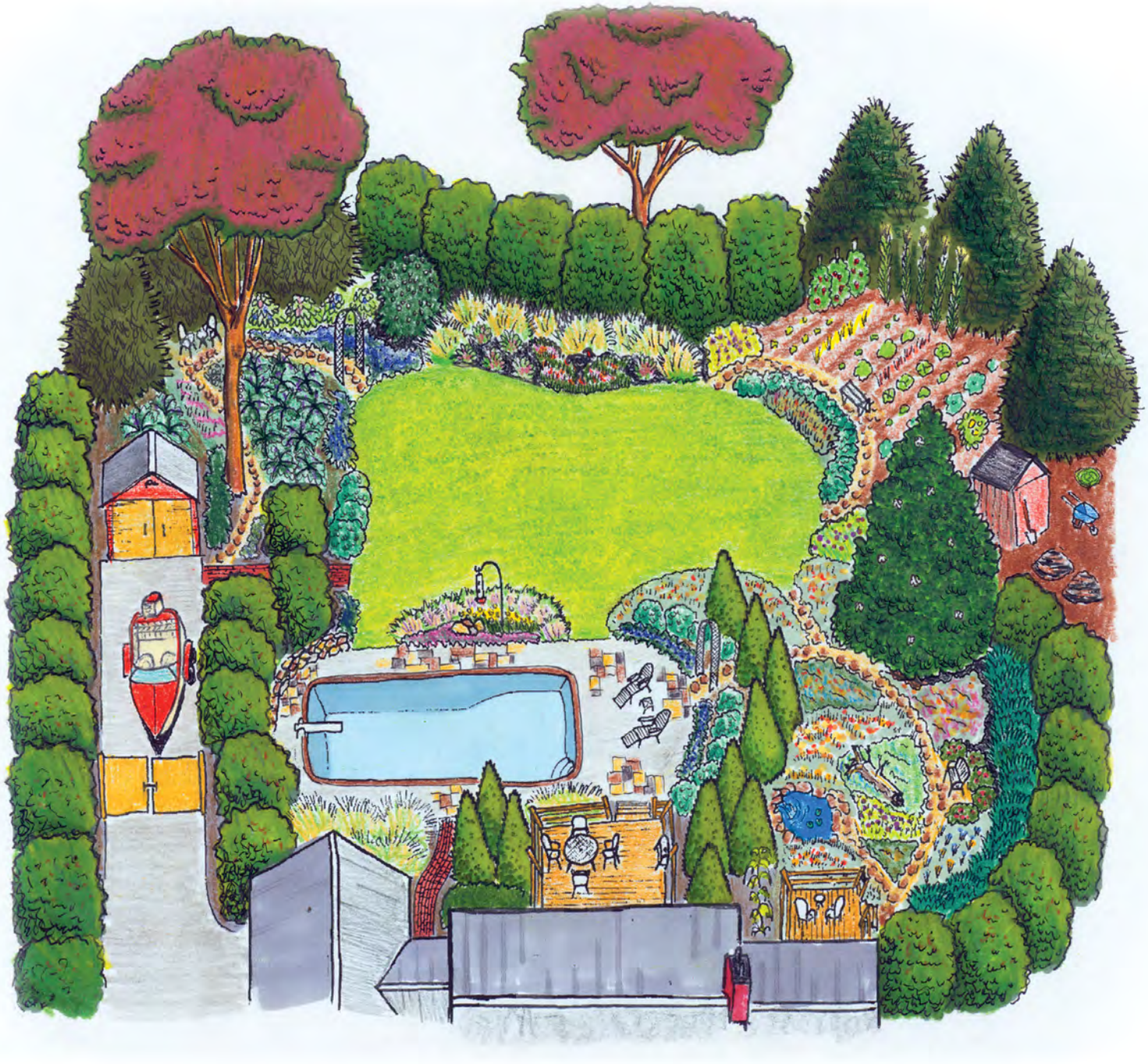


Figure 2. This backyard landscape illustrates many of the uses of shrubs, including background, screen, wildlife habitat, edging, and accent plantings. The large hedge along the left side of the driveway serves as a sound barrier as well as a screen.

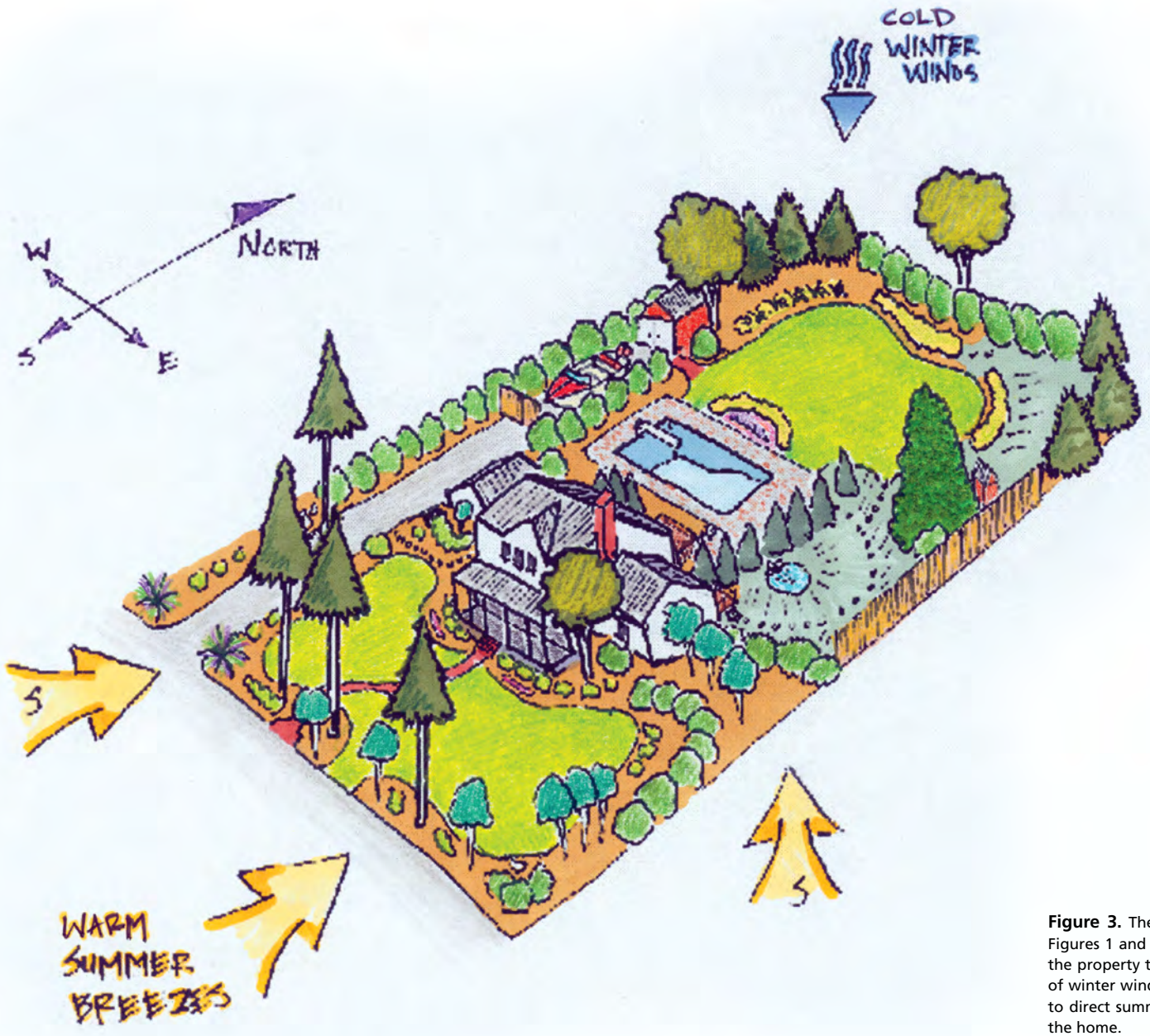


Figure 3. The aerial view of the landscape depicted in Figures 1 and 2 shows how shrubs can be placed around the property to conserve energy by buffering the effects of winter wind and summer sun. Shrubs also can be used to direct summer breezes and allow winter sun to reach the home.

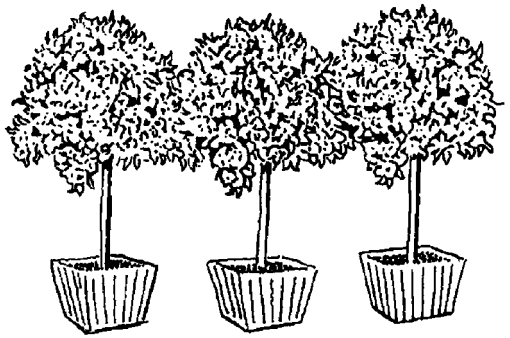


Figure 4. Container plants.

Height and Width

Knowing the mature size of a plant is very important. Size includes not just height, but also the mature spread or width of the shrub. Both should be considered before choosing a shrub for a particular location in the landscape. Choosing a plant that will become too large for the space available is a common mistake homeowners make. Problems arise later as the plant outgrows its location and blocks walkways, driveways, or windows.

Light

It is important that you know the light conditions of the different areas where you will be placing shrubs. Choose plants that grow well in those light conditions.

Full sun is at least 6–8 hours of direct sunlight. For sunny areas, choose plants that require full sunlight to grow.

Full shade areas receive no direct sunlight. In these areas, the shade could be the result of trees, buildings, or other structures. Filtered shade refers to the shade provided by a thin canopy of trees that results in filtered or "spotted" areas of light on the forest floor. Choose plants that grow in shade for these areas.

Part sun areas receive direct sunlight for at least half of the day. Fitting plants to this type of light situation can be challenging. Some shade plants will tolerate full sun in the morning if given afternoon shade. Some sun plants will grow fine in situations of some early morning or late afternoon shade. Refer to the comments section of the plant table for further information on specific light references for plants in this light category.

Climatic Zone

The U.S. Department of Agriculture has categorized the climates of the United States, Canada, and Mexico into numbered zones based on average low winter temperatures. The zone numbers range from 1 to 11. Each decrease in a zone number means the average low winter temperature is 10 degrees colder. The map in Figure 5 shows the USDA zones for Mississippi. All of Mississippi is within Plant Hardiness Zones 7 and 8. These are the average low winter temperature ranges for each zone and sub-zone:

Zone	°F Range
7	10–0
7a	5–0
7b	10–5
8	20–10
8a	15–10
8b	20–15

Remember that a plant hardiness rating does not guarantee a plant's ability to grow well in an area. For example, plants suited to drier areas of the southwestern United States in Zone 7 may withstand the winter temperatures in Mississippi, but they may not grow well because of diseases associated with our higher humidity. A plant's hardiness zone rating ONLY indicates its ability to withstand a certain winter low temperature.

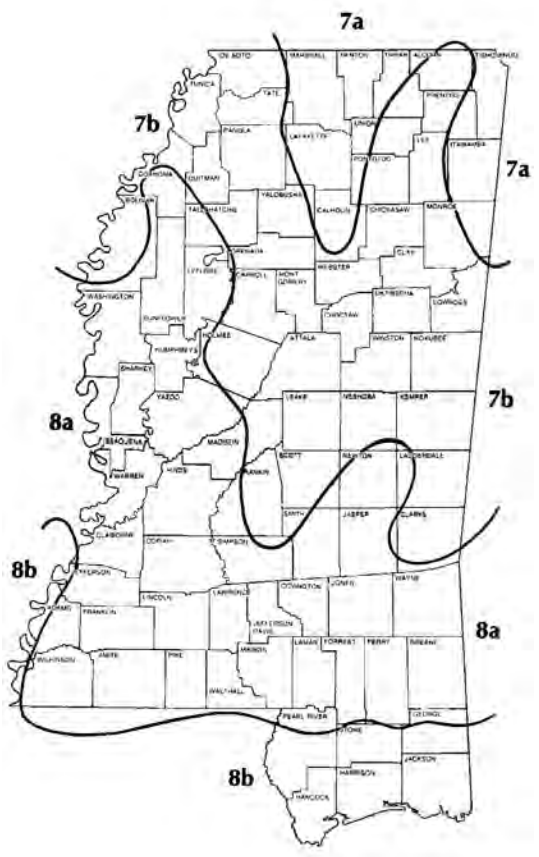


Figure 5. Zones of plant cold-hardiness for Mississippi.

Soil Conditions

Determine the **fertility needs** of the planting site before selecting plants or planting. Take a representative soil sample of the area being planted and submit it to the MSU Soil Testing Laboratory for analysis. Remember: it is much easier to choose a plant to fit your soil conditions than to change the soil conditions to fit the plant.

The soil analysis will also include a **pH level**, or measure of the alkalinity or acidity of the soil. Plants will grow best within certain pH ranges, so selection of plant material depends on pH (unless you can amend the planting site). Soil pH affects the availability of plant nutrients. Azaleas, camellias, and hollies are examples of acid-loving plants. Examples of shrubs that will grow in alkaline soils are barberry, deutzia, and elaeagnus. Table 1 includes a column that contains the pH range of specific plants.

Soils can be described as **light (sandy)**, **medium**, or **heavy (clay)**. Medium soils are best for proper growth of most landscape plants. Sandy or clay soils can be amended with organic matter to improve the water-retaining qualities of sandy soils and the drainage of clay soils, making these soils more conducive to plant growth. Adequate **soil drainage** is important for the growth of most plants. However, some plants like drier conditions and some plants like wetter conditions (bog or aquatic plants). Comments on soil requirements or tolerances have been made for many of the plants in Table 1.

Form

Form is the shape of the plant. Make sure the plant will fit into the required space and that its form complements the surrounding plantings or area. See Figure 6 for examples of plant forms.

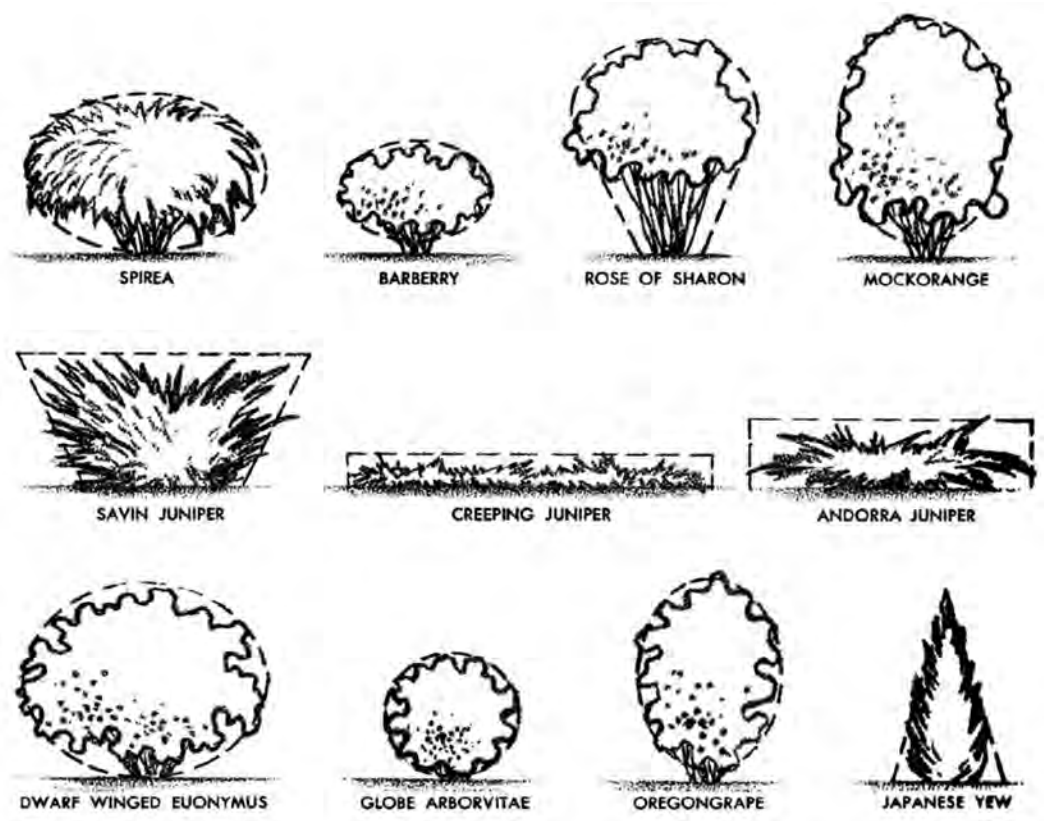


Figure 6. Examples of plant form.

Texture

Texture refers to the fineness or coarseness of plants. For example, large-leaved shrubs, as a rule, are considered coarse-textured. Examples include aucuba, fatsia, and bigleaf hydrangea. Fine-textured plants include falsecypress, arborvitae, and any of the junipers. In most cases, plants with fine textures should be used in greater numbers in the landscape than plants with coarse textures.

Seasonal Interest or Color

These are the characteristics of the plant that contribute to its overall appeal. Special physical features that make the plant attractive through the seasons could include fruit, flowers, foliage color, bark, or branching structure. The comments section of Table 1 includes information on seasonal interest or color.

Risk Analysis

When choosing plants, it pays to determine the risks the plant could bring to your landscape. Take the following into consideration when choosing plants:

- Does it attract stinging insects like bees or wasps?
- Does it produce messy fruit or other plant parts in the landscape?
- Does it produce fruit that may cause slipping, particularly on walkways?
- Does it produce thorns, spines, or prickles that can cause harm?
- Are leaves sharply pointed, which may cause harm?
- Is it poisonous to children or pets?
- Does it cause allergies?
- Does it have aggressive growth characteristics that crowd out its neighbors?
- Is it invasive?

Eradication of invasive plants costs millions of dollars every year in the United States. A number of plants can be invasive in landscapes. An invasive plant species by federal definition must be exotic and have a negative economic or health impact. Invasive plant species can increase maintenance costs and cause problems in surrounding landscapes. Some invasive plants and potential alternatives are offered in Table 2.

Avoid invasive species whenever possible. Keep in mind that some invasive plants are regulated and illegal to move into the landscape. Remember that invasive plants in one area may not be invasive in another. The comments column in Table 1 provides cautionary statements about invasive or potentially invasive plants. Before purchasing plants, be informed about which species are invasive in your area. In addition, new species can escape cultivation.

Some gardeners may prefer native plants instead of exotic or invasive species. Native species are noted in Table 1 of this publication. However, remember that some native species also can be aggressive in the landscape. Despite occasional problems, choosing a native plant could amount to savings in plant purchases and preservation of natural resources, as well. The comments section also offers other information concerning the risk factors for plants.

Shopping Tips

Local vs. Online

Plant shopping at your local nursery, garden center, or online can be an exciting but sometimes confusing experience. Always check your favorite nursery or garden center first to see if you can buy the plants locally. You will usually be able to buy a larger plant for your money than you could if purchasing the same plant online. Also, you have the benefit of talking to a real person and seeing and inspecting the real plant. The only downside of shopping locally is the variety of plants offered may be less than what you could order online. If you have found a plant online that you can't find locally, request that your nursery or garden center order the plant for you before ordering online.

Container vs. No Container

Plants come in various "packages" (Figure 7). Shrubs are typically sold in containers or pots of various sizes. These can range from small containers measured in inches to large containers measured in gallons. Large shrubs can also be sold ball and burlapped, more commonly referred to as B and B. These plants' roots with attached soil are wrapped in burlap or a similar material. Plants also can be bare-root and packaged in boxes, paper, or plastic wrapping. Roses can be offered for sale bare-root. Obviously, those plants with roots surrounded by soil have a higher survival rate than those offered bare-root. Bare-root plants can, however, be cheaper, and if you handle them properly, can be a very good choice.

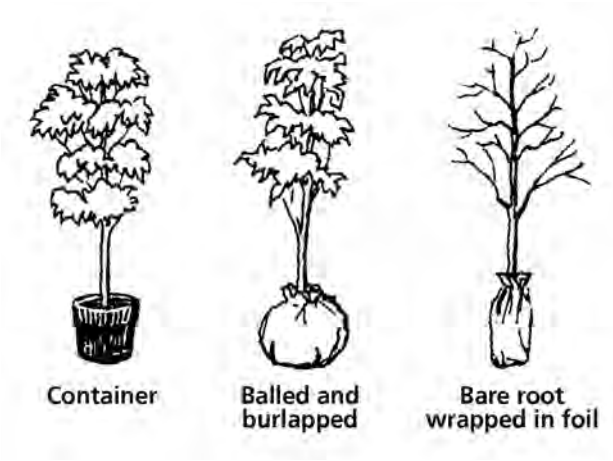


Figure 7. Plants are sold in various packages.

Small Plants vs. Large Plants

Remember that small container plants will grow and are less expensive than large container plants of the same type. So if cost is a consideration and you have the patience, purchasing smaller containers is more economical. If you want the space filled sooner and a more established look to your landscape, and you can afford the extra cost, by all means purchase a more mature plant in a larger container.

Low Maintenance vs. High Maintenance

We all want more leisure time, so it is important to select a plant that doesn't require too much maintenance in terms of pruning, spraying, watering, and disease and insect management. It is worth the extra effort to learn about the requirements of your selection before you make your purchase. Talk with nursery workers and gardening neighbors, or consult other resources.

Shop for Quality!

Always inspect your plant selection for signs of insect or disease damage. Make sure the plant shows no signs of mechanical damage to the bark or branches. Mechanical damage is caused by machinery or rough handling of the plant.

Select shrubs that have a good framework of strong branches. Look for plants with healthy green foliage and a full canopy. If it is a deciduous shrub purchased while dormant, look for an overall good branching structure. Avoid plants that have exposed roots circling the top of the pot or protruding from the pot's drainage holes. These plants are root-bound and indicate they have been held too long in the same pot (Figure 8).



Figure 8. Avoid root-bound, overgrown plants.

Protecting Plants until Planting Time

It is always better to have your planting area prepared before you bring home your plants so you can get them immediately into the ground. If this is not the case, you will need to provide a temporary holding area (Figure 9) to protect the plants until planting can occur. Do not allow plants to dry out; maintaining adequate moisture is very important. The holding area should be in an accessible area for easy watering. Also make sure the area is partially shaded and protected from drying winds. Check the plants daily to make sure the roots are kept moist.

If it will be more than 3 or 4 days before you can plant, provide additional protection. Group the plants close together and mulch around the packaging (container, B and B, bare-root) with compost, pine needles, or shredded pine bark to keep the roots moist until planting. If the plant is bare-root, be sure to open the packaging to make sure the roots are moist before covering with mulch.

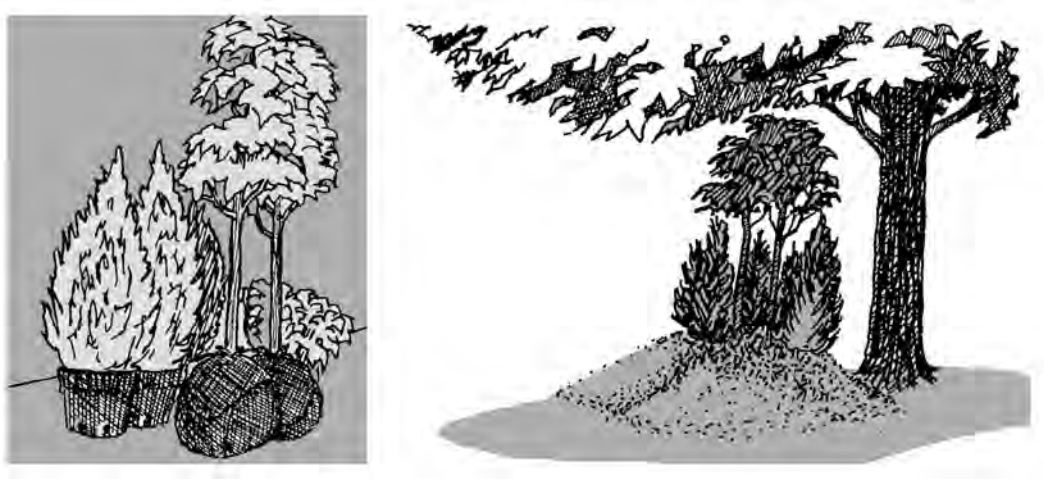
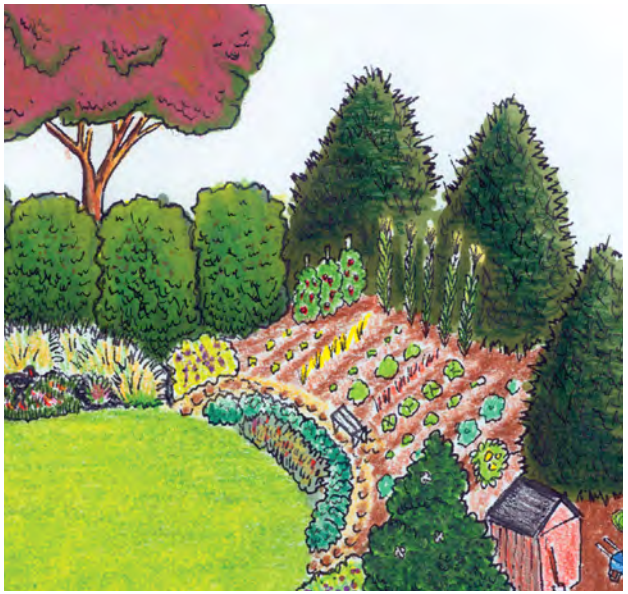


Figure 9. Protect plants before planting by shading them and mulching the roots in sawdust or another suitable material.





The following tables list ornamental landscape shrubs by height group and scientific name with information on foliage type, hardiness zone, plant height and width, plant spacing, pH range, and nativity for each, along with special comments.

TABLE 1. Ornamental landscape shrubs by height group

Small shrubs 10–16

Medium shrubs 17–21

Large shrubs 22–29

TABLE 2. Invasive landscape plants and suggested alternatives for each 31

TABLE 1. Ornamental landscape shrubs by height group.

Small Shrubs — Evergreen — Less than 5 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height	Width	Spacing	pH range	Native[3]	Comments
Compact Abelia	*Abelia x grandiflora 'Prostrata'*	SE	6–9	F	1.5′–2′	1.5′–2′	2′–3′	6.0–8.0		Flowers on new wood. Tolerates city conditions well. May have several blooming cycles. Attracts bees. Medium-fast growth rate.
Edward Goucher Glossy Abelia	*Abelia x grandiflora 'Edward Goucher'*	SE	6–9	F–S	3′–5′	3′–5′	4′–6′	6.0–8.0		Flowers on new growth. Tolerates city conditions well. May have several blooming cycles per season. Has slender arching branches. Attracts bees. Medium-fast growth rate.
Coral Ardisia	*Ardisia crenata*	BE	8–10	P–S	2′–4′	2′–4′	1–2′	5.0–7.0		Reseeds itself freely where adequate mulch is provided; invasive in Florida. Will not tolerate full sun. Medium-slow growth rate.
Black Chokeberry	*Aronia melanocarpa*	D	3–8	F–P	3′–5′	3′–5′	3′–5′	5.5–7.0	X	Similar to red chokeberry, but forms colonies from root suckers and fruit are purplish black. Growth rate is slow, but once established suckers can grow fast.
Dwarf Aucuba	*Aucuba japonica 'Nana'*	BE	7–10	S	3′–5′	3′–5′	2′–3′	5.5–7.0		See Japanese Aucuba. Medium-fast growth rate.
Black Barberry	*Berberis gagnepaini*	BE	6–9	F–P	3.5′–5′	4′–6′	3′–4′	6.0–8.0		Flowers grown on old wood. Can be used for bonsai. Medium growth rate.
Crimson Pygmy Japanese Barberry	*Berberis thunbergii atropurpurea 'Crimson Pygmy'*	D	4–8	F	1.5′–2′	2.5′–3′	2–3′	6.0–8.0		Redleaved dwarf form. Medium growth rate.
Rose Glow Japanese Barberry	*Berberis thunbergii atropurpurea 'Rose Glow'*	D	4–8	F	~5′	~5′	2′–3′	6.0–8.0		Best color in full sun. More green as shade increases. Good for city conditions. Dwarf forms available. Medium growth rate.
Redleaf Japanese Barberry	*Berberis thunbergii atropurpurea*	D	4–8	F	~5′	~5′	3′–4′	6.0–8.0		Will not retain red leaf color in deep shade. Good for city conditions. Medium growth rate. Numerous varieties available. Invasive in northeast United States.
Golden Japanese Barberry	*Berberis thunbergii 'Aurea'*	D	3–8	F	3′–5′	3′–5′	3′–4′	6.0–8.0		Bright yellow leaves in full sun. Several other yellow varieties developed. Medium growth rate.
Harland's Boxwood	*Buxus harlandii*	BE	6–8	F–P	2′–3′	2′–3′	1′–2′	6.0–7.5		Shallow roots require mulch. Prefers rich, well-drained soils. Medium growth rate.
Japanese Littleleaf Boxwood	*Buxus microphylla japonica*	BE	6–9	F–P	3′–5′	3′–4′	2′–3′	6.0–7.5		More upright in form. Very fast grower. Medium growth rate.
Korean Boxwood	*Buxus microphylla koreana*	BE	5–9	F–P	2′–2.5′	2′–2.5′	1′–2′	6.0–7.5		Very small and compact. Medium growth rate.
Richard's Boxwood	*Buxus microphylla 'Richardii'*	BE	6–9	F–P	3′–6′	3′–4′	1′–2′	6.0–7.5		Very fast grower. Medium growth rate.
Wintergreen Korean Boxwood	*Buxus microphylla 'Wintergreen'*	BE	6–9	F–P	3′–5′	3′–4′	2′–3′	6.0–7.5		Foliage light green. Larger than Korean and 'Winter Gem' Korean box. Medium growth rate.
Purple Beautyberry	*Callicarpa dichotoma*	D	5–8	F–P	3′–4′	4′–5′	2′–3′	6.0–8.0		Similar to American Beautyberry but smaller in all respects. Fast growth rate.
Compact Scarlet Bottlebrush	*Callistemon citrinus 'Compacta'*	BE	8–11	F	~4′	~4′	3′–4′	6.0–7.5		May be killed by severe winters. Flower clusters in form of a bottle brush. Tolerant of salt spray. Can withstand drought. Medium growth rate.

Small Shrubs — Evergreen — Less than 5 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height	Width	Spacing	pH range	Native[3]	Comments
Bluebeard	*Caryopteris x clandonensis*	SE	6–9	F	2′–3′	2′–3′	2′–3′	6.0–8.0		Will tolerate some shade. Gray foliage with blue flowers typical, but also gold leaf forms. Small shrub with medium growth rate.
Common Bluebeard	*Caryopteris incana*	SE	6–9	F	3′–5′	3′–5′	3′–4′	6.0–8.0		Blue or white cultivars, as well as gold leaf forms. Small shrub with medium growth rate.
New Jersey Tea	*Ceanothus americanus*	SE	4–8	F–S	3′–4′	3′–5′	2′–3′	5.5–7.0	X	Flowers not showy, but related to many western native species with showy flowers. Drought-tolerant. Slow to medium growth rate.
Dwarf Hinoki Falsecypress	*Chamaecyparis obtusa 'Nana'*	NE	4–8	F–P	2′	3.5′	2′–3′	5.0–6.0		Branchlets may be slightly orange-brown in summer. Not tolerant of air pollution. Variegated forms available. Slow growth rate.
Compact Atlantic Whitecedar	*Chamaecyparis thyoides 'Compacta'*	NE	3–9	F–P	~2′	~2′	2′–3′	5.5–6.5	X	Dwarf form. Many cultivars. Wild forms grow to be large trees. Wetland species. Slow growth rate.
Goldentwig Dogwood	*Cornus sericea 'Flaviramea'*	D	3–8	F–P	7′–9′	7′–9′	3′–4′	6.0–8.0		Yellow twigs all year. Showy in winter. Good for contrast against dark structures. Spreads rapidly. Good for moist, well-drained soils. Medium growth rate.
Creeping Cotoneaster	*Cotoneaster adpressus*	SE	4–8	F–P	1′–1.5′	4′–6′	2–3′	6.0–7.0		One of the slower growing dwarf cotoneasters. Needs well-drained soils. Medium growth rate.
Cranberry Cotoneaster	*Cotoneaster apiculatus*	SE	4–7	F	~3′	3′–6′	3′–4′	5.5–8.0		Low-growing with showy red fruit in fall. Can be used as a ground cover. Slow growth rate.
Bearberry Cotoneaster	*Cotoneaster dammeri*	BE	5–7	F	1′–1.5′	~6′	3′–4′	6.0–7.0		One of the best ground covers for moist soils. Frequently roots along the stems. Several cultivars. Medium growth rate.
Rock Cotoneaster	*Cotoneaster horizontalis*	SE	5–7	F	2′–3′	5′–8′	3′–8′	6.0–7.0		Low-growing with showy red fruit in fall. Can be used as a ground cover. Slow growth rate.
Dwarf Globe Japanese Cryptomeria	*Cryptomeria japonica 'Globosa Nana'*	NE	5–8	F	2′–3′	2.5′–3.5′	3′–4′	6.0–7.0		Dwarf form of the much larger Cryptomeria. Other dwarf forms are available. Slow growth rate.
Alexandrian–laurel	*Danae racemosa*	BE	7–9	S	2′–4′	2′–4′	2′–4′	6.0–7.0		Compact shrub with showy red fruit. Slow growth rate.
Rose Daphne	*Daphne cneorum*	BE	5–7	S	0.5′–1′	1′–2′	1′–3′	6.5–8.0		Compact shrub with very fragrant flowers. A few cultivars with white to pink flowers or varigated foliage. Needs well-drained soils. Slow growth rate.
Winter Daphne	*Daphne odora*	BE	7–9	S	3′–4′	3′–4′	3′–5′	5.0–7.0		Compact shrub with very fragrant flowers. A few cultivars with white to pink flowers or varigated foliage. Slow growth rate.
Slender Deutzia	*Deutzia gracilis*	D	4–8	F–P	2′–4′	3′–4′	3′–5′	6.0–7.0		Compact shrub with white spring flowers. Slow to medium growth rate.
Southern Bush–honeysuckle	*Diervilla sessilifolia*	D	4–7	F–P	3′–5′	3′–5′	3′–5′	6.0–7.0	X	Mountain native. Usually found on cliff ledges. Yellow spring flowers. Medium growth rate.
Paperbush	*Edgeworthia papyrifera*	D	7–9	F–P	3′–4′	3′–4′	3′–4′	5.5–7.0		Unusual. Produces fragrant, cream-yellow flowers in early spring. Slow growth rate.
Coral–bean	*Erythrina herbacea*	D	7–10	F–P	3′–5′	3′–5′	4′–6′	5.5–7.0	X	Bright red tubular flowers in clusters. Winter kills to ground in colder weather. Seed red and toxic (as is plant). Growth rate is fast for suckers on established plant.

Small Shrubs — Evergreen — Less than 5 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height	Width	Spacing	pH range	Native[3]	Comments
Pulchellus Japanese Euonymus	*Euonymus japonicus 'Microphyllus'*	BE	5–9	F–P	4′–6′	2′–3′	2′–3′	6.0–8.0		Used as a substitute for boxwood. Variegated leaf form available. Medium-fast growth rate.
Tree Ivy or Fatshedera	*Fatshedera lizei*	BE	7–10	P	3′–5′	3′–5′	2′–3′	6.0–7.0		A bi-generic cross between *Hedera* and *Fatsia*. Not self supporting. Severe winters will burn foliage. Lower stems tend to be bare. Growth rate is medium fast.
Dwarf Fothergilla	*Fothergilla gardnerii*	D	5–8	F–P	2′–3′	2′–3′	2′–3′	5.5–7.5	X	Several cultivars available. Related to Witchhazel, but shorter. Slow growth rate.
Dwarf Gardenia	*Gardenia radicans*	BE	8–10	F–S	2′–3′	3′–4′	2′–3′	5.5–6.0		Can survive most winters in 7b. Has a larger number of pests. Chlorosis common problem due to lack of iron. Sensitive to poor drainage and heavy soils. Medium growth rate.
Smooth Hydrangea	*Hydrangea arborescens*	D	4–9	F–S	3′–5′	3′–5′	3′–5′	6.0–8.0	X	Native woodland shrub that typically grows on higher pH soil. Flowers not as showy as Biglead Hydrangea. Fast growth rate.
Bigleaf Hydrangea	*Hydrangea macrophylla*	D	6–9	P–S	3′–6′	3′–6′	3′–5′	5.0–7.5		Acid (pH 5.0-5.7) soils produce blue flowers; more alkaline (pH 6.0 and above) soils produce pink flowers. Flowers on 1-year-old wood. Prune only stems that have flowered. Medium-fast growth rate.
Oakleaf Hydrangea	*Hydrangea quercifolia*	D	5–9	P–S	4′–6′	4′–6′	3′–4′	6.0–8.0	X	Sensitive to heavy, poorly drained soils. Flowers few in dense shade. Relatively short lived. Medium growth rate.
Serrate Hydrangea	*Hydrangea serrata*	D	6–7	F–P	4′–5′	4′–5′	3′–5′	5.0–6.5		Similar to *Hydrangea macrophylla*. A few cultivars with flower color from pink to blue. Medium growth rate.
Golden St. Johnwort	*Hypericum frondosum*	D	5–8	F–P	3′–4′	3′–4′	3′–4′	6.0–7.0	X	Showy yellow blooms. There are several native species of *Hypericum*. Slow growth rate.
Carissa Chinese Holly	*Ilex cornuta 'Carissa'*	BE	7–9	F–P	3′–4′	4′–6′	3′–4′	5.0–6.5		A sport of Rotunda Chinese Holly. A recent introduction. Medium growth rate.
Rotunda Chinese Holly	*Ilex cornuta 'Rotunda'*	BE	6–9	F–P	3′–4′	6′–8′	3′–4′	6.0–7.0		Difficult to tell from Spreading Chinese Holly except lower-growing, denser foliage. Rarely has fruit. Medium growth rate.
Compact Japanese Holly	*Ilex crenata 'Compacta'*	BE	5–7	F–P	~6′	~6′	3′–4′	6.0–7.0		Both surface and internal drainage must be good for this plant to thrive. Old specimens have interesting irregular forms. Medium growth rate.
Heller Japanese Holly	*Ilex crenata 'Helleri'*	BE	5–7	P	4′–5′	4′–5′	2′–3′	5.0–6.5		Difficult to transplant. Fruit occurs on new wood. Responds to shearing. Medium growth rate.
Dwarf Yaupon Holly	*Ilex vomitoria 'Nana'*	D	7–10	F–S	3′–5′	3′–5′	3′–5′	6.0–8.0	X	Berries, when produced, are red. Tolerates city conditions and shearing well. Medium growth rate.
Indigo	*Indigofera amblyantha*	D	7–9	F	4′–6′	4′–6′	4′–6′	5.5–7.0		Fine textured leaves and clusters of small pink flowers. Legume. Medium growth rate.
Kirilow Indigo	*Indigofera kirilowii*	D	5–8	F	2′–3′	1′–2′	2′–3′	6.0–7.0		Fine textured leaves and clusters of small pink flowers. Legume. Forms a colony and can be invasive. Medium growth rate.
Virginia Sweetspire	*Itea virginica*	D	5–9	F–P	3′–5′	3′–5′	3′–5′	5.5–7.0	X	Grows in wetlands, but often planted on drier sites. Colonial from roots. A few cultivars. Medium to fast growth rate.

Small Shrubs — Evergreen — Less than 5 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height	Width	Spacing	pH range	Native[3]	Comments
Showy Jasmine	*Jasminum floridum*	SE	7–10	F–P	3′–4′	4′–7′	3′–5′	6.0–8.0		Branches have tendency to climb like a vine if support is nearby. Little maintenance. Mulch plantings heavily, since plants do not compete well with weeds. Semi-evergreen in north and central Mississippi. Medium growth rate.
Winter Jasmine	*Jasminum nudiflorum*	SE	6–10	F–P	3′–5′	3′–5′	3′–5′	6.0–8.0		Drought tolerant. Very little maintenance. Best in sun. Leaves may fall in early spring. Green stems. Excellent for top of retaining walls where branches can cascade over the wall. Medium growth rate.
Blue Vase Juniper	*Juniperus chinensis 'Blue Vase'*	NE	4–9	F	4′–5′	3′–4′	4′–6′	6.0–8.0		Should not be planted in confined areas because of large size and fast growth. Will withstand most adverse growing conditions except poorly drained soil. Medium growth rate.
Pfitzer Chinese Juniper	*Juniperus chinensis 'Pfitzeriana'*	NE	4–9	F	4′–5′	8′–10′	6′–10′	6.0–8.0		Tolerates city conditions well. Prefers moist soils but will withstand dry ones. Soil must be well-drained. Tolerant of alkaline soils. Medium growth rate.
Pfitzer Chinese Juniper 'Pfitzeriana Aurea'	*Juniperus chinensis*	NE	4–9	F	4′–5′	8′–10′	6′–10′	6.0–8.0		Gold form of 'Pfitzeriana.' Prefers moist soils but will withstand dry ones. Soil must be well-drained. Tolerant of alkaline soils. Medium growth rate.
Nick's Compact Pfitzer Juniper 'Pfitzeriana Compacta'	*Juniperus chinensis*	NE	4–9	F	12"–18"	6′	5′–8′	6.0–8.0		Needles more awl-shaped than Pfitzer Juniper. Medium growth rate.
Golden Pfitzer Juniper 'Pfitzeriana Gold Lace'	*Juniperus chinensis*	NE	4–9	F	4′–5′	5′–6′	4′–5′	6.0–8.0		Slightly smaller gold form of 'Pfitzeriana.' Very decorative. Tolerant of city conditions. Will withstand drought but prefers moist, well-drained soils. Tolerates alkaline soils. Medium-fast growth rate.
San Jose Juniper	*Juniperus chinensis 'San Jose'*	NE	4–9	F	12"–18"	6′–8′	4′–6′	6.0–8.0		Branches lie flat on the ground. Exhibits both juvenile and mature needles. Has been a popular prostrate juniper for many years. Medium-fast growth rate.
Japanese Garden Juniper	*Juniperus procumbens*	NE	4–8	F	8"–12"	10′–15′	5′–8′	5.0–7.0		Coarse, stiff branches. Dense growth habit. Medium-fast growth rate.
Variegated Japanese Garden Juniper	*Juniperus procumbens 'Variegata'*	NE	4–8	F	8"–12"	10′–15′	5′–8′	5.0–7.0		See Japanese Garden Juniper. This form has blue-green foliage with creamy white blotches. Medium growth rate.
Broadmoor Juniper	*Juniperus sabina 'Broadmoor'*	NE	5–7	F	2′–3′	10′	2′–3′	6.0–7.0		Excellent juniper for ground cover for large areas. Medium growth rate.
Tamarix Juniper	*Juniperus sabina 'Tamariscifolia'*	NE	4–7	F	~18"	10′–15′	3′–4′	6.0–7.0		Excellent juniper for ground cover for large areas. Sensitive to poorly drained soils. Medium growth rate.
Grey Owl Eastern Redcedar	*Juniperus virginiana 'Grey Owl'*	NE	2–9	F	~3	~6′	4′–6′	6.0–7.0		Possible hybrid with *J. chinensis* 'Pfitzeriana.' Nice silver-gray foliage. Medium growth rate.
Dwarf Crapemyrtle	*Lagerstroemia indica and hybrids*	D	7–9	F	2′–5′	2′–4′	2′–4′	5.0–6.0		Very shrubby in 6b. Many cultivars with a range of characteristics like flower color. See Extension Publication 2007 Crapemyrtle: Flower of the South.
Common Lavender	*Lavandula angustifolia*	BE	5–8	F	1′–2′	1′–2′	1′–2′	6.0–7.0		Herbal with aromatic foliage. Grayish foliage with typically purple flowers. Other, less hardy species available. Slow growth rate.
Dog–hobble	*Leucothoe axillaris*	BE	5–8	P–S	3′–6′	3′–6′	2′–6′	5.5–7.0	X	Also called coast leucothoe and native to the southeast, particularly low areas. Several cultivars. Slow to medium growth rate.

Small Shrubs — Evergreen — Less than 5 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height	Width	Spacing	pH range	Native[3]	Comments
Drooping Leucothoe	*Leucothoe fontanesiana*	BE	5–9	P–S	3′–6′	3′–6′	2′–6′	5.5–7.0	X	Native to the Apalachian Mountains. Several cultivars. Slow to medium growth rate.
Pheasant–eye	*Leycesteria formosa*	SE	7–9	P–S	3′–5′	3′–5′	3′–5′	6.0–7.0		Stems typically green; flowers purple in racemes. Medium growth rate.
Fetterbush Lyonia	*Lyonia lucida*	BE	7–9	P–S	3′–5′	3′–5′	3′–5′	5.5–7.0	X	Coastal plain native with racemes of pinkish white flowers. Slow to medium growth rate.
Oregon Grape Mahonia	*Mahonia aquifolium*	BE	5–7	F–S	3′–6′	3′–5′	2′–3′	6.0–8.0		Remove older branches each year to encourage low, dense form. Plant increases in size by underground rhizomes. Medium to fast growth rate.
Leatherleaf Mahonia	*Mahonia bealei*	BE	6–9	P–S	6′–10′	6′–10′	2′–3′	6.0–8.0		Plant blends well with rich browns of brick and woodwork. Remove one-third of tallest canes each spring. Does well on north sides of buildings. Medium growth rate.
Chinese Mahonia	*Mahonia fortunei*	BE	7–9	P–S	5′–6′	5′–6′	3′–4′	6.0–8.0		Fruit less showy than other mahonias. Will withstand more sun than other mahonias. Slowly spreads by underground rhizomes. Easily pruned to maintain natural form. Slow growth rate.
Dwarf Southern Waxmyrtle	*Myrica cerifera var. pumila*	BE	7–11	F–P	3′–4′	4′–10′	3′–4′	5.0–7.0	X	Sometimes found in southern MS in dunes. Other dwarfs include ‘Fairfax’ (4–5 feet), ‘Club Med’ (3–4 feet), ‘Georgia Gem’ (12–18 inches tall by 3 feet wide), plus a few others. Growth rate is typically slower compared to the standard form.
Compact/Dwarf Nandina	*Nandina domestica (dwarfs)*	BE	6–9	F–P	4′–5′	4′–5′	1′–2′	5.5–7.0		‘Compacta’ and ‘Harbour Dwarf,’ low-growing, dense form of common nandina; ‘Nana,’ minimal fruit production, smaller than Compact Nandina, slow growth rate; ‘Nana Purpurea’ similar to ‘Nana,’ but foliage is purple-green.
Alabama Snow–wreath	*Neviusia alabamensis*	D	4–8	P–S	3′–6′	3′–6′	3′–6′	6.5–7.0	X	Rare in wild, but similar to Spirea. Spreads to form colonies. Nice native shrub. Medium growth rate.
Dwarf Flowering Pomegranate	*Punica granatum ‘Nana’*	SE	7–11	F–P	~18"	3–4′	3′–4′	5.5–7.0		Leaves narrow and small. Single orange-red flower during summer. Slow growth rate.
Variegated Dwarf Firethorn	*Pyracantha ‘Harlequin’*	SE	8–9	F	~6′	~6′	3′–5′	6.0–8.0		May be pruned to keep in bounds. Leaves green with a creamy white margin that turns pinkish with cold weather. May reach up to 6–10 feet tall and 6 feet wide. Slow growth rate.
Indian Hawthorn	*Raphiolepis indica*	BE	8–10	F–P	4′–6′	4′–6′	3′–4′	5.5–7.0		Many cultivars to select from. ‘Ballerina’ is most dwarf with deep pink flowers; ‘Pink Cloud’ is medium in height with light pink flowers; ‘Jack Evans’ has compact growth and double pink flowers; ‘Springtime’ is medium to large among Indian hawthorns. Medium-fast growth rate.
Gable Hybrid Azalea	*Rhododendron ‘Gable’*	BE	5–8	F–P	2′–4′	2′–4′	2′–4′	5.5–7.0		Many hybrids in many colors. ‘Blaauw's Pink,’ double, mid-season, is one example. Evergreen. Medium growth rate.
Glen Dale Hybrid Azalea	*Rhododendron ‘Glenn Dale’*	BE	7–8	P–S	3′–6′	3′–6′	3′–4′	5.0–6.0		Developed at U.S. Plant Introduction Station, Glenn Dale, MD. Some selections are ‘Buccaneer’ (orange-red with dark blotch), ‘Copperman’ (brilliant orange), ‘Evensong’ (rose flowers), ‘Fashion’ (orange-pink flowers), ‘Glacier’ (white with chartreuse throat). Medium growth rate.

Small Shrubs — Evergreen — Less than 5 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height	Width	Spacing	pH range	Native[3]	Comments
Kurume Azalea	*Rhododendron obtusum japonicum*	BE	6–7	P–S	3′–6′	3′–6′	3′–4′	5.0–6.0		Popular hybrid azalea. Some selections include 'Coral Bells' (coral flowers, midseason), 'Christmas Cheer' (red, early to midseason), 'Hinodegiri' (scarlet, midseason), 'Snow' (white, midseason), 'Hexe' (deep red, midseason), 'Bridesmaid' (salmon late season). Medium-slow growth rate.
Black Jetbead	*Rhodotypos scandens*	D	4–8	F–S	3′–6′	4′–9′	3′–5′	5.5–7.0		Can form colonies and can be somewhat invasive. Flowers white in spring followed by black shiny fruit. Medium to fast growth rate.
Fragrant Sumac	*Rhus aromatica*	D	3–9	F–P	2′–6′	6′–10′	3′–5′	6.5–8.0	X	Native, generally on higher pH soils. Small yellow flower followed by red fruit. Slow to medium growth rate.
Carolina Rose	*Rosa carolina*	SE	4–9	F–P	3′–6′	3′–6′	3′–5′	6.0–7.0	X	Pink, fragrant flowers from June to July. Suckers freely, so may require some maintenance. Medium to fast growth rate.
Hybrid Roses	*Rosa hybrida*	V	7–9	F	1′–5′	1′–5′	3′–6′	6.0–7.0		Numerous hybrids. Some may exceed 5 feet. Hardiness variable. In general, hybrid teas have large, pointed buds and long stems; floribundas have medium-sized flowers in flat-topped clusters; heavy-bloomers polyanthas have large flower clusters with individual flowers that are smaller than floribundas; and grandifloras have long-stemmed flowers. Fast growth rate.
Rugose Rose	*Rosa rugosa*	D	2–7	F	4′–6′	4′–6′	3′–4′	6.0–7.0		Good for exposed, windy sites. Can spread up to 15 feet in a few years. Suckers freely and can be invasive. Roots easily. Fast growth rate.
Prairie Rose	*Rosa setigera*	D	4–9	F	3′–4′	3′–15′	3′–15′	6.0–7.0	X	Flowers are pink to white from June to July. Can be difficult to maintain. Fast growth rate.
Scotch Rose	*Rosa spinosissima*	D	4–8	F	3′–4′	3′–4′	3′–4′	6.0–7.0		Flowers are white and pink to yellow from May to June. Can be invasive. Medium to fast growth rate.
Virginia Rose	*Rosa virginiana*	D	3–7	F	4′–6′	4′–6′	3′–5′	6.0–7.0	X	Pink flowers in June. Suckers freely, so may require some maintenance. Medium to fast growth rate.
Rosemary	*Rosmarinus officinalis*	BE	7–9	F	2′–4′	2′–4′	2′–3′	5.5–6.5		Favorite in old gardens. Foliage has favorable scent. May be killed by severe winter freezes. Has been used as ground cover in drier soils. Some cultivars available: 'Prostratus' (low, spreading form), 'Albus' (with white flowers), 'Tuscan Blue' (upright with blue flowers). Medium growth rate.
Butcher's Broom	*Ruscus aculeatus*	BE	7–9	P–S	1.5′–3′	1.5′–3′	1.5′–3′	5.5–6.5		Evergreen that does well in shade. Red fruit ripen in the fall. Slow growth rate.
Himalayan Sarcococca	*Sarcococca hookeriana*	BE	7–9	P–S	4′–6′	4′–6′	3′–5′	5.5–6.5		Dense evergreen for moist, acid, high organic soils. Can form colonies from suckers. Other species are also available, but none are common. Slow to medium growth rate.
Variegated Serissa	*Serissa foetida 'Yellowrim'*	BE	7–9	F–P	3′–4′	3′–4′	2′–3′	5.5–6.5		Leaves green with yellow margins. Requires frequent pruning to maintain dense growth. Foliage variegation best in full sun. Has several flowering phases during warm months. Medium growth rate.
Japanese Skimmia	*Skimmia japonica*	BE	7–9	P–S	3′–4′	3′–4′	2′–3′	5.5–6.5		Small evergreen with fragrant, creamy white flowers. Some varieties and species available, but not common. Can be difficult to grow. Slow growth rate.

Small Shrubs — Evergreen — Less than 5 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height	Width	Spacing	pH range	Native[3]	Comments
Anthony Waterer Spirea Waterer Spirea	*Spiraea x bumalda 'Anthony Waterer'*	D	4–8	F–P	3′–4′	4′–5′	2′–3′	6.0–7.0		Prune in spring if needed. Excellent summer color. Fast growth rate.
Gold Flame Anthony	*Spiraea x bumalda 'Goldflame'*	D	6–8	F–P	2′–3′	3′–5′	2′–3′	6.0–7.0		Spring foliage is bronze-gold turning to soft yellow in summer. Medium-fast growth rate.
Reeves Spirea	*Spiraea cantoniensis*	D	4–9	F–P	4′–6′	4′–6′	3′–5′	6.0–7.0		Double-flowered form available. Flowers a little later than other varieties. Prune after flowering, removing old wood at ground level. Fast growth rate.
Thunberg Spirea	*Spiraea thunbergii*	D	4–8	F–P	3′–5′	3′–5′	2′–4′	6.0–7.0		Usually first of spiraeas to flower in spring. Late cold spells can kill flower buds. Flowers best in full sun. Colonial and can be invasive. Prune out old wood in spring after flowering. Medium growth rate.
Common Snowberry	*Symphoricarpos albus*	D	3–7	F–S	3′–6′	3′–6′	2′–5′	6.0–7.0		Similar to Indiancurrant Coralberry, but fruit are white. Native to central North America. Fast growth rate.
Indiancurrent Coralberry	*Symphoricarpos orbiculatus*	D	2–8	F–S	2′–5′	4′–8′	2′–5′	5.5–7.5	X	Does well in poor soil. Good for use under trees where shade is not dense. Fruit are small and pink to purple in winter (*S. albus* has white fruit). Medium growth rate.
Rheingold American Arborvitae	*Thuja occidentalis 'Rheingold'*	NE	2–7	F	4′–5′	3′–4′	2′–4′	6.0–7.5		Ovate to conical form with gold foliage turning copper to brownish in winter. Slow growth rate.
Mapleleaf Viburnum	*Viburnum acerifolium*	D	4–8	P–S	4′–6′	4′–6′	3′–4′	5.5–7.0	X	Deciduous, native, and rare in Mississippi. Slow growth rate.
Koreanspice Viburnum	*Viburnum carlesii*	BE	5–8	F–P	4′–6′	4′–6′	3′–4′	5.5–7.0		Evergreen shrub. Flowers pink to white in spring. Very fragrant. Slow growth rate.
Service Viburnum	*Viburnum utile*	BE	6–8	P–S	4′–6′	4′–6′	3′–4′	5.5–7.0		Evergreen shrub. Flowers white in spring. Slow growth rate.
Adam's Needle Yucca	*Yucca filamentosa*	BE	5–9	F–S	3′–6′	2′–4′	3′–4′	5.5–7.0	X	Tolerates most areas except wet soils. Variegated forms available. Leaves less rigid than Aloe Yucca. Leaf margins have filaments. Sometimes called bear grass. Slow growth rate.
Small Soapweed	*Yucca glauca*	BE	4–8	F–S	3′–4′	2′–3′	3′–4′	5.5–7.0	X	Tolerates most areas except wet soils. Leaves less rigid than Aloe Yucca. Leaf margins have few or no filaments. Sometimes called bear grass. Slow growth rate.
Curveleaf Yucca	*Yucca recurvifolia*	BE	6–9	F–S	3′–6′	2′–4′	3′–4′	5.5–7.0	X	Tolerates most areas except wet soils. Similar to *Y. gloriosa*, but foliage is recurved. Leaf margins lack filaments. Slow growth rate.

Medium Shrubs — 5–10 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height	Width	Spacing	pH range	Native[3]	Comments
Glossy Abelia	*Abelia x grandiflora*	SE	6–9	F–S	3'–6'	3'–6'	4′–6′	6.0–8.0		Flowers on new growth. Tolerates city conditions well. May have several blooming cycles per season. Tends to accumulate deadwood. Attracts bees. Medium-fast growth rate.
Red Chokeberry	*Aronia arbutifolia*	D	4–9	F–P	6'–10'	3'–5'	5'–8'	5.5–7.0	X	Clusters of small, white to reddish flowers in spring that produce red fruit in fall. Slow growth rate.
Japanese Aucuba	*Aucuba japonica*	BE	7–10	P–S	6'–10'	6'–10'	3′–4′	5.5–7.0		Needs damp but well-drained soil. Sunburns in full sun; wind burns in winter. Plant no deeper than grown in nursery. Medium to slow growth rate. 'Picturata,' leaves with prominent yellow splotch and slow growth rate; 'Variegata,' leaves with yellow specks or tiny spots and medium growth rate.
Wintergreen Barberry	*Berberis julianae*	BE	5–8	F–P	6'–8'	6'–8'	2′–3′	6.0–8.0		Reported to be hardiest evergreen barberry. Low maintenance. Difficult to transplant. Flowers on old wood. Medium growth rate.
Mentor Barberry	*Berberis x mentorensis*	SE	5–8	F–P	5'–6'	5'–7'	3′–5′	6.0–8.0		Tolerates city conditions well. Medium growth rate.
Butterfly–bush	*Buddleia davidii*	SE	5–9	F	5'–10'	5'–10'	4'–8'	6.0–7.0		Many cultivars with flower color ranging from white to dark purple. Can be invasive. Growth rate is fast from established plants.
Lindley's Butterfly–bush	*Buddleia lindleyana*	SE	7–9	F	4'–6'	4'–6'	3'–5'	6.0–7.0		Flowers are purple-violet. A few cultivars have been developed. Growth rate is fast from established plants.
Honeycomb Butterfly–bush	*Buddleia x weyeriana 'Honeycomb'*	SE	5–9	F	5'–10'	5'–10'	4'–8'	6.0–7.0		Flowers are yellow. Growth rate is fast from established plants.
American Beautyberry	*Callicarpa americana*	D	7–11	F–P	3'–8'	3'–8'	3′–5′	6.0–8.0	X	Fruits more in full sun. Tolerates very poor soil conditions. Fruit persists for relatively short time. Fast growth rate.
White American Beautyberry	*Callicarpa americana 'Lactea'*	D	7–11	F–P	3'–8'	3'–8'	3′–5′	6.0–8.0	X	See American Beautyberry. Fast growth rate.
Bodinier Beautyberry	*Callicarpa bodinieri*	D	6–8	F–P	6'–10'	6'–10'	3'–4'	6.0–8.0		Similar to American Beautyberry but slightly larger. Arching branch habit. Fast growth rate.
Japanese Beautyberry	*Callicarpa japonica*	D	5–8	F–P	4'–6'	4'–6'	3'–4'	6.0–8.0		Similar to American Beautyberry. Some cultivars have been developed. Fast growth rate.
Sweet Shrub	*Calycanthus floridus*	D	5–9	F–P	6'–9'	6'–12'	4′–8′	6.0–7.0	X	Native shrub worthy of more use in landscapes. At least two botanical varieties and several cultivars. Often associated with old southern landscapes. Also called Carolina Allspice. Medium growth rate.
Buttonbush	*Cephalanthus occidentalis*	D	5–11	F	4'–8'	3'–6'	3'–4'	5.5–7.0	X	Common wetland shrub with globose white inflorescences similar to a pincushion. Not drought tolerant. Medium growth rate.
Common Flowering Quince	*Chaenomeles speciosa*	D	4–8	F	6'–10'	6'–10'	5′–8′	6.0–7.0		Early spring color. Sheds leaves early in fall. May flower sparsely in lower south. Several cultivars and flower colors. Medium growth rate.
Mexican–orange	*Choisya ternata*	BE	7–10	F–P	6'–8'	6'–8'	4'–5'	5.5–6.5		Compact shrub from Mexico. Needs well-drained soil. Medium growth rate.

Medium Shrubs — 5–10 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height	Width	Spacing	pH range	Native[3]	Comments
Summersweet Clethra	*Clethra alnifolia*	D	4–9	F–P	4'–8'	4'–6'	3'–5'	5.5–7.0	X	Produces white racemes of fragrant blooms in summer. Several cultivars available including some with pink flowers. Slow to medium growth rate.
Redosier Dogwood	*Cornus sericea*	D	2–7	F–P	7'–9'	7'–10'	6'–10'	5.5–7.0		Native to north U.S. but not to south; does not do well 7b south. New stems red, except some cultivars like 'Flaviramea' (Goldentwig Dogwood). Fast growth rate.
Redtwig Dogwood	*Cornus sericea var. coloradensis*	D	2–7	F–P	7'–9'	7'–10'	4'–6'	6.0–8.0		See Redosier Dogwood. Red twigs throughout winter. Excellent for contrast with light-colored structures. Needs room to develop. May require annual pruning. Medium growth rate.
Spreading Cotoneaster	*Cotoneaster divaricatus*	SE	4–7	F	5'–6'	5'–8'	4'–6'	6.0–8.0		Can be used as a hedge, but multifaceted. Red fruit in fall. Susceptible to fire blight. Medium to fast growth rate.
Parney Cotoneaster	*Cotoneaster lacteus*	BE	6–8	F	6'–10'	6'–10'	5'–10'	6.0–7.0		White spring flowers followed by red fruit in fall persisting into winter. Several cultivars available. Medium growth rate.
Alabama Croton	*Croton alabamensis*	BE	6–8	F–P	4'–6'	3'–5'	3'–5'	6.0–8.0	X	Typically grows on high pH rock outcrops and rare in the wild. Unusual. Slow growth rate.
Fuzzy Deutzia	*Deutzia scabra*	D	4–8	F–P	6'–10'	4'–8'	4'–6'	6.0–8.0		Good plant for city conditions. Full sun is best. Easy to transplant. Variegated forms available. Grown for profusion of flowers. Fast growth rate.
American Euonymus	*Euonymus americanus*	SE	6–9	F–S	4'–6'	4'–6'	3'–5'	6.0–7.0	X	Also called Strawberry-bush. Colonial shrub with green twigs and red, hanging fruit. Growth is fast for suckers on established plants.
Japanese Euonymus	*Euonymus japonicus*	BE	7–9	F–P	5'–10'	3'–6'	3'–6'	6.0–7.0		Variegated forms may revert to this green form. Similar upright form. Scale a problem. Medium to fast growth rate.
Variegated Japanese Euonymus	*Euonymus japonicus Cultivars*	BE	7–9	F–P	5'–10'	3'–6'	3'–5'	6.0–8.0		'Aureomarginatus' (Gold Spot), leaves gold-margined; 'Aureovariegatus,' leaves with gold center; 'Silver King,' leaves with creamy-white margins; upright form 'Silver Queen,' leaves with creamy-white margins, spreading form. Color better in sun. Upright form and large. Scale a common problem. Medium growth rate.
Manhattan Spreading Euonymus	*Euonymus kiautschovicus 'Manhattan'*	BE	5–8	F–P	4'–6'	4'–6'	4'–6'	6.0–8.0		Foliage and fruit may be poisonous. Scale is a common problem. Tolerant of a wide range of conditions. Medium-fast growth rate.
Japanese Aralia	*Fatsia japonica*	BE	8–10	P–S	6'–10'	6'–10'	5'–8'	6.0–8.0		May not be hardy in Zone 7b north, but may survive most winters. Burns in full sun. Tolerant of salt spray. Good for tropical effect. Medium-fast growth rate.
Large Fothergilla	*Fothergilla major*	D	4–8	F–P	6'–8'	5'–7'	4'–6'	5.5–7.5	X	Related to Witchhazel. Medium growth rate.
Cape Jasmine or Gardenia	*Gardenia jasminoides*	BE	8–10	F–P	4'–6'	4'–6'	3'–5'	5.5–6.0		Can survive most winters in 7b. A popular plant in old gardens in the South. Sensitive to heavy, poorly drained soils. Iron chlorosis in alkaline soils. Several cultivars. Medium growth rate.
Dwarf Burford Chinese Holly	*Ilex cornuta 'Burfordii Nana'*	BE	7–9	F–P	5'–8'	5'–8'	4'–6'	6.0–7.0		Can be pruned to restrict growth. Tolerant of most growing conditions except poorly drained soils. Slow growth rate.
Spreading Chinese Holly	*Ilex cornuta 'Femina Spreading'*	BE	7–9	P	4'–6'	4'–6'	3'–6'	6.0–7.0		Very heavy berry production. Very wide spreading. No pollination needed for berry production. Fruits on old wood. Medium to fast growth rate.

Medium Shrubs — 5–10 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height	Width	Spacing	pH range	Native[3]	Comments
Convexleaf Japanese Holly	*Ilex crenata 'Convexa'*	BE	5–7	F–P	5'–8'	8'–15'	4'–8'	5.0–6.5		May be difficult to transplant, especially in large sizes. Good substitute for boxwood. Fairly tolerant of most conditions. Medium to fast growth rate.
Hetz Japanese Holly	*Ilex crenata 'Hetzii'*	BE	5–7	F–P	6'–8'	8'–15'	4'–8'	5.0–6.5		Taller growing than Heller Japanese Holly. May do best in part shade in hotter areas. Responds to fertilizer. Fruits on new wood. Medium growth rate.
Inkberry	*Ilex glabra*	BE	4–9	F–P	6'–8'	8'–10'	3'–5'	4.0–5.0	X	Clump-forming in nature. Black fruit distinguishes this holly from most native species. Several cultivars available. Medium to fast growth rate.
Common Winterberry	*Ilex verticillata*	D	3–9	F–P	6'–10'	8'–10'	3'–5'	4.0–5.0	X	Native, typically along creeks. Colonial in nature. Red fruit on female only. Both male and female cultivars available. Medium growth rate.
Japanese Anise–Tree	*Illicium anisatum*	BE	7–9	P–S	6'–10'	5'–8'	4'–6'	5.5–6.5		Leaves aromatic with fragrance of anise when crushed. Fast growth rate.
Star Bush	*Illicium floridanum*	BE	7–9	P–S	6'–10'	5'–8'	4'–6'	5.5–6.5	X	Used like Japanese Camellia. Flowers have unpleasant odor. Cannot tolerate heavy shade. Fast growth rate.
Double Flowering Japanese Kerria	*Kerria japonica 'Flora Pleno'*	D	4–9	F–S	3'–6'	6'–9'	5'–8'	5.5–7.5		Best in partial sun. Sun bleaches flowers. Fibrous roots. Sometimes difficult to transplant. Transplanting requires clump of green stems. Better suited to central and north Mississippi. Fast growth rate.
Beautybush	*Kolkwitzia amabilis*	D	4–8	F–P	6'–10'	5'–8'	5'–8'	5.5–7.0		Related to bush honeysuckles. Flowers pink in spring. Fast growth rate.
Semi–dwarf Crapemyrtle	*Lagerstroemia indica and hybrids*	D	7–9	F	5'–10'	5'–10'	5'–8'	5.0–6.0		Very shrubby in 6b. Many cultivars with a range of characteristics like flower color. See Extension Publication 2007 Crapemyrtle: Flower of the South.
Spicebush	*Lindera benzoin*	D	4–9	P–S	6'–12'	6'–12'	5'–10'	5.5–6.5	X	Native, particularly on wet, rich soils. Shiny red fruit in fall, except in yellow-fruited forms. Slow to medium growth rate.
Little Volcano Bush Clover	*Lespedeza liukiuensis 'Little Volcano'*	D	6–9	F	4'–8'	6'–8'	3'–5'	5.5–6.5		New introduction to the U.S.; invasive potential still not fully known. Similar to *L. bicolor* and *L. thunbergii*, but form is more upright and dense. Medium to fast growth rate.
Loropetalum	*Loropetalum chinense*	BE	6–9	F–S	6'–10'	6'–10'	5'–25'	5.5–7.0		Several cultivars. Very attractive when in flower. Should not be used in an open, windswept area. Grows best in part sun to shade. Medium to fast growth rate.
Texas Silverleaf	*Leucophyllum frutescens*	BE	8–10	F	5'–8'	4'–6'	4'–6'	6.5–8.0		Native to Southwest with gray foliage and purple flowers, although other flower colors available. Some compact forms available. Good for hot, dry locations. Slow growth rate.
Chinese Neillia	*Nellia sinensis*	D	5–7	F–S	5'–6'	5'–6'	4'–6'	6.5–7.0		Similar to Spiraea. Deciduous shrub flowering in spring. Needs well-drained soil. Medium growth rate.
Hybrid Mockorange	*Philadelphus x lemoinei*	D	5–8	F–P	4'–6'	3'–5'	3'–5'	6.0–7.0		Several cultivars, some of which are highly fragrant. Slow to medium growth rate.
Common Ninebark	*Physocarpus opulifolius*	D	2–7	F–P	5'–10'	6'–10'	5'–8'	6.0–8.0	X	Native just north of MS and typically found along rocky streams. Purple-leaf (such as 'Diablo') and yellow-leaf (such as 'Dart's Gold') forms available. Medium to fast growth rate.

Medium Shrubs — 5–10 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height	Width	Spacing	pH range	Native[3]	Comments
Dwarf Mugo Pine	*Pinus mugo var. mugo*	NE	3–7	F–P	6'–8'	10'–15'	5'–8'	5.5–6.5		One of few shrub pines available. Often used in oriental designs. Not well adapted to Zone 7b south. Slow growth rate.
Variegated Tobira Pittosporum	*Pittosporum tobira 'Variegata'*	BE	7–10	F–P	6'–8'	8'–10'	5'–8'	6.0–7.5		See Tobira Pittosporum. Variegated foliage gray-green with white markings, but may revert to green form. Other variegated forms available. May need protection in Zone 7. Fast growth rate.
Berckman's Golden Arborvitae	*Platycladus orientalis 'Aurea Nana'*	NE	5–11	F–P	5'–8'	3'–5'	4'–5'	6.0–7.5		Formal shape of plant lends itself to formal gardens. Green branchlets tipped with golden-yellow. Once classified in the genus Thuja. Slow growth rate.
Baker Oriental Arborvitae	*Platycladus orientalis 'Bakeri'*	NE	6–11	F–P	5'–8'	3'–5'	4'–5'	6.0–7.5		Excellent plant for hot, dry locations. Plant shape complements formal landscape designs. Can get larger with age. Once classified as Thuja. Medium growth rate.
Double Flowering Almond	*Prunus glandulosa*	D	4–8	F	4'–5'	3'–4'	3'–5'	5.5–6.5		Very attractive in flower. May be used for cut flowers. Medium growth rate.
Flame Azalea	*Rhododendron calendulaceum*	D	5–7	P–S	4'–8'	4'–8'	3'–6'	4.0–6.0	X	Native to the Apalachian Mountains. Several cultivars. Flowers May to June. Can reach 15 feet with age. Slow to medium growth rate.
Oconee Azalea	*Rhododendron flammeum*	D	6–7	P–S	6'–8'	6'–8'	4'–6'	4.0–6.0	X	Native to the southern Apalachians. Deciduous. A few cultivars with flower colors ranging from yellow, pink, and salmon to orange-red. Flowers in April. Slow to medium growth rate.
Southern Indica Azalea	*Rhododendron indicum*	BE	7–9	F–S	5'–10'	5'–10'	4'–6'	4.0–6.0		Well-drained soil essential. Some selections are 'Elegans' (light pink, very early), 'President Clay' (orange-red, early), 'Brilliant' (rose-pink, early- to midseason), 'Formosa' (rose-lavender, early- to midseason), 'Pride of Mobile' (watermelon-pink, midseason), 'Mrs. G. G. Gerbing' (white). Medium-fast growth rate.
Pinxterbloom Azalea	*Rhododendron periclymenoides*	D	4–8	P–S	4'–6'	4'–6'	3'–5'	4.5–5.5	X	Flowers before foliage (deciduous) appears. Flowers on last year's wood. Native to the east-central U.S. Flowers April to May. Medium growth rate.
Swamp Azalea	*Rhododendron viscosum*	D	4–9	P–S	1'–8'	3'–8'	2'–6'	4.0–5.5	X	Native from the Atlantic to the Gulf Coast. Deciduous. A few cultivars with flower color ranging from yellow to pink and red to white. Flowers mid-May to June. Slow to medium growth rate.
Clove Currant	*Ribes odoratum*	D	3–7	P–S	6'–8'	6'–8'	3'–6'	6.0–7.0	X	Native from Arkansas north and west, so not as tolerant to southern summers. Susceptible to anthracnose. Flowers yellow and fragrant followed by edible fruit. Slow to medium growth rate.
Bristly Locust	*Robinia hispida*	D	5–8	F–P	6'–10'	6'–10'	4'–6'	6.0–7.0	X	Native to Alabama and Georgia to Virginia and Kentucky. A colonial shrub with hispid branches. Flowers showy, pink, pendant. Fast growth rate once established.
Ural Falsespirea	*Sorbaria sorbifolia*	D	2–7	F–P	5'–10'	5'–10'	3'–8'	6.0–7.0		Rather coarse, multistemmed, colonial shrub. Flowers white in rather large panicles, June to July. Fast growth rate.
Double Bridal Wreath Spirea	*Spiraea prunifolia plena*	D	5–8	F–S	4'–9'	6'–8'	3'–5'	6.0–7.0		Flowers appear before leaves. May be used as ground cover along steep banks. Spreads by underground shoots and forms a thicket; can be invasive. Prune out old wood at ground level after flowering. Medium growth rate.
Vanhoutte Spirea	*Spiraea x vanhouttei*	D	3–8	F–P	6'–8'	10'–12'	5'–8'	6.0–7.0		Widely used and very attractive. Very good plant in conjunction with azaleas. Good for city conditions. Flowers better in full sun. Easily transplanted. Prune old wood to ground after flowering in spring. Fast growth rate.

Medium Shrubs — 5–10 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height	Width	Spacing	pH range	Native[3]	Comments
American Snowbell	*Styrax americanus*	D	5–9	F–P	6'–8'	4'–6'	4'–6'	5.5–6.5	X	Native wetland shrub or small tree. Flowers white and showy. Medium growth rate.
Littleleaf Lilac	*Syringa microphylla*	D	4–8	F–P	4'–6'	9'–12'	5'–8'	5.5–6.5		Leaves small; flowers purple, very fragrant. Slow to medium growth rate.
Variegated Japanese Cleyera	*Ternstroemia gymnanthera 'Variegata'*	BE	7–10	P–S	6'–8'	4'–5'	4'–5'	5.5–7.0		Often listed as *Cleyera japonica* 'Variegata' or 'Tricolor.' Older specimens may get much taller. Takes pruning well. Tolerant of dry soils and competition. Medium-fast growth rate.
Globe American Arborvitae	*Thuja occidentalis 'Woodwardii'*	NE	3–7	F	6'–8'	10'–18'	4'–8'	6.0–7.5		Globose in shape. May split apart with age, especially in ice or snow. Slow to medium growth rate.
Arrowwood Viburnum	*Viburnum dentatum*	D	6–8	F–S	6'–10'	6'–10'	4'–6'	5.0–6.0	X	A few cultivars available. Other similar native Viburnums occur in MS. Good for city conditions or seaside. Many shoots originate from the base. Native Americans used this plant for arrow shafts. May be thicket-forming in moist areas. Needs room to develop. Fast growth rate.
Japanese Viburnum	*Viburnum japonicum*	BE	7–9	F–S	6'–8'	6'–8'	3'–4'	5.5–6.5		Does best in part shade. Not widely grown. Sometimes confused with *V. awabuki*. Medium-fast growth rate.
Chinese Snowball Viburnum	*Viburnum macrocephalum*	SE	6–9	F–S	6'–10'	4'–8'	4'–6'	5.5–6.5		Semi-evergreen shrub to small tree. Large snowball-like inflorescences produced in late spring. Medium growth rate.
Weigela	*Weigela florida*	D	5–8	F	6'–9'	9'–12'	5'–8'	5.5–6.5		Does not grow well in coastal areas that are hot and humid. Many cultivars. Popular shrub in old southern gardens. Medium growth rate.
Aloe Yucca	*Yucca aloifolia*	BE	8–11	F–P	6'–8'	4'–6'	3'–5'	5.0–7.0	X	Heat- and drought-tolerant plant. Old plants form large clumps with irregular stems. Leaves are stiff, ending in sharp spines. Not recommended for use near walkways or in yards where young children will play. Medium growth rate.
Moundlily Yucca	*Yucca gloriosa*	BE	6–9	F–P	6'–8'	4'–6'	3'–5'	5.5–7.0	X	Flowers staggered over a long period in mass plantings. One of most manageable of yuccas. Old plantings form multiple stems. Drought tolerant. Medium-slow growth rate.

Large Shrubs — 10 feet or more

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height	Width	Spacing	pH range	Native[3]	Comments
Flame Buckeye	*Aesculus pavia*	D	4–8	F–P	10'–20'	10'–20'	5′–8′	6.0–7.0	X	Fruit is poisonous to livestock and humans. New growth is coppery in color. Not easily transplanted. Flowers are red. Can grow to be a small tree. Fast growth rate.
Bottlebrush Buckeye	*Aesculus parviflora*	D	4–8	F–P	8'–12'	8'–15'	8'–15'	6.0–7.0	X	Spreading colonial shrub.
Tag Alder	*Alnus serrulata*	D	5–9	F–P	6'–20'	6'–20'	6'–10'	5.5–7.0	X	Has catkins in spring followed by dark green foliage through summer. Tolerant of very wet soils. Medium growth rate.
Indigobush Amorpha	*Amorpha fruticosa*	D	4–9	F–P	6'–20'	5'–15'	6'–10'	5.5–7.0	X	Fine-textured compound leaves. Deep purple blooms, although white and blue forms exist. Tolerant of poor, wet soils. Can be weedy on the landscape.
Eastern Baccharis	*Baccharis halimifolia*	SE	5–9	F	10'–12'	6'–10'	7′–10′	7.0–8.0	X	Can thrive in brackish water. Good for poorly drained soils, but can be invasive. Dioecious; males do not produce the silver or white color in fall. Medium to fast growth rate.
Hollygreen Barberry	*Berberis pruinosa*	BE	6–9	F–P	8'–10'	8'–10'	5′–7′	6.0–8.0		Taller and more vigorous than Wintergreen Barberry. Less hardy than other barberries. Flowers on old wood. Medium growth rate.
Alternate–leaf Butterfly–bush	*Buddleia alternifolia*	SE	5–7	F	10'–20'	6'–12'	5'–6'	7.0–8.0		Willow-like texture with grayish color. Prefers well-drained soils. Growth rate is fast from established plants.
Common Boxwood	*Buxus sempervirens*	BE	5–6	F–P	15'–20'	10'–15'	3′–4′	6.0–7.5		Good for hedging. Some cultivars adapted to Zone 8, and author has seen old shrubs in 7b. Grows equally well in alkaline or acid soils. Larger than Littleleaf Boxwood. Old specimens may reach 30 feet. Many cultivars. Medium growth rate.
Scarlet Bottlebrush	*Callistemon citrinus*	BE	8–11	F	10'–15'	10'–15'	5'–8'	6.0–7.5		May be killed by severe winters. Red flower clusters in form of a bottle brush. Tolerant of salt spray. Can withstand drought. Medium to fast growth rate.
Stiff Bottlebrush	*Callistemon rigidus*	BE	9–11	F	8'–10'	8'–10'	4'–8'	6.0–7.0		May be killed by severe winters. Red flower clusters in form of a bottle brush. Tolerant of salt spray. Can withstand drought. Medium growth rate.
Alpine Bottlebrush	*Callistemon sieberi*	BE	7–9	F	6'–10'	6'–10'	4'–8'	6.0–7.0		Light yellow flower clusters in form of a bottle brush. Can withstand drought. Medium growth rate.
Japanese Camellia	*Camellia japonica*	BE	7–9	F–S	10'–15'	6'–10'	4′–6′	4.5–5.5		Provide protection from sun in middle of day. Compact in full sun; more open with more shade. Many selections available. Medium-slow growth rate.
Sasanqua Camellia	*Camellia sasanqua*	BE	6–9	P–S	6'–10'	5'–8'	4′–6′	4.5–6.5		Prefers less acid soil than Japanese Camellia. More cold-hardy. Flowers and foliage burn in full sun. Plant shallow where drainage is poor. Medium growth rate.
Japanese Plum Yew	*Cephalotaxus harringtonia*	NE	6–9	F–S	5'–20'	5'–20'	3'–10'	6.5–7.0		Several cultivars available from dwarf to fastigiate (columnar). Slow growth rate.
Chinese Plum Yew	*Cephalotaxus fortunei*	NE	7–9	F–S	15'–20'	8'–15'	5'–10'	6.5–7.0		Not as common as Japanese Plum Yew in cultivation. Slow growth rate.
Chinese Redbud	*Cercis chinensis*	D	6–9	F–P	8'–10'	6'–8'	5′–8′	5.5–7.5		Flowers more intense in color. Smaller than Eastern Redbud. Shrub-like for several years. Hard to transplant as mature tree. Medium growth rate.
Blue Falsecypress	*Chamaecyparis pisifera 'Boulevard'*	NE	5–8	F	15'–20'	10'–15'	3′–5′	6.0–7.0		May develop to adult foliage and become much taller. Very attractive but not widely grown. Slow growth rate.

Large Shrubs — 10 feet or more

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height	Width	Spacing	pH range	Native[3]	Comments
Sawara Falsecypress	*Chamaecyparis pisifera 'Filifera'*	NE	4–8	F	15'–20'	10'–15'	10'–15'	6.0–7.0		Fine textured, weeping form. Good for accenting. Can grow to be a 50-foot tree. Susceptible to juniper blight. Medium growth rate.
Sawara Falsecypress	*Chamaecyparis pisifera 'Filifera Aurea'*	NE	4–8	F	15'–20'	10'–15'	10'–15'	6.0–7.0		Fine textured, weeping form with yellow foliage. Good for accenting. Can grow to be a 20-foot tree. Susceptible to juniper blight. Medium growth rate.
Fragrant Wintersweet	*Chimonanthus praecox*	D	6–9	F–S	10'–15'	8'–12'	6'–10'	6.0–7.0		Flowers yellow, fragrant. Some cultivars developed. Slow growth rate.
Chinese Fringetree	*Chionanthus retusus*	D	6–8	F–P	15'–25'	15'–20'	15'–20'	6.0–7.0		Similar to White Fringetree, but shorter petals and probably less showy. Can grow to be a small tree. Slow growth rate.
White Fringetree	*Chionanthus virginicus*	D	4–9	F–P	25'–30'	25'–30'	20'–25'	6.0–7.0	X	Also known as Grancy Gray-beard. Popular shrub or small tree with age. Male and female trees. Slow growth rate.
Japanese Clethra	*Clethra barbinervis*	D	5–7	F–P	10'–20'	8'–15'	5'–10'	5.5–7.0		Produces white racemes of slightly fragrant blooms in summer. May grow to a small tree with age. Slow to medium growth rate.
Buckwheat–tree	*Cliftonia monophylla*	BE	7–9	F–P	6'–12'	4'–10'	3'–8'	5.5–7.0	X	White or pink flowers in racemes. Wetland shrub; may grow to a tree with age. Medium growth rate.
Silky Dogwood	*Cornus amomum*	D	4–8	F–P	6'–10'	6'–10'	4'–8'	5.5–7.0	X	Small, white flowers in clusters followed by dark bluish fruit. Wetland shrub or small tree in the wild. Medium to fast growth rate.
Drummond's Dogwood	*Cornus drummondii*	D	4–9	F–P	20'–25'	10'–20'	10'–20'	5.5–7.0	X	Similar to Silky Dogwood, except fruit are white. Suckers profusely and can be aggressive. Growth rate is slow, but shoots are fast.
Swamp Dogwood	*Cornus foemina*	D	6–9	F–P	20'–25'	10'–20'	10'–20'	5.5–7.0	X	Very similar to Silky Dogwood, except larger. Wetland shrub or small tree in the wild. Medium to fast growth rate.
Gray Dogwood	*Cornus racemosa*	D	3–8	F–P	10'–15'	10'–15'	10'–15'	5.5–7.0	X	Similar to Drummond's Dogwood, except fruit are white to bluish-white and inflorescence more paniculate. Suckers profusely and can be aggressive. Growth rate is slow, but shoots are fast.
Bloodtwig Dogwood	*Cornus sanguinea*	D	4–8	F–P	6'–15'	6'–15'	5'–7'	5.5–7.0		Red stems showy in winter, but needs pruning. Several cultivars available. Growth rate is slow to medium, but fast for suckers.
Fragrant Winterhazel	*Corylopsis glabrescens*	D	5–8	F–P	8'–15'	8'–15'	6'–10'	5.5–7.0		Flowers fragrant. Related to Witchhazel. Can be grown as a small tree. Slow to medium growth rate.
American Filbert	*Corylus americana*	D	4–9	F–P	8'–15'	6'–10'	6'–8'	5.5–7.0	X	Produces catkins in spring. Fruit (nut) edible. Often colonial. Medium to fast growth rate.
European Filbert	*Corylus avellana*	D	4–8	F–P	12'–20'	10'–15'	10'–15'	5.5–7.0		Similar to American Filbert. Can grow to be a small tree. Several cultivars, including the common 'Contorta' or Harry Lauder's Walkingstick. Medium to fast growth rate.
Common Smoketree	*Cotinus coggygria*	D	5–8	F	10'–15'	10'–15'	10'–15'	5.5–7.0		Most forms are purple. Several cultivars available. Medium growth rate.
American Smoketree	*Cotinus obovatus*	D	4–8	F–S	20'–30'	20'–30'	20'–30'	6.0–8.0	X	Also called Chittamwood. Grows on high-pH soils or rock in the wild. Can become a small tree with age. Slow to medium growth rate.
Willowleaf Cotoneaster	*Cotoneaster salicifolius*	BE	6–7	F	10'–15'	8'–12'	6'–10'	6.0–7.0		White flowers in spring followed by red fruit in fall persisting into winter. Medium growth rate.

Large Shrubs — 10 feet or more

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height	Width	Spacing	pH range	Native[3]	Comments
Swamp Cyrilla	*Cyrilla racemiflora*	SE	6–11	F–P	10'–15'	10'–15'	8'–12'	5.5–7.0	X	White flowers in tassels. Wetland plant in the wild. Eventually a small tree. Medium growth rate.
Isu Tree	*Distylium racemosum*	BE	6–9	P	7'–10'	7'–10'	7'–10'	5.5–6.0		Produces reddish-maroon flowers in spring. Will eventually be a small tree. Medium growth rate.
Common Pearlbush	*Exochorda racemosa*	D	4–8	F–P	10'–15'	10'–15'	5'–8'	5.5–6.0		Somewhat difficult to transplant. Requires little pruning. Profusion of white flowers in spring. Can be grown as a small tree. Medium growth rate.
Pineapple Guava	*Feijoa sellowiana*	BE	8–10	F–S	10'–15'	8'–10'	5'–8'	6.0–7.5		Tolerant of salt spray. Very intolerant of poorly drained soils. Several cultivars listed but hard to find in the trade. Medium growth rate.
Common Fig	*Ficus carica*	D	7–10	F–P	10'–15'	10'–15'	10'–15'	5.5–7.5		'Mission,' 'Celeste,' 'Brown Turkey,' and 'Magnolia' often grown for home fruit production. Selective pruning keeps plant in bounds. Medium to fast growth rate.
Fortune Fontanesia	*Fontanesia fortunei*	D	4–8	F–P	12'–15'	12'–15'	10'–15'	5.5–7.0		Fine-textured large shrub or small tree (can grow to more than 30 feet). Medium to fast growth rate.
Border Forsythia	*Forsythia x intermedia*	D	5–8	F–P	8'–10'	10'–12'	5'–8'	6.0–7.5		Has profusion of yellow flowers in early spring. Many cultivars. 'Lynwood Gold' flowers are more open than standard form and heavily distributed along stem. Best where winters are cold. Thin out old wood immediately after flowering. Medium to fast growth rate.
Franklin Tree	*Franklinia alatamaha*	D	5–9	F–P	10'–20'	6'–15'	5'–10'	5.5–7.0	X	Once native, but original site never relocated. Related to *Camellia*. Can be grown as a small tree. Susceptible to root rot. Medium growth rate.
Loblolly–bay	*Gordonia lasianthus*	BE	7–9	F–P	30'–40'	15'–20'	15'–20'	5.5–7.0	X	Related to *Camellia*. In wild grows on wet sites. Shrub small, but will eventually be a tree. Medium growth rate.
Vernal Witchhazel	*Hamamelis vernalis*	D	4–8	F–P	6'–10'	6'–10'	6'–10'	5.5–7.0	X	Native woodland or creek margin shrub or small tree. Several cultivars available. Medium growth rate.
Common Witchhazel	*Hamamelis virginiana*	D	4–8	F–P	20'–30'	20'–25'	15'–20'	5.5–7.0	X	Native woodland or creek margin shrub or small tree. Medium growth rate.
Seven–son Flower	*Heptacodium miconioides*	D	5–8	F–P	15'–20'	8'–15'	5'–15'	5.5–7.0		Flowers creamy white and fragrant; related to honeysuckle. Medium growth rate.
Rose of Sharon or Shrub Althea	*Hibiscus syriacus*	D	5–8	F	8'–12'	6'–10'	4'–6'	6.0–7.5		Remove buds to increase flower size. Flowers when few other plants are flowering. Many varieties available. Fast growth rate.
Common Seabuckthorn	*Hippophae rhamnoides*	SE	3–7	F–P	12'–30'	10'–40'	10'–20'	6.0–7.5		Grayish, fine-textured foliage. Essentially dioecious, so plant male and female plants for edible fruit. Better on sandy, poor soil. Medium growth rate.
Panicle Hydrangea	*Hydrangea paniculata*	D	3–8	F	10'–20'	10'–20'	6'–8'	6.0–7.0		Several improved cultivars available. Can be grown as a small tree. Fast growth rate.
Foster's No. 2 Holly	*Ilex x attenuata 'Foster #2'*	BE	6–9	F–P	~25'	~15'	5'–7.5'	5.0–6.0		Hybrid between American Holly and Dahoon Holly. Leaves more narrow than American Holly. More tolerant of adverse conditions than American Holly. Medium to fast growth rate.
Dahoon Holly	*Ilex cassine*	BE	7–9	F–P	20'–30'	8'–15'	8'–12'	5.0–6.0	X	Reported to grow in wet, boggy soils. Leaf color similar to American Holly. Slightly tolerant of salt spray. Often multi-stemmed, but will become a tree. Medium growth rate.

Large Shrubs — 10 feet or more

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height	Width	Spacing	pH range	Native[3]	Comments
Burford Chinese Holly	*Ilex cornuta 'Burfordii'*	BE	7–9	F–P	20'–25'	20'–25'	7'–10'	6.0–7.0		Much variation in seedlings. With time will become a small tree, 25–30 feet tall and wide. Medium to fast growth rate.
Needlepoint Chinese Holly	*Ilex cornuta 'Needlepoint'*	BE	7–9	F–P	10'–15'	8'–10'	5'–7'	6.0–7.0		Same as 'Anicet Delcambre.' Single point on leaf tip. Medium to fast growth rate.
Bigleaf Japanese Holly	*Ilex crenata 'Rotundifolia'*	BE	6–7	F–P	8'–12'	8'–12'	4'–8'	5.0–6.5		Best if sheared regularly. Substitute for boxwood. Foliage burn in hot, dry soils. May be best in part sun. Fruits on new wood. Medium-fast growth rate.
Possumhaw	*Ilex decidua*	D	5–9	F–P	7'–15'	5'–12'	5'–8'	5.0–6.5	X	Birds reported to prefer red berries over orange ones. May be found in fence rows near open fields. Fruit not showy until after frost. Medium growth rate.
Nellie R. Stevens Holly	*Ilex 'Nellie R. Stevens'*	BE	6–9	F–P	15'–25'	10'–15'	5'–7.5'	6.0–6.0		Hybrid between English and Chinese holly. Female clone. Large leaves. Medium-fast growth rate.
Yaupon Holly	*Ilex vomitoria*	BE	7–10	F–S	15'–20'	10'–15'	5'–8'	5.0–8.0	X	Highly desirable native shrub. Dioecious. May be "poodled" or espaliered. Yellow fruit form available. Fruits on 2-year-old wood. 'Pendula' is a weeping form. Medium to fast growth rate.
Small Anise–Tree	*Illicium parviflorum*	BE	6–9	P–S	15'–20'	12'–18'	8'–10'	5.5–6.5	X	Native to Georgia and Florida. Flowers small, yellowish. Cannot tolerate heavy shade. Fast growth rate.
Blue Column Juniper	*Juniperus chinensis 'Columnaris Glauca'*	NE	4–9	F	~24'	~10'	2'–3'	6.0–8.0		All leaves are juvenile (sharp-pointed). Medium growth rate.
Hetz Chinese Juniper	*Juniperus chinensis 'Hetzii'*	NE	4–9	F	~15	~15	10'–15'	6.0–8.0		Similar to 'Pfitzeriana.' Medium to fast growth rate.
Hollywood Juniper	*Juniperus chinensis 'Kaizuka'*	NE	4–9	F	20'–30'	5'–6'	5'–8'	6.0–8.0		Sometimes listed as 'Torulosa.' Twisted, contorted growth form. Medium to fast growth rate.
Variegated Hollywood Juniper	*Juniperus chinensis 'Kaizuka Variegated'*	NE	4–9	F	20'–30'	5'–6'	5'–8'	6.0–8.0		Does not grow as tall or as fast as regular Hollywood juniper. Medium to fast growth rate.
Blue Haven Juniper	*Juniperus scopulorum 'Blue Haven'*	NE	4–7	F	~20	~6'	8'–12'	5.5–7.0		Sometimes sold as 'Blue Heaven.' Extremely durable plant for dry locations when larger plant is needed. Maintains blue color throughout the year. Medium-fast growth rate.
Gray Gleam Juniper	*Juniperus scopulorum 'Gray Gleam'*	NE	4–7	F	15'–20'	5'–7'	8'–12'	6.0–8.0		Upright form with good gray-green to blue-gray foliage. Medium-fast growth rate.
Weeping Rocky Mountain Juniper	*Juniperus scopulorum 'Pendula'*	NE	4–7	F	~20'	8'–12'	5'–8'	6.0–8.0		Usually planted as a specimen. A spectacular weeping or drooping form with branching characteristic. May need staking when first planted. Medium growth rate.
Skyrocket Rocky Mountain Juniper	*Juniperus scopulorum 'Skyrocket'*	NE	4–7	F	~20'	~3'	5'–8'	6.0–8.0		Usually planted as a specimen. A spectacular weeping or drooping form with branching characteristic. May need staking when first planted. Medium growth rate.
Wichita Blue Rocky Mountain Juniper	*Juniperus scopulorum 'Wichita Blue'*	NE	4–7	F	~20'	5'–8'	5'–8'	6.0–8.0		Pyramidal form with bright blue foliage. Medium growth rate.
Canaerti Eastern Redcedar	*Juniperus virginiana 'Canaertii'*	NE	4–9	F	~25	5'–8'	5'–8'	6.0–8.0	X	Compact pyramidal form of native Eastern redcedar. Could be considered a tree. Medium growth rate.

Large Shrubs — 10 feet or more

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height	Width	Spacing	pH range	Native[3]	Comments
Mountain Laurel	*Kalmia latifolia*	BE	4–9	P–S	7'–15'	7'–15'	5'–8'	4.5–6.0	X	Can get much larger. Many cultivars, but not easily found in Southern nurseries. Magnificent display of color in spring. Almost impossible to transplant from native stands. Slow growth rate.
Intermediate Crapemyrtle	*Lagerstroemia indica and hybrids*	D	7–9	F	13'–20'	8'–15'	6'–9'	5.0–6.0		Very shrubby in 6b. Many cultivars with a range of characteristics like flower color. See Extension Publication 2007 Crapemyrtle: Flower of the South.
Tall Crapemyrtle	*Lagerstroemia indica and hybrids*	D	7–9	F	~20'	8'–15'	10'–20'	5.0–6.0		Very shrubby in 6b. Many cultivars with a range of characteristics like flower color. See Extension Publication 2007 Crapemyrtle: Flower of the South.
Vicary Golden Privet	*Ligustrum x vicaryi*	BE	5–9	F–P	10'–12'	10'–12'	5'–6'	6.0–7.0		Grown for its golden-yellow foliage that is present throughout the growing season. Medium growth rate.
Star Magnolia	*Magnolia stellata*	D	4–8	F–P	~10	~8'	4'–6'	5.0–6.0		Usually flowers before other shrubs in spring. May flower in midwinter in warm areas. Flowers subject to late freeze damage or freeze after winter warm spell. Medium-slow growth rate.
Hybrid Mahonia	*Mahonia x media*	BE	7–9	P–S	8'–15'	3'–5'	3'–5'	6.0–7.0		Hybrid between *M. japonica* and *M. lomariifolia*. A few cultivars available. Slow growth rate.
Weeping White Mulberry	*Morus alba 'Pendula'*	D	4–9	F–P	15'–20'	15'–20'	10'–15'	5.5–7.0		Grafted onto White Mulberry under-stock, which probably makes this more tree than shrub. Height varies depending on the height of graft union. Striking appearance. Medium to fast growth rate.
Southern Waxmyrtle	*Myrica cerifera*	BE	7–11	F–P	10'–15'	10'–15'	10'–15'	4.0–6.0	X	Early settlers boiled leaves and fruit to get wax that they used to make bayberry candles. Not particularly long-lived. Very tolerant of most growing conditions. Greatest success comes in transplanting smaller plants. Easily transplanted in the 3–4-foot height range. Fast growth rate.
Oleander	*Nerium oleander*	BE	8–11	F–P	6'–20'	6'–20'	7'–10'	6.0–7.5		All plant parts poisonous. Smoke from burning plant parts is also poisonous. Withstands temperatures at least to 24 °F. Endures heat, glare, poor, dry, alkaline, sandy soils. Many improved selections, including dwarfs. Generally, cold tolerance increases as flower color darkens. Medium-fast growth rate.
Devilwood	*Osmanthus americanus*	BE	6–9	F–P	15'–25'	10'–20'	8'–15'	5.5–7.0	X	Native to the Coastal Plain. Flowers similar to other *Osmanthus* species. Slow to medium growth rate.
Hollyleaf Osmanthus	*Osmanthus x fortunei*	BE	7–9	F–P	15'–20'	15'–20'	10'–15'	5.5–7.0		Popular plant in old Southern gardens. Fragrance not as strong nor flower period as long as Sweet Olive. Slow growth rate.
Sweet Olive	*Osmanthus fragrans*	BE	7–10	F–P	20'–30'	20'–30'	10'–15'	5.5–7.0		Flower initiation induced by sudden changes in temperature and moisture. A long-lived shrub. Old plants may reach 25 feet tall and 12–15 feet wide. Good drainage essential. Slow growth rate.
Sweet Olive	*Osmanthus heterophyllus*	BE	7–9	F–P	10'–20'	8'–15'	8'–15'	5.5–7.0		Flower initiation induced by sudden changes in temperature and moisture. A long-lived shrub. Old plants may reach 24 feet tall and 12–15 feet wide. Good drainage essential. Slow to medium growth rate.
Odorless Mockorange	*Philadelphus inodorus*	D	5–9	F	~10'	8'–10'	6'–8'	6.0–8.0	X	Native on higher pH soils. Excellent deciduous shrub for South. Prune out old, non-flowering wood after flowering. Medium growth rate.

Large Shrubs — 10 feet or more

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height	Width	Spacing	pH range	Native[3]	Comments
Fraser Photinia	*Photinia x fraseri*	BE	7–9	F–P	10'–15'	10'–15'	6'–12'	6.0–7.0		New growth very showy with coppery-red color. Prone to fire blight and other diseases, so relatively short lived. Will grow in shade, but foliage not as dense. Plant is a cross between Chinese Photinia and Japanese Photinia. Medium to fast growth rate.
Japanese Photinia	*Photinia glabra*	BE	7–9	F–P	10'–12'	8'–10'	5'–8'	6.0–7.0		Red leaf color best in full sun. Takes pruning well. Sometimes called Red Top or Red Tip. Loose, well-drained soil essential for good growth. Magnesium deficiency may be a problem. Medium growth rate.
Chinese Photinia	*Photinia serratifolia (serrulata)*	BE	6–9	F–P	20'–25'	15'–20'	10'–15'	6.0–7.0		Can be invasive. Becomes leggy with old age. New growth coppery colored. Very intolerant of poorly drained soils. Medium growth rate.
Japanese Pieris	*Pieris japonica*	BE	5–7	F–S	9'–12'	6'–8'	3'–4'	5.5–6.5		Many cultivars, with flowers ranging in color from white to reddish. Compact forms also availble. Slow growth rate.
Mock Orange, Tobira Pittosporum	*Pittosporum tobira*	BE	7–10	F–P	10'–12'	15'–20'	10'–12'	6.0–7.5		Lemon-scented foliage. Several cultivars, including variegated leaf forms. Withstands heat and drought, but not recommended for zone without protection. Possible winter damage every 10 years or so. Medium growth rate.
Oriental Arborvitae	*Platycladus orientalis*	NE	6–11	F–P	18'–25'	10'–15'	6'–10'	6.0–7.5		Branches more vertical than regular arborvitae. Many varieties in the industry. Plant shape complements formal landscape designs. Fast growth rate.
Southern Yew	*Podocarpus macrophyllus 'Maki'*	NE	7–10	F–P	20'–35'	10'–20'	4'–6'	5.5–7.0		Can be sheared and shaped easily. Dioecious. Widely used on the coast. May need protection in Zone 7. Medium to fast growth rate.
Chickasaw Plum	*Prunus angustifolia*	D	5–9	F	15'–25'	15'–25'	4'–6'	5.5–7.0	X	Thicket-forming and ideal for roadside slopes. Often recommended for naturalistic plantings. Medium growth rate.
Carolina Cherrylaurel	*Prunus caroliniana*	BE	7–10	F–P	20'–30'	15'–25'	15'–20'	5.5–7.0	X	Typically a small tree, but compact forms may grow as large shrubs. Fruit and seedlings can cause problems in landscape. Medium to fast growth rate.
Common Cherrylaurel	*Prunus laurocerasus*	BE	6–8	F–P	10'–18'	8'–15'	4'–10'	5.5–7.0		A few cultivars including dwarf forms. Flowers whittish in racemes. Medium growth rate.
Flowering Pomegranate	*Punica granatum*	SE	7–10	F–P	12'–20'	12'–20'	7'–10'	5.5–7.0		Popular shrub of the old South. There are many double-flowered and non-fruiting forms. May need protection in Zone 7. Medium to fast growth rate.
Wafer–ash	*Ptelea trifoliata*	D	3–9	F–S	15'–20'	15'–20'	5'–10'	5.5–7.0	X	Not common commercially and usually small understory shrub or tree in woods. Related to *Citrus*. Slow to medium growth rate.
Formosa Firethorn	*Pyracantha koidzumi*	SE	8–10	F–P	8'–12'	8'–12'	7'–10'	6.0–8.0		Difficult to transplant as a large specimen. Excellent for espalier. Berries produced on 2nd year's wood, so prune in spring after berries have shed and before new growth begins. Seed viable and can be invasive. Medium-fast growth rate.
Florida Azalea	*Rhododendron austrinum*	D	7–9	P–S	8'–10'	8'–10'	4'–8'	4.0–6.0	X	Native to the coastal plain. Deciduous. Several cultivars, mostly yellow to orange flowers. Flowers April to May, fragrant. Slow to medium growth rate.
Piedmont Azalea	*Rhododendron canescens*	D	5–9	P–S	10'–15'	8'–12'	5'–10'	4.0–6.0	X	Native to the Southeast. Deciduous. Flowers typically pink, fragrant, March to April. Slow to medium growth rate.
Exbury/Knap Hill Azaleas	*Rhododendron hybrids*	D	5–8	P–S	8'–12'	6'–8'	4'–6'	4.0–6.0		Many hybrids involving several native species. Deciduous. Many colors. 'Gibraltar' (flame-orange) is one example. Slow to medium growth rate.

Large Shrubs — 10 feet or more

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height	Width	Spacing	pH range	Native[3]	Comments
Plumleaf Azalea	*Rhododendron prunifolium*	D	5–8	P–S	8'–10'	6'–8'	5'–8'	4.0–6.0	X	Native to Alabama and Georgia. Deciduous. A few hybrids with flower color ranging from orange to red and pink. Flowers July to August. Slow to medium growth rate.
Flameleaf Sumac	*Rhus copallina*	D	4–9	F–P	20'–30'	20'–30'	7'–10'	5.5–7.0	X	Suckers freely forming a large colony. One of the earliest woody plants to appear on cleared land. Medium growth rate.
Smooth Sumac	*Rhus glabra*	D	3–9	F–P	10'–15'	10'–15'	6'–10'	5.0–6.0	X	Suckers freely forming large clumps. Withstands wide range of growing conditions. Tolerant of city conditions. Medium-fast growth rate.
Lady Banks' Rose	*Rosa banksiae*	SE	7–8	F–P	15'–20'	15'–20'	5'–20'	6.0–7.0		Climbing, thornless rose native to China. Flowers March to April. Color forms range from yellow to white. Medium to fast growth rate.
Memorial Rose	*Rosa wichuraiana*	SE	5–8	F	8'–16'	8'–16'	4'–10'	6.0–7.0		Rambler and can be invasive. Sometimes found escaped on road banks. Several cultivars. Fast growth rate.
Pussy Willow	*Salix caprea*	D	4–8	F–P	15'–25'	12'–15'	5'–8'	6.5–8.0		Similar to S. discolor, but S. discolor is susceptible to canker. Female catkins are similar to a cat's paws. Can be grown as a small tree. Fast growth rate.
Common Elderberry	*Sambucus nigra*	D	4–9	F–P	5'–12'	5'–10'	3'–5'	6.0–8.0	X	Variety *canadensis* is native and variety nigra is not. Fruit of this species has been used to make elderberry wine. Fruit attracts birds to the landscape. Spreads by stolons. May become a pest. Some variable leaf cultivars available. Fast growth rate.
American Bladdernut	*Staphylea trifolia*	D	4–8	F–S	10'–15'	8'–12'	6'–8'	6.0–7.0	X	Rare in Mississippi. Good along creeks. Produces bladder-like fruit that float on water. Colonial in habit. Medium to fast growth rate.
Bigleaf Snowbell	*Styrax grandiflorus*	D	7–9	F–S	8'–15'	6'–12'	4'–6'	5.5–6.5	X	Native woodland understory shrub or small tree. Flowers white, showy in spring. Slow to medium growth rate.
Common Lilac	*Syringa vulgaris*	D	3–7	F–P	8'–15'	6'–12'	5'–8'	6.0–7.5		Marginal plant for Zone 7b. Not recommended for Zone 8 and south. Needs adequate cold for good flower production. Several forms available with white, pink, blue, and purple flowers. Medium growth rate.
Japanese Cleyera	*Ternstroemia gymnanthera*	BE	7–10	P–S	8'–10'	5'–6'	5'–6'	5.5–7.0		Often listed as *Cleyera japonica*. Older specimens may get much taller. Takes pruning well. Tolerant of dry soils and competition. Several cultivars available. Medium-fast growth rate.
Pyramidal Arborvitae	*Thuja occidentalis 'Pyramidalis'*	NE	3–7	F–P	20'–30'	5'–8'	4'–6'	6.0–7.5		Many other cultivars available. Well-drained soils essential for good growth. Seems to do well in most other soils. Plant shape complements formal landscape designs. Fast growth rate.
Sparkleberry	*Vaccinium arboreum*	SE	7–9	F–S	15'–20'	15'–20'	6'–10'	5.5–6.5	X	Native, sometimes evergreen, colonial, understory shrub to small tree. Interesting bark. Fruit black, small, not as edible as other Vaccinium. Slow to medium growth rate.
Rabbiteye Blueberry	*Vaccinum ashei*	SE	7–9	F	8'–9'	8'–9'	4'–6'	4.5–5.5	X	Do not plant in soils that have been limed. Add half-bushel peat moss to each planting hole. Do not fertilize the first year. For varieties see Extension Publication 3801 Fruit and Nut Review: Blueberries. Medium to fast growth rate.
Highbush Blueberry	*Vaccinium corymbosum*	SE	3–7	F–S	6'–12'	8'–12'	4'–8'	5.5–6.5	X	Do not plant in soils that have been limed. Add half-bushel peat moss to each planting hole. Do not fertilize the first year. For varieties see Extension Publication 3801 Fruit and Nut Review: Blueberries. Slow growth rate.
Elliott Blueberry	*Vaccinium elliottii*	SE	6–9	F–S	6'–12'	6'–12'	4'–8'	5.5–6.5	X	Native evergreen species that bears fruit very early. Usually occurs on low ground. Slow growth rate.

Large Shrubs — 10 feet or more

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height	Width	Spacing	pH range	Native[3]	Comments
Awabuki Viburnum	*Viburnum awabuki*	BE	7–9	F–S	15'–20'	12'–15'	8'–10'	5.5–6.5		Evergreen and extremely dense in full sun. Good for screening in shade. Medium to fast growth rate.
Burkwood Viburnum	*Viburnum x burkwoodii*	BE	5–8	F–P	8'–10'	6'–8'	3′–5′	5.5–6.5		Flowers have fragrance of gardenia. Medium growth rate.
Linden Viburnum	*Viburnum dilatatum*	D	5–7	F–P	8'–10'	6'–8'	5′–8′	6.5–7.5		Seed viable and can be invasive. Several cultivars. Attractive when in flower in spring. Medium to fast growth rate.
Small Viburnum	*Viburnum obovatum*	SE	6–9	F–P	12'–20'	12'–20'	6'–12'	6.5–8.0	X	Native to the Southeast. Usually evergreen. Some compact forms available. Medium to fast growth rate.
Sweet Viburnum	*Viburnum odoratissimum*	BE	7–10	F	10'–20'	10'–20'	6'–10'	6.5–7.5		Very dense evergreen with smooth leaves. May be confused with other similar Viburnums. Medium to fast growth rate.
European Snowball Viburnum	*Viburnum opulus 'Sterile'*	D	3–8	F–P	8'–12'	8'–12'	5′–8′	6.5–7.5		Flowers are sterile. Good for city conditions. Attractive when in flower. Flowers occur on new wood. Medium to fast growth rate.
Doublefile Viburnum	*Viburnum plicatum var. tomentosum*	D	4–8	F–S	8'–10'	9'–12'	5′–8′	6.5–7.5		Outer flowers in cluster are sterile. Easy to transplant. Can be invasive. Does well in part shade. Several cultivars. Medium growth rate.
Leatherleaf Viburnum	*Viburnum rhytidophyllum*	BE	5–7	F–P	10'–15'	10'–15'	5′–8′	6.0–7.0		Drooping foliage causes the plant to look wilted. Tolerates shade where other shrubs fail. Should be used sparingly. One of the most cold-hardy viburnums. Medium-slow growth rate.
Sandankwa Viburnum	*Viburnum suspensum*	BE	8–11	F–P	6'–12'	6'–12'	3′–5′	6.0–8.0		Zone 7 with protection. Does best in partial shade in summer. Medium growth rate.
Laurestinus Viburnum	*Viburnum tinus*	BE	8–10	F–S	6'–12'	6'–12'	4′–8′	6.0–8.0		Flowers may have unpleasant odor. Grows best on poor soils, but they must be well-drained. Warm spell during winter may cause flowers to open. Variegated cultivar available. Medium growth rate.
American Cranberrybush Viburnum	*Viburnum trilobum*	D	2–7	F–P	8'–12'	8'–12'	4'–6'	5.0–7.0		Native to northern U.S. and Canada. Not well adapted to heat. Fruit edible. Medium growth rate.
Lilac Chastetree	*Vitex agnus–castus*	D	6–9	F–P	15'–20'	15'–20'	10′–15′	6.0–7.0		Often pruned into a single or multitrunked tree. Has escaped cultivation in some places. Popular plant in old gardens. Foliage has pungent odor when crushed. Medium-fast growth rate.
Chastetree	*Vitex negundo*	D	6–8	F–P	10'–15'	10'–15'	8'–15'	6.0–7.0		Often pruned into a single or multitrunked tree. Has escaped cultivation in some places. Some cutleaf forms available. Medium-fast growth rate.

[1]Foliage: Broadleaf Evergreen; D = Deciduous; NE = Needled Evergreen; SE = Semibroadleaf Evergreen; and V = Variable.

[2]Light: F = Full Sun; P = Part Sun to Part Shade; and S = Shade.

[3]Native: Refers to species that are native to the southeastern United States.

TABLE 2. Invasive landscape plants and suggested alternatives for each.

Common Name	Scientific Name	Suggested Substitutes*
Japanese Barberry	*Berberis thunbergii*	*Viburnum obovatum* or similar selections from Table 1.
Russian-olive	*Elaeagnus angustifolia*	Not well adapted to SE, *Leucophyllum frutescens* for gray foliage or refer to Table 1 for other plant selections.
Thorny Elaeagnus	*Elaeagnus pungens*	*Osmanthus* spp., *Viburnum* spp., or other similar BE from Table 1.
Autumn Elaeagnus	*Elaeagnus umbellata*	*Osmanthus* spp., *Viburnum* spp., or other similar BE from Table 1.
Dwarf Winged Euonymus	*Euonymus alatus 'Compactus'*	*Viburnum obovatum*, *Loropetalum*, or other similar SE or D species from Table 1.
Shrub Bush Clover	*Lespedeza bicolor*	*Lespedeza liukiuensis*, though new to U.S. and invasive potential not fully known.
Thunberg Lespedeza	*Lespedeza thunbergii*	*Lespedeza liukiuensis*, though new to U.S. and invasive potential not fully known.
Amur Privet	*Ligustrum amurense*	Yaupon Holly, Southern Waxmyrtle, or similar BE from Table 1.
Japanese Privet	*Ligustrum japonicum*	*Ilex* spp., *Osmanthus* spp., *Viburnum* spp., or other similar BE from Table 1.
Roundleaf Japanese Privet	*Ligustrum japonicum 'Rotundifolium'*	*Ilex* spp., *Osmanthus* spp., *Viburnum* spp., or other similar BE from Table 1.
Glossy Privet	*Ligustrum lucidum*	*Ilex* spp., *Osmanthus* spp., *Viburnum* spp., or other similar BE from Table 1.
Border Privet	*Ligustrum obtusifolium*	Yaupon Holly, Southern Waxmyrtle, or similar BE from Table 1.
California Privet	*Ligustrum ovalifolium*	Yaupon Holly, Southern Waxmyrtle, or similar BE from Table 1.
Chinese Privet	*Ligustrum sinense*	Yaupon Holly, Southern Waxmyrtle, or similar BE from Table 1.
Weeping Chinese Privet	*Ligustrum sinense 'Pendulum'*	Yaupon Holly, Southern Waxmyrtle, or similar BE from Table 1.
Variegated Chinese Privet	*Ligustrum sinense 'Variegata'*	Vicary Golden Privet, Variegated Pittosporum, or similar BE from Table 1.
Common Privet	*Ligustrum vulgare*	Yaupon Holly, Southern Waxmyrtle, or similar BE from Table 1.
Winter Honeysuckle	*Lonicera fragrantissima*	Hybrid Mockorange, or similar D species from Table 1.
Heavenly Bamboo or Nandina	*Nandina domestica*	Dwarf fruitless varieties or another BE with similar texture such as *Ilex* or *Osmanthus* spp.
English Dogwood or Mockorange	*Philadelphus coronarius*	Native *Philadelphus inodorus*, or for fragrance Hybrid Mockorange. See Table 1.
Trifoliate-orange	*Poncirus trifoliata*	Use *Citrus* cultivars, although less hardy and typically require protection in northern MS.
Scarlet Firethorn	*Pyracantha coccinea*	Hybrid firethorns or *Ilex* spp. which produce similar fruit.
Cherokee Rose	*Rosa laevigata*	Refer to other roses in Table 1.
Multiflora Rose	*Rosa multiflora*	Refer to other roses in Table 1. May sucker from rootstock under hybrid roses.
Japanese Spirea	*Spiraea japonica*	*Spiraea x bumalda* varieties, or similar D shrub from Table 1.
Small Flowering Tamarix	*Tamarix parvifolia*	*Juniperus* spp. or other similar fine-textured shrub from Table 1.
Five-stamen Tamarix	*Tamarix ramosissima*	*Juniperus* spp. or other similar fine-textured shrub from Table 1.

* BE = Broadleaf Evergreen; D = Deciduous; SE = Semibroadleaf Evergreen; spp. = species (plural)

Landscape renderings by
Richard Martin III



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STEVE MARTIN, Interim Director

Selecting Landscape Trees

MISSISSIPPI STATE UNIVERSITY EXTENSION

with Special Comments on Invasive and Native Plants



Figure 1.
Trees have many roles in this home's landscape. They are used extensively for accenting and shading the home. They help create a background for other plantings and help provide a screen or barrier along the property lines. Low-growing trees can be used as foundation plants near the home, and unusual trees are often used as specimen plants like those on each side of the front steps. Trees also are used to provide a haven to attract wildlife.

Trees are among the most beautiful, useful, and permanent products of nature. Selecting the right tree or trees for the home landscape is an important decision. Your choice will impact not only you, but also those who inherit or buy your property in the years to come. Because trees are considered to be a more permanent part of the landscape and can take years to achieve the needed effect, planting trees is one of the first priorities when installing a new landscape or renovating an old one.

Trees come in a variety of shapes, sizes, colors, and textures. Many provide special features during the year like flowers, fruits, or leaf colors. Selecting the right tree for you and your landscape situation will involve many factors. For some, a tree that brings back childhood memories will go to the top of the list. For others, choosing a tree that will grow quickly and provide shade will be the top choice. Some may want an evergreen that acts as a windbreak against cold winter winds. Others may need a small or narrow tree to fit into a confined space. Whatever your reasons for choosing a tree, these pillars of the landscape will play a major role in the long-term beauty and success of your landscape, so choose wisely.

This publication will provide information to help you make the right tree choices. Whether you are planning a new landscape or renovating an established landscape, this publication contains plant characteristics and cultural information on many kinds of trees that grow well in Mississippi.

What Is a Tree?

For the purposes of this publication, a tree is a small to large, woody plant that commonly has a single trunk. However despite this definition, trees can be grown as multi-trunk shrubs, or multi-trunk shrubs can be grown as single-trunk trees through pruning. Crape myrtle is a good example of a plant used as a tree or shrub, depending upon the pruning technique. Some may start as shrubs when young but grow to trees with age. In addition, some trees are small.

The authors' choice to exclude some species or include others by this definition was somewhat arbitrary as the distinction between trees and large shrubs based solely on size is not absolute. For this reason, there may be plants included or excluded from this publication that other authors consider trees.

Tree Selection Checklist

When choosing a tree for your landscape, there are many things to consider. It is always better to evaluate your landscape situation before you go shopping, so you can fit the tree to the site rather than trying to change the site to fit the tree.

Use the checklist below to help you assess the landscape location where the tree will be planted. Then select a tree or trees from the table that fit your particular landscape situation. Explanations of the topics follow the checklist.

- Function or role
- Height and width
- Amount of light
- Climatic zone
- Soil conditions
  - Fertility needs
  - Soil pH
  - Light (sandy), medium, heavy (clay)
  - Available water (quality of drainage)
- Form
- Texture
- Seasonal interest or color
- Risk analysis

Function or Role

Determine what function or role the tree will play in your landscape. For example, do you need a small, flowering tree to accent the front door? Or do you need an evergreen tree that could screen an unsightly view? Common examples of functions or roles that trees play in our landscapes include:

- Foundation plants (Figure 1)
- Hedge, screen, and background plants (Figures 1 and 2)
- Energy conservation, which includes managing wind, heat, and cold (Figure 3)
- Erosion control
- Container plants (Figure 4)
- Border and edging plants (Figures 1 and 2)
- Specimen plants
- Accent plants (Figure 1)
- Sound barriers (Figure 2)
- Wildlife habitats (Figures 1 and 2)

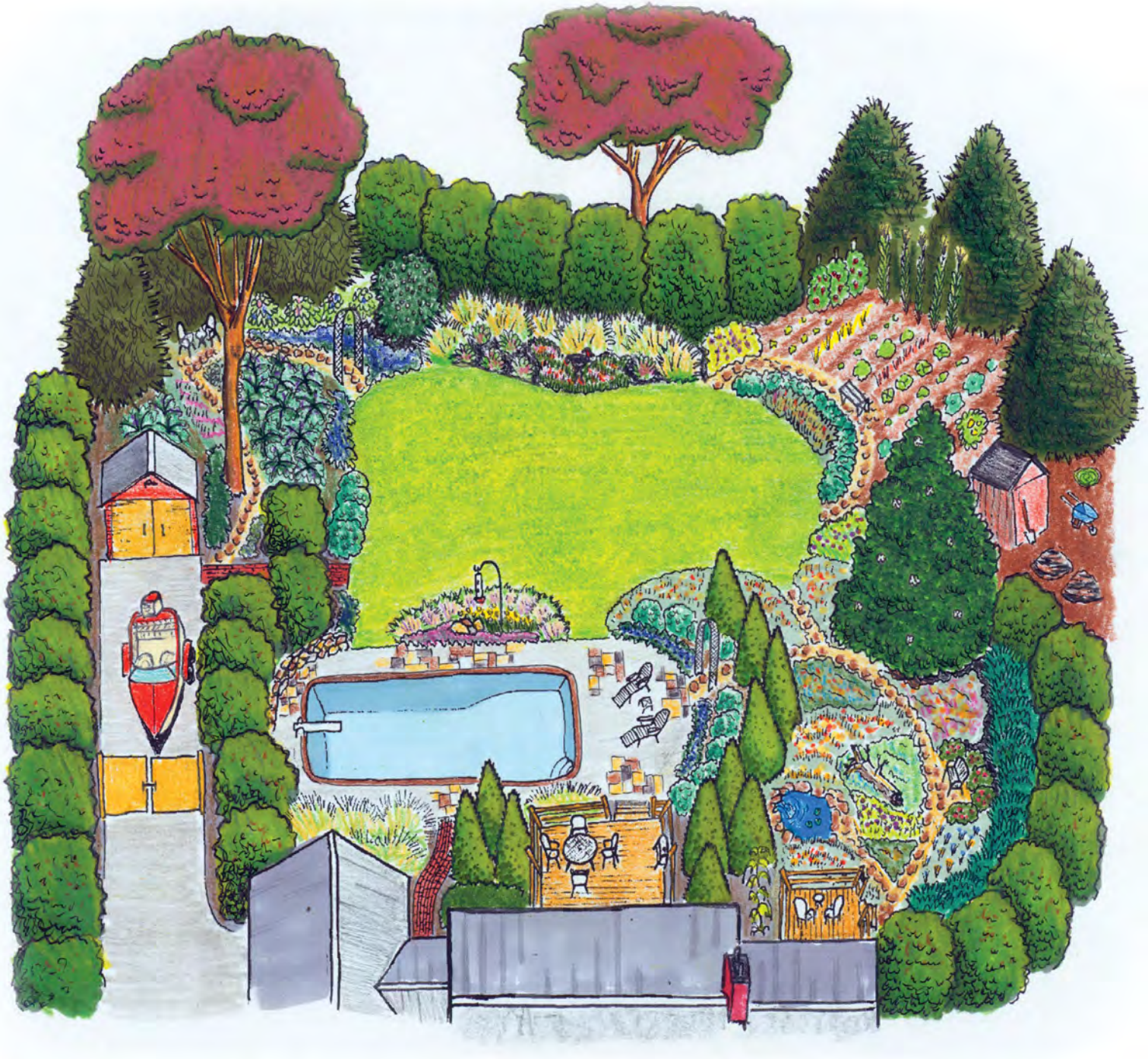


Figure 2.
This backyard landscape illustrates many of the uses of trees, including background, screen, wildlife habitat, shade, and accent plantings. The large hedge along the left side of the driveway could be small trees that serve as a sound barrier or a screen.

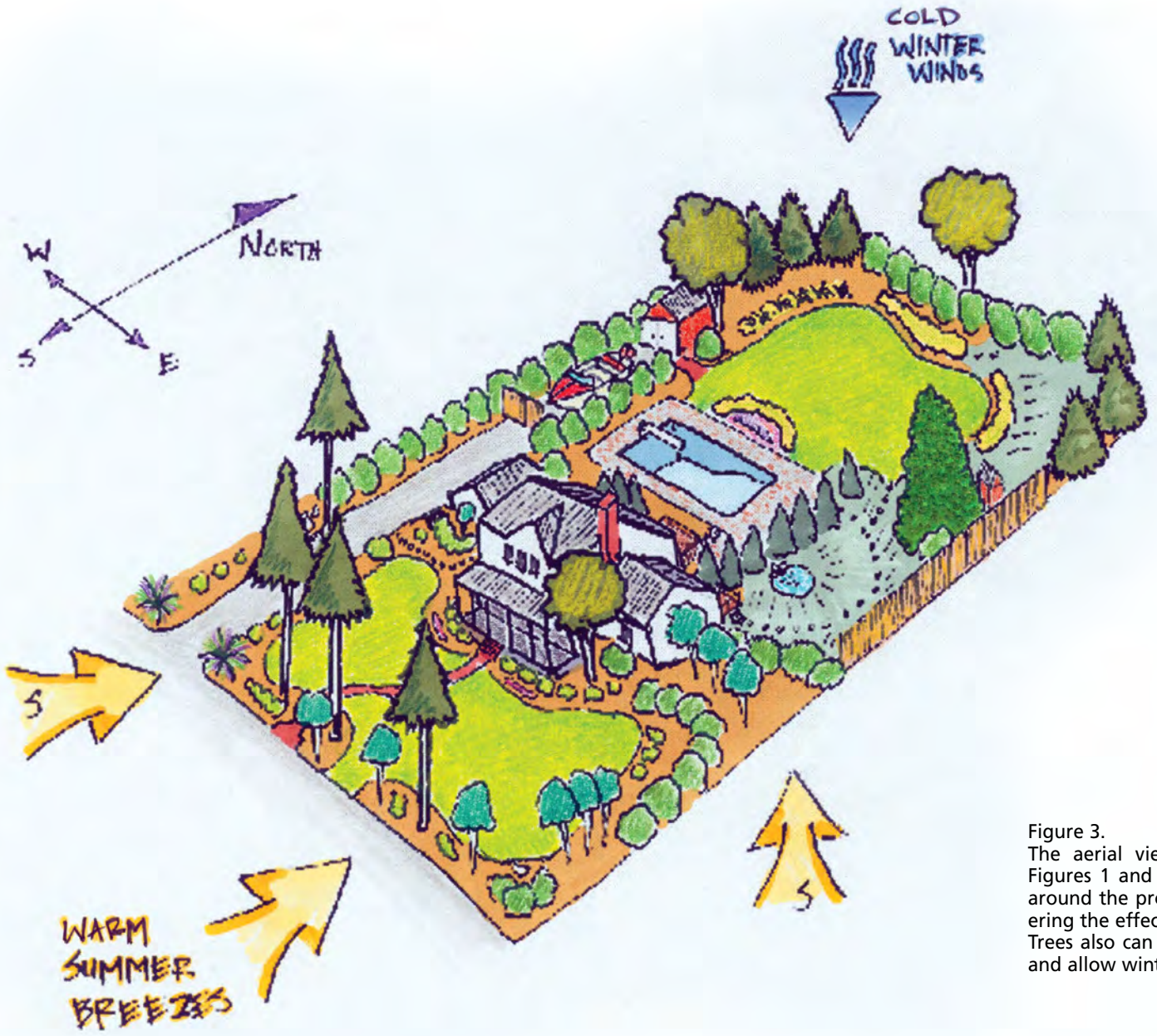


Figure 3.
The aerial view of the landscape depicted in Figures 1 and 2 shows how trees can be placed around the property to conserve energy by buffering the effects of winter wind and summer sun. Trees also can be used to direct summer breezes and allow winter sun to reach the home.

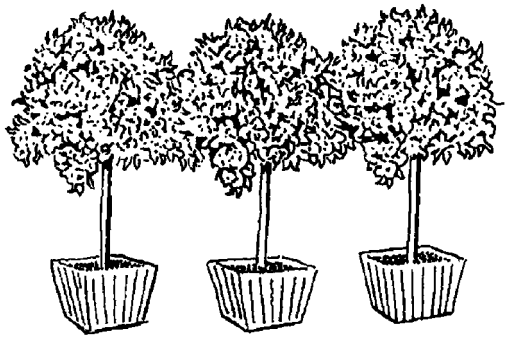


Figure 4. Container plants.

Height and Width

Knowing the mature size of a tree is very important. Size includes not just height, but also the mature spread or width of the tree. Both these should be considered before choosing a tree for a particular location in the landscape. Be aware that some trees' canopy can be quite narrow in spread when young, but become more open and spreading as they mature. Choosing a plant that will become too large for the space available is a common mistake.

Always make sure you select a tree that will not grow into utility lines or other overhead obstructions. Also, avoid planting trees in areas where there are underground utility lines or septic field lines. Planting a tree that will ultimately outgrow its space will eventually lead to problems when it blocks walkways or driveways, encroaches on other property, or becomes a hazard because of close proximity to homes or other structures.

Light

It is important that you know the light conditions of the different areas where you will be placing trees. Choose plants that grow well in those light conditions.

Full sun is at least 6–8 hours of direct sunlight. For sunny areas, choose plants that require full sunlight to grow.

Full shade areas receive no direct sunlight. In these areas, the shade could be the result of trees, buildings, or other structures. Filtered shade refers to the shade provided by a thin canopy of trees, which results in filtered or spotted areas of light on the forest floor. Choose plants that grow in shade for these areas.

Part sun areas receive direct sunlight for at least half of the day. Fitting plants to this type of light situation can be challenging. Some shade plants will tolerate full sun in the morning if given afternoon shade. Some sun plants will grow fine in situations of some early morning or late afternoon shade. Refer to the comments section of Table 1 for further information on specific light requirements for plants in this light category.

Climatic Zone

The U.S. Department of Agriculture has categorized the climates of the United States, Canada, and Mexico into numbered zones based on average low winter temperatures. The zone numbers range from 1 to 11. Each decrease in a zone number means the average low winter temperature is 10 degrees colder. The map of Mississippi in Figure 5 shows the USDA zones for Mississippi. All of Mississippi is within Plant Hardiness Zones 7 and 8. These are the average low winter temperature ranges for each zone and sub-zone:

Zone	°F Range
7	10–0
7a	5–0
7b	10–5
8	20–10
8a	15–10
8b	20–15

Remember that a plant hardiness rating does not guarantee a plant's ability to grow well in an area. For example, plants suited for drier areas of the southwest in Zone 7 may withstand the winter temperatures here but not grow well because of diseases associated with our higher humidity. A plant's hardiness zone rating ONLY indicates its ability to withstand a certain winter low temperature.



Figure 5. Zones of plant cold-hardiness for Mississippi.

Soil Conditions

Determine the fertility needs of the planting site before selecting plants or planting. Take a representative soil sample of the area being planted and submit it to the MSU Soil Testing Laboratory for analysis. Remember: it is much easier to choose a plant to fit your soil conditions than to change the soil conditions to fit the plant.

The soil analysis will also include a pH level, or measure of the alkalinity or acidity of the soil. Plants will grow best within certain pH ranges, so selection of plant material depends on pH (unless you can amend the planting site). Soil pH affects the availability of plant nutrients. Hollies, purple leaf plums, and Southern red oaks are examples of trees that will grow in acid soils. Examples of trees that will grow in alkaline soils are Southern catalpa and Eastern red cedar. Table 1 lists the pH range of specific plants.

Soils can be described as light (sandy), medium, or heavy (clay). Medium soils are best for proper growth of most landscape plants. Sandy or clay soils can be amended with organic matter to improve the water-retaining qualities of sandy soils and the drainage of clay soils, making these soils more conducive to plant growth. Adequate soil drainage is important for the growth of most plants. However, some plants like drier conditions and some plants like wetter conditions (bottomland or wetland plants). Comments on soil requirements or tolerances have been made for many of the plants in Table 1.

Form

Form is the shape of the plant. Make sure the plant will fit into the required space and that its form complements the surrounding plantings and the area. See Figure 6 for examples of plant forms. Certain small trees can have a shrubby form. Some trees may have different forms depending upon age. This is true of some shade trees that may have a pyramidal form when young, but develop a broad, rounded canopy when mature.

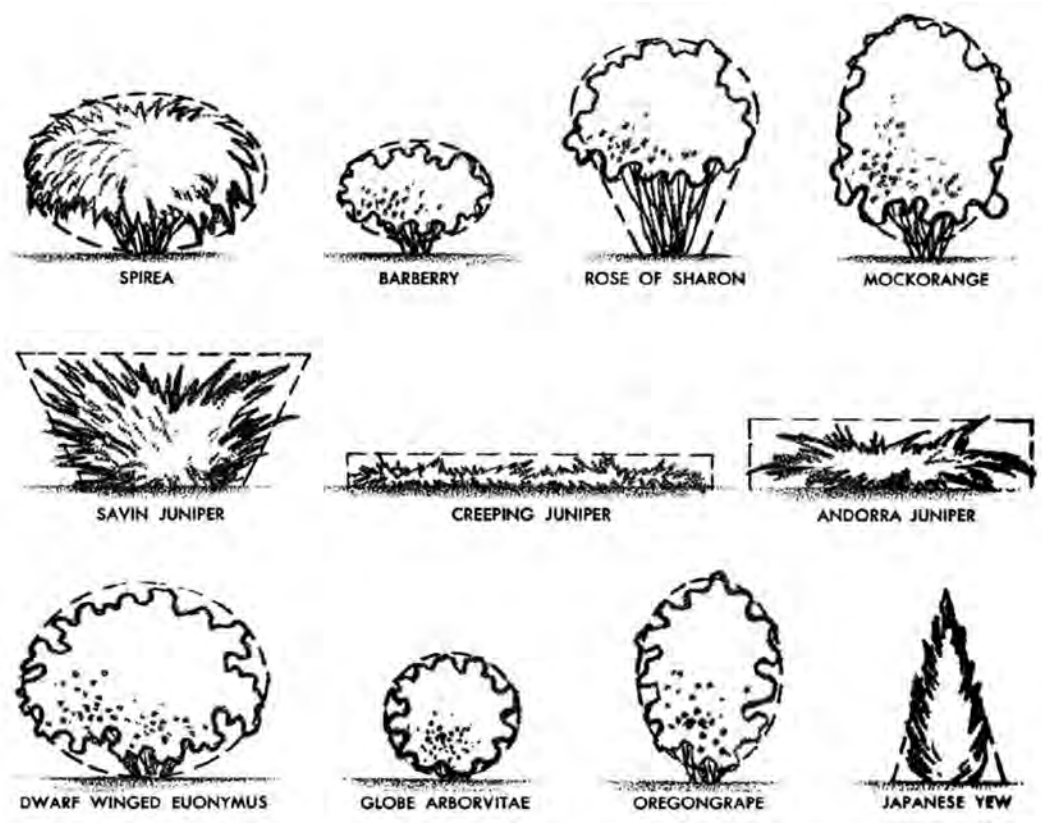


Figure 6. Examples of plant form.

Texture

Texture refers to the fineness or coarseness of plants. For example, large-leaved trees, as a rule, are considered coarse-textured. Examples include loquat, Southern magnolia, and sycamore. Fine-textured plants include pine, Leyland cypress, and Arizona cypress. In most cases, plants with fine textures should be used in greater numbers in the landscape than plants with coarse textures.

Seasonal Interest or Color

These are the characteristics of the plant that contribute to its overall appeal. Special physical features that make the plant attractive through the seasons could include fruit, flowers, foliage, bark, or branching structure. The comments section of the table includes information on seasonal interest or color.

Risk Analysis

When choosing plants, it pays to determine the risks the plant may or may not bring to your landscape. Take the following into consideration when choosing plants:

- Does it attract stinging insects like bees or wasps?
- Does it produce messy fruit or other plant parts in the landscape?
- Does it produce fruit that may cause slipping, particularly on walkways?
- Does it produce thorns, spines, or prickles that can cause harm?
- Are leaves sharply pointed, which may cause harm?
- Is it poisonous to children or pets?
- Does it cause allergies?
- Does it have aggressive growth characteristics that crowd out its neighbors?
- Is it invasive?

Eradication of invasive plants costs millions of dollars every year in the United States. A number of plants can be invasive in landscapes. An invasive plant species, by federal definition, must be exotic and have a negative economic or health impact. Invasive plant species can increase maintenance costs and cause problems in surrounding landscapes. Some invasive plants and potential alternatives are listed in Table 2.

Avoid invasive species whenever possible. Keep in mind that some invasive plants are regulated and illegal to move into the landscape. Remember that invasive plants in one area may not be invasive in another. The comments column in Table 1 provides cautionary statements about potentially invasive plants not discussed in Table 2. Before purchasing plants, be informed about which species are invasive in your area. In addition, new species can escape cultivation.

Some gardeners may prefer native plants, instead of exotic or invasive species. Native species are noted in Table 1 of this publication. However, remember that some native species can also be aggressive in the landscape. Despite occasional problems, choosing a native plant could amount to savings in plant purchases and preservation of natural resources, as well. The comments section also offers other information concerning the risk factors for plants.

Shopping Tips

Local vs. Online

Plant shopping at your local nursery, garden center, or online can be an exciting but sometimes confusing experience. Always check your favorite nursery or garden center first to see if you can buy the plants locally. You will usually be able to buy a larger plant for your money than you could if purchasing the same plant online. Also, you have the benefit of talking to a real person and seeing and inspecting the real plant. The only downside of shopping locally is that the number of different plants offered may be less than what you could order online. If you have found a plant online that is not found locally, request that your nursery or garden center order the plant for you.

Container vs. No Container

Plants come in various packages (Figure 7). Trees are typically sold in containers or pots of various sizes. These can range from 1 gallon up to many gallons. Trees also can be sold ball and burlapped, more commonly referred to as B and B. These plants have their roots with attached soil wrapped in burlap or a burlap-type material. Trees also can come with soil and roots contained in a wire basket. Whether B and B or wire basket, as much of the packaging as possible should be removed after the tree is in the planting hole and before backfilling with soil. Plants also can be bare-root and packaged in boxes, paper, or plastic wrapping. Obviously, those plants with roots surrounded by soil have a higher survival rate than those offered bare-root. Bare-root plants can, however, be cheaper, and if you handle them properly, can be a very good choice.

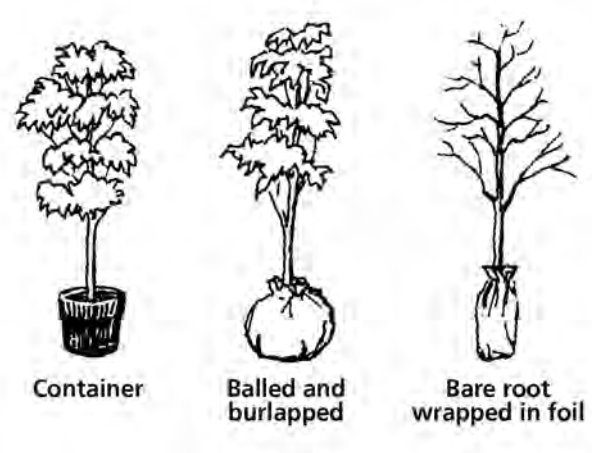


Figure 7. Plants are sold in various packages.

Small Plants vs. Large Plants

Remember that small container plants will grow and are cheaper than large container plants of the same type. So if cost is a consideration and you have the patience, purchasing smaller trees is more economical. If you want the space filled sooner and a more established look to your landscape, and you can afford the extra cost, by all means purchase a more mature plant in a larger container.

Low Maintenance vs. High Maintenance

We all want more leisure time, so it is important to select a plant that doesn't require too much maintenance in terms of pruning, spraying, watering, and disease and insect management. It is worth the extra effort to learn about the requirements of your selection before you make your purchase. Talk with nursery workers and gardening neighbors, or consult other resources.

Shop for Quality!

Always inspect your plant selection for signs of insect or disease damage. Make sure the plant shows no signs of mechanical damage to the bark or branches. Mechanical damage is caused by machinery or rough handling of the plant.

Select trees that have a good framework of strong branches. Look for plants with healthy green foliage and a full canopy. If it is a deciduous tree purchased while dormant, look for an overall good branching structure. Avoid plants that have exposed roots circling the top of the pot or protruding from the pot's drainage holes. These plants are root-bound, which indicates they have been held too long in the same pot (Figure 8).



Figure 8. Avoid root-bound, overgrown plants.

Protecting Plants until Planting Time

It is always better to have your planting area prepared before bringing home your plants so you can get them into the ground immediately. If this is not the case, a temporary holding area (Figure 9) should be provided for the plant until planting can occur. Do not allow plants to dry out; maintaining adequate moisture is very important. The holding area should be in an accessible area for easy watering. Also make sure the area is partially shaded and protected from drying winds. Check the plants daily to make sure the roots are kept moist.

If it will be more than 3 or 4 days before you can plant, provide additional protection. Group the plants close together and mulch around the packaging (container, B and B, wire basket, bare-root) with compost, pine needles, or shredded pine bark to keep the roots moist until planting. If the plant is bare-root, open the packaging to make sure the roots are moist before you cover them with mulch.

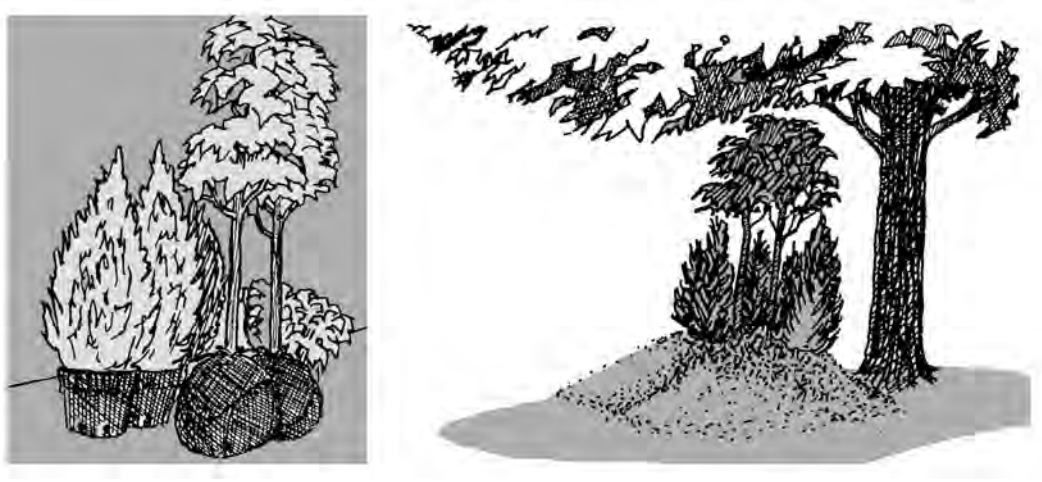


Figure 9. Protect plants before planting by shading them and mulching the roots in sawdust or another suitable material.





The following tables list ornamental landscape trees by height group and scientific name with information on foliage type, hardiness zone, plant height and width, plant spacing, pH range, and nativity for each, along with special comments.

TABLE 1. Ornamental landscape trees by height group

Small 10–16

Medium 17–23

Large 24–33

TABLE 2. Invasive landscape trees and suggested alternatives for each 34

TABLE 1. Ornamental landscape trees by height group.

Small Trees — Less than 20 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height[3]	Width	Spacing	pH range	Native[4]	Comments
Amur Maple	*Acer ginnala*	D	3–8	F–P	15'–20'	15'–20'	12'–15'	6.0–7.5		Can be invasive by reseeding. A few cultivars sold, including dwarf and red-leaved and -fruited forms. Growth rate is medium.
Japanese Maple	*Acer palmatum*	D	5–8	F–P	15'–25'	15'–25'	13'–20'	6.0–7.5		Has the effect of a miniature tree. Poor drainage reduces growth. Shade reduces intensity of leaf color. Many cultivars available. Growth rate is slow.
Bloodgood Japanese Maple	*Acer palmatum* 'Bloodgood'	D	5–8	F–P	15'–25'	15'–25'	13'–20'	6.0–7.5		See Japanese Maple. A small tree. New foliage is brilliant red. This deepens to dark red in sun. Most brilliant of red cultivars. Growth rate is slow.
Burgundy Lace Japanese Maple	*Acer palmatum* 'Burgundy Lace'	D	5–8	F–P	10'–12'	12'–15'	13'–20'	6.0–7.5		See Japanese Maple. Very slender branches with deeply lobed leaves that appear palmately (like the hand) compound. Red leaves appear lacy. Growth rate is slow.
Dissectum Atropurpureum	*Acer palmatum*	D	5–8	F–P	6'–10'	8'–14'	13'–20'	6.0–7.5		See Japanese Maple. Like 'Dissectum' but leaves bright red in shade.
Dissectum Japanese Maple	*Acer palmatum* 'Dissectum'	D	5–8	F–P	6'–10'	8'–14'	13'–20'	6.0–7.5		See Japanese Maple. This plant sometimes referred to as Threadleaf. Many cultivars in this group. Branching habit is more weeping. Leaves almost fern-like in texture. Growth rate is slow.
Oshio-Beni Japanese Maple	*Acer palmatum* 'Oshio-Beni'	D	5–8	F–P	15'–20'	15'–20'	13'–20'	6.0–7.5		See Japanese Maple. Leaves slightly redder than 'Bloodgood.' Growth rate is slow.
Bush's Buckeye	*Aesculus* x *bushii*	D	6–9	F–P	15'–25'	15'–25'	8'–10'	6.0–8.0	X	Natural hybrid between *A. glabra* and *A. pavia*, occurring where both species exist in proximity. Flowers pink. Growth rate is fast.
Flame Buckeye	*Aesculus pavia*	D	6–9	F–P	10'–20'	10'–20'	5'–8'	6.0–7.0	X	Fruit is poisonous to livestock and humans. New growth is coppery in color. Not easily transplanted. Flowers red. Grows to be a small tree. Growth rate is fast.
Painted Buckeye	*Aesculus sylvatica*	D	6–9	F–P	6'–15'	4'–10'	5'–12'	6.0–7.0	X	Native to east-central United States as far west as Alabama, but not Mississippi. Flowers yellow-green with red. Growth rate is medium to fast.
Tag Alder	*Alnus serrulata*	D	5–9	F–P	6'–20'	6'–20'	6'–10'	5.5–7.0	X	Shrub to small tree. Has catkins in spring followed by dark green foliage through summer. Tolerant of very wet soils. Growth rate is medium.
Downy Serviceberry	*Amelanchier arborea*	D	4–9	F–S	15'–25'	15'–25'	10'–20'	6.0–7.0	X	Variable tree with many cultivars. Flowers white in spring. Fruit edible. Growth rate is medium.
Devils-walkingstick	*Aralia spinosa*	D	4–9	F–S	10'–20'	5'–10'	5'–10'	5.5–7.0	X	Colonial tree and difficult to contain in landscape. Leaves very large. Fruit dark purple in top of stems. Stems very spiny. Growth rate is slow (old wood) to fast (suckers).
Strawberry Tree	*Arbutus unedo*	BE	7–8	F–P	10'–15'	8'–12'	6'–10'	5.0–6.0		Sometimes grown as a shrub. A few cultivars. Bark similar to Mountain Laurel, with which it is related. Growth rate is slow.

Small Trees — Less than 20 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height[3]	Width	Spacing	pH range	Native[4]	Comments
Common Pawpaw	*Asimina triloba*	D	5–8	F–S	15'–20'	15'–20'	10'–15'	6.0–7.0	X	Can get much larger in good conditions. Ripe fruit edible; related to tropical soursop. Typically occurs wild in rich, damp woods. Often colonial from suckers. Growth rate is medium.
Eastern Baccharis	*Baccharis halimifolia*	SE	5–9	F	5'–12'	5'–12'	5'–10'	5.5–7.0	X	Shrub and later a small tree. Dioecious with female silvery pappus the somewhat attractive feature. Very common and aggressive by reseeding, a problem in landscapes. Growth rate is fast.
Japanese Camellia	*Camellia japonica*	BE	7–9	F–S	10'–15'	6'–10'	4'–6'	4.5–5.5		Commonly grown as shrub. Provide protection from sun in middle of day. Compact in full sun; more open with more shade. Many selections available. Growth rate is medium-slow.
Buckwheat-tree	*Cliftonia monophylla*	B	7–9	F–P	6'–12'	4'–10'	3'–8'	5.5–7.0	X	White or pink flowers in racemes. Have seen pink flowered forms in MS coast wetlands. Shrub eventually grows to a tree with age. Tends to grow in high organic wetland soils. Growth rate is medium.
Pagoda Dogwood	*Cornus alternifolia*	D	3–7	F–P	15'–25'	15'–25'	10'–20'	5.5–6.5		Native to eastern North America, but rare in Mississippi. Similar to Silky Dogwood, except leaves alternate. Prefers well-drained soils. Growth rate is slow to medium.
Silky Dogwood	*Cornus amomum*	D	4–8	F–P	6'–10'	6'–10'	4'–8'	5.5–7.0	X	Small white flowers in clusters followed by dark bluish fruit. Wetland shrub or small tree in the wild. Growth rate is medium to fast.
Bentham's Cornel	*Cornus capitata*	BE	8–9	F–P	10'–20'	8'–15'	6'–10'	5.5–7.0		Shrubby at first followed by a small tree. Flowers cream followed by red fruit. Growth rate is slow to medium.
Gray Dogwood	*Cornus racemosa*	D	3–8	F–S	10'–15'	10'–15'	10'–15'	5.5–6.5	X	In poor soils may not reach 6 feet. Sprouts and suckers freely. More tolerant of adverse conditions than Flowering Dogwood. Growth rate is medium to slow.
Fragrant Winterhazel	*Corylopsis glabrescens*	D	5–8	F–P	8'–15'	8'–15'	6'–10'	5.5–7.0		Flowers fragrant. Related to Witchhazel. Shrubby at first, but can be grown as a small tree. Growth rate is slow to medium.
Common Smoketree	*Cotinus coggygria*	D	5–8	F	10'–15'	10'–15'	10'–15'	5.5–7.0		Typical forms grown are purple. Several cultivars available. Growth rate is medium.
Parsley Hawthorn	*Crataegus marshallii*	D	7–11	F–P	10'–15'	10'–15'	8'–12'	5.5–7.5	X	Attractive (foliage, flowers, fruit, bark) small tree, often found under larger trees in low woods. Growth rate is slow to medium.
Riverflat Hawthorn	*Crataegus opaca*	D	7–11	F–P	10'–15'	10'–15'	8'–12'	5.5–7.5	X	Attractive (foliage, flowers, fruit, bark) small tree, often found under larger trees in low woods. Often grown for (haw) fruit. Growth rate is slow to medium.
Littlehip Hawthorn	*Crataegus spathulata*	D	6–9	F–P	15'–20'	10'–15'	8'–12'	5.5–7.5	X	Attractive (foliage, flowers, fruit, bark) small tree, often found under larger trees in woods. Fine-textured foliage. Growth rate is slow to medium.

Small Trees — Less than 20 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height[3]	Width	Spacing	pH range	Native[4]	Comments
Common Quince	*Cydonia oblonga*	D	5–8	F	15'–20'	8'–15'	10'–12'	6.0–6.5		Shrub to small tree primarily grown for fruit. Several cultivars. Flowers white to pink in spring; generally smooth. Growth rate is medium.
Blue-bean	*Decaisnea fargesii*	D	6–7	P–S	10'–15'	10'–15'	8'–12'	6.0–7.0		Related to Akebia, so not a true bean (Fabaceae). Leaves large with a tropical effect. Fruit blue, bean-like; an interesting feature for the landscape, but may not be easily established. Growth rate is medium.
Eastern Leatherwood	*Dirca palustris*	D	4–9	P–S	3'–6'	3'–6'	3'–6'	6.0–7.5	X	Rarely seen in Mississippi, wild or in landscapes. Very small tree with leathery branches. Flowers and fruit not showy and prefers damp, rich years. Growth rate is slow.
Paperbush	*Edgeworthia papyrifera*	D	7–9	P–S	3'–4'	3'–4'	3'–4'	6.0–7.0		Unusual, coarse, small tree when grown on single trunk. Flowers very early before leaves develop. Prefers rich, moist soils. Another one for the collector. Growth is slow.
Loquat	*Eriobotrya japonica*	BE	7–10	F–P	15'–25'	15'–25'	8'–12'	6.0–8.0		Hardiest of tropical fruits. Fruits are tasty, but only south since plants usually don't bear in Zone 7b. Drought resistant. Excellent for city tree plantings. Growth rate is medium.
Eastern Wahoo	*Euonymus atropurpureus*	D	4–9	F–S	15'–25'	12'–20'	10'–15'	6.0–7.0	X	Rare in Mississippi, wild or in landscapes. Typically a wooded, floodplain species in the wild. Small tree at maturity. Fruit similar to Strawberry Bush. Growth rate is slow to medium.
Winterberry Euonymus	*Euonymus bungeanus*	D	4–7	F–S	18'–24'	18'–24'	10'–20'	6.0–7.0		Small tree when mature. More open canopy when grown in shade. Fruit similar to other Euonymus. Growth rate is slow to medium.
Spreading Euonymus	*Euonymus kiautschovicus* 'Sieboldiana'	D	5–8	F–S	18'–24'	18'–24'	10'–20'	6.0–7.0		Aside from minor features, very similar to Winterberry Euonymus. This form is a small tree, unlike many cultivars of Spreading Euonymus. Growth rate is medium.
Pineapple Guava	*Feijoa sellowiana*	BE	8–10	F–P	10'–15'	10'–15'	8'–12'	5.5–7.5		Typically grown for fruit with several cultivars, but a fair, small landscape tree with silver-underside foliage. Fruit usually do not reach maturity in Zone 7. Growth is slow to medium.
Common Fig	*Ficus carica*	D	7–11	F–P	10'–20'	10'–15'	10'–15'	5.5–7.5		Another plant typically grown for fruit, but interesting in the landscape. Bark smooth, grayish; branches often curled. Selective pruning keeps plant in bounds. Several cultivars; refer to Extension publication IS1457. Growth rate is medium to fast.
Carolina Buckthorn	*Frangula caroliniana*	D	5–9	F–P	15'–20'	10'–15'	10'–15'	6.0–8.0	X	Formerly *Rhamnus caroliniana*. Small tree generally of alkaline soils. Dark green foliage. Bark smooth with white patches. Growth rate is medium.
Franklin Tree	*Franklinia alatamaha*	D	5–9	F–P	10'–20'	6'–15'	6'–15'	5.5–6.5	X	Originally found in Georgia, but now apparently extinct in the wild. Related to *Camellia*. Not easy to cultivate. Could be a shrub, but treated here as a small tree. Growth rate is medium.

Small Trees — Less than 20 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height[3]	Width	Spacing	pH range	Native[4]	Comments
Vernal Witchhazel	*Hamamelis vernalis*	D	4–8	F–P	6'–10'	10'–15'	7'–10'	6.0–7.0	X	Shrubby when small. Difficult to move as a large plant. Trunk and bark are landscape features. Does not flower well in deep shade. A few cultivars. Growth rate is medium.
Seven-son Flower	*Heptacodium miconioides*	D	5–8	F–P	15'–20'	8'–18'	5'–15'	6.0–7.0		Interesting leaves with bark similar to Bush Honeysuckle, with which it is related, but flowers much later. Shrubby when young. Not common in landscapes. Growth rate is medium.
Rose-of-Sharon or Shrub Althea	*Hibiscus syriacus*	D	5–8	F–P	8'–12'	6'–10'	5'–8'	6.0–7.0		Long cultivated with many cultivars. Shrubby tree that may reseed in landscape. Growth rate is medium.
Nellie R. Stevens Holly	*Ilex* x 'Nellie R. Stevens'	BE	6–9	F–P	15'–25'	15'–20'	10'–15'	6.0–6.0		Hybrid between English and Chinese holly. Female clone. Large leaves. Can plant closer for screening. Growth rate is medium to fast.
Yaupon Holly	*Ilex vomitoria*	BE	7–10	F–S	15'–20'	10'–15'	5'–8'	5.0–6.0	X	Highly desirable native shrub or tree. Dioecious. May be "poodled" or espaliered. Yellow fruit form available. Fruits on 2-year-old wood. Several dwarf shrubby forms available. Growth rate is medium to fast.
Weeping Yaupon Holly	*Ilex vomitoria* 'Pendula'	BE	7–10	F–P	15'–20'	10'–15'	10'–15'	6.0–8.0	X	Accent plant usually grown alone. Shrubby young, but a small tree form with age. Fruits on 2-year-old wood. Will tolerate dry conditions. Growth rate is medium.
Florida Anise-tree	*Illicium floridanum*	BE	6–9	P–S	6'–10'	5'–8'	5'–8'	5.5–6.5	X	Shrub to small tree generally of low ground, particularly along creeks. Flowers showy red. Several cultivars, including dwarf forms. Growth rate is medium.
Blue Point Juniper	*Juniperus chinensis* 'Blue Point'	NE	4–9	F	8'–12'	5'–8'	5'–8'	6.0–8.0		Relatively popular juniper. Upright pyramidal form with blue foliage. Junipers have some deer resistance, but have seen small native junipers browsed (not consumed) by deer. Growth rate is medium.
Blue Column Juniper	*Juniperus chinensis* 'Columnaris'	NE	4–9	F	20'–24'	5'–10'	5'–10'	6.0–8.0		All leaves are juvenile; that is, they are sharp-pointed. Growth rate is medium.
Hetz Chinese Juniper	*Juniperus chinensis* 'Hetzii'	NE	5–9	F	10'–15'	10'–15'	10'–15'	6.0–8.0		Typically grown as a shrub, but like many other larger shrub junipers, can become a small spreading tree. Similar to Pfitzer juniper except branches at 45-degree angle and not horizontal. Growth rate is medium to fast.
Keteleer Chinese Juniper	*Juniperus chinensis* 'Keteleeri'	NE	4–9	F	15'–20'	6'–15'	7'–10'	6.0–8.0		Free fruiting. Dioecious. Larger fruit than most junipers. Growth rate is medium.
Irish Common Juniper	*Juniperus communis* 'Hibernica'	NE	4–9	F	5'–15'	2'–4'	3'–5'	6.0–8.0		Dense upright, spiny juniper with formal columnar shape. Have seen a low- growing variety, depressa, which is native to much of North America, in the northwestern United States. Growth rate is medium.
Hillspire Juniper	*Juniperus virginiana* 'Hillspire'	NE	3–9	F	15'–30'	5'–15'	10'–15'	6.0–8.0	X	Takes pruning well. Upright compact form of the native. Often used for nursery spirals and other clipped forms. Growth rate is medium.

Small Trees — Less than 20 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height[3]	Width	Spacing	pH range	Native[4]	Comments
Mountain Laurel	*Kalmia latifolia*	BE	4–9	P–S	15'–20'	10'–15'	8'–12'	4.5–6.0	X	Numerous cultivars, but not easily found in Southern nurseries. Usually grows on rocky sites in wild. Magnificent display of color in spring. Interesting bark feature when mature. Growth rate is slow.
Common Crapemyrtle	*Lagerstroemia indica*	D	7–9	F–P	15'–25'	10'–20'	10'–15'	5.0–6.0		Easily propagated. Easily transplanted in very large sizes. Often grown as shrubs, but some cultivars can be grown as small trees with proper pruning. Many cultivars. Growth rate is fast.
Hybrid Crapemyrtle	*Lagerstroemia indica* x *L. fauriei*	D	7–9	F–P	5'–35'	5'–35'	10'–25'	5.0–6.0		Many cultivars (refer to Crapemyrtle Extension publication P2007 for more information), often with Native American tribal names. Larger cultivars can easily be grown as small trees for bark and flower features. Growth rate is fast.
Spicebush	*Lindera benzoin*	D	4–9	P–S	6'–12'	6'–12'	6'–12'	5.5–7.0	X	Native understory shrub, or tree with age, usually in rich, wet woods. Fruit red, spicy. Related to sassafras. Several species, one endangered in Mississippi. Growth rate is slow to medium.
Lily Magnolia	*Magnolia liliflora*	D	5–8	F–P	8'–12'	8'–12'	8'–12'	5.5–6.5		Also known as *Magnolia quinquepeta*. Flowers generally purple and relatively closed, upright. A few cultivars. Growth rate is slow to medium.
Star Magnolia	*Magnolia stellata*	D	4–9	F–P	15'–20'	10'–15'	10'–15'	5.5–6.5		Popular white-flowered magnolia. Flowers early, showy. Several cultivars, some pink-flowered. Growth rate is slow.
Sargent Crabapple	*Malus sargentii*	D	4–8	F–P	8'–12'	10'–15'	15'–20'	5.0–6.5		Slightly susceptible to scab and fire blight. Dense branching crab that may grow twice as wide as tall. Growth rate is medium to fast.
Banana Shrub	*Michelia figo*	BE	7–10	F–P	6'–10'	6'–10'	7'–10'	5.0–6.5		A small tree with age. Variety *skinneriana* very similar and increasingly common. Chlorosis of foliage a problem where soil pH is not at proper levels. Flowers very fragrant. Petals have maroon border. Fragrance that of very ripe bananas. Very sensitive to poorly drained soils. Often referred to as *Michelia fuscata* or *Magnolia fuscata*. Growth rate is slow.
Southern Waxmyrtle	*Myrica cerifera*	BE	7–11	F–P	10'–15'	10'–15'	10'–15'	4.0–6.0	X	Now *Morella cerifera*. Typically a plant of wet, acidic soils, but very tolerant of most growing conditions. Early settlers boiled leaves and fruit to get wax that they used to make bayberry candles. Not particularly long- lived. Greatest success comes in transplanting smaller plants. Easily transplanted in the 3- to 4-foot height range. Natural form will become a small tree, but some cultivars are smaller forms. Growth rate is fast.
Parrotiopsis	*Parrotiopsis jacquemontiana*	D	5–7	F–P	8'–12'	5'–10'	8'–10'	6.0–7.0		Another Witchhazel relative. Shrub, eventually to a small tree. Not common in landscapes. Growth rate is slow.
Fraser Photinia	*Photina* x *fraseri*	BE	7–9	F–P	10'–20'	5'–10'	5'–10'	6.0–7.0		Hybrid photinia. Susceptible to leaf spot. Commonly sold for screening and new red growth. Growth rate is medium to fast.

Small Trees — Less than 20 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height[3]	Width	Spacing	pH range	Native[4]	Comments
Feverbark	*Pinckneya pubens*	D	7–9	P–S	10'–20'	5'–15'	10'–15'	5.5–6.5	X	Native to low woods from Florida to South Carolina. A few cultivars. Not easily cultivated, especially in Zone 7. Grown for pink sepals. Growth rate is slow to medium.
Oriental Arborvitae	*Platycladus orientalis*	NE	6–11	F	18'–25'	10'–15'	5'–10'	6.0–7.0		Formerly *Thuja orientalis*. Many cultivars, including the commonly sold golden forms. Some relatively formal and generally smaller than the standard form. Growth rate is slow to medium.
Purpleleaf Plum	*Prunus cerasifera*	D	4–8	F–P	15'–30'	15'–25'	10′–15'	5.5–6.5		Best leaf color in full sun. Prune to reduce crossing branching. Tree is short- lived. Growth rate is medium.
Flowering Peach	*Prunus persica*	D	5–9	F	15'–30'	15'–25'	7′–10′	6.0–7.5		Usually grown for fruit (refer to Extension publication IS1434 for more information). However, some cultivars are grown as ornamentals, which are generally dwarf and/or double flowering. Well-drained soils are essential to reduce root rot problems. Growth rate is slow to medium.
Chinese Flowering Quince	*Pseudocydonia sinensis*	D	5–8	F	10'–20'	5'–10'	5′–8′	5.5–6.5		Grown for its fruit, but the bark alone is worth planting. Early spring color. Susceptible to fireblight. Growth rate is medium.
Wafer-ash	*Ptelea trifoliata*	D	3–9	F–P	15'–20'	5'–15'	5'–10'	5.5–6.5	X	Shrub to small tree more for the collector. Related to Citrus. Growth rate is slow to medium.
Bristly Locust	*Robinia hispida*	D	5–8	F	6'–10'	5'–8'	4'–6'	6.0–7.0	X	Unusual native of the east-central United States. Colonial shrub to small tree with hanging 2- to 4-inch clusters of pink, pea-like flowers. Branches covered with red bristles. Growth rate medium to fast, particularly for suckers.
Smooth Sumac	*Rhus glabra*	D	3–9	F–P	10'–20'	10'–20'	4'–6′	5.0–6.0	X	Suckers freely forming large clumps. Leave texture fine on coarse stems. Withstands wide range of growing conditions. Tolerant of city conditions. Growth rate is medium to fast.
Pussy Willow	*Salix caprea*	D	4–8	F–P	15'–25'	12'–15'	8′–10′	6.5–8.0		Female catkins are the familiar pussy willows. Can be used as a cut flower. May have problems with high humidity of the Deep South. Growth rate is fast.
American Elder	*Sambucus canadensis*	D	4–9	F–P	5'–12'	5'–12'	5'–12'	5.5–7.0	X	Now considered a variety of Common Elder (*Sambucus nigra*). Sometimes grown for fruit, but seldom grown as an ornamental. Purple- and lace- leaved forms of Common Elder more popular. Grows on wet sites in the wild. Shrub to small tree. Growth rate is medium to fast.
Common Elder	*Sambucus nigra*	D	5–7	F–P	5'–12'	5'–12'	5'–12'	5.5–7.0		Purple- and lace-leaved forms more popular, but unfortunately not well- adapted for Mississippi. Species a shrub to small tree, but some cultivars only shrubs and much shorter. Growth rate slow to fast depending upon cultivar and conditions.
Silky Stewartia	*Stewartia malacodendron*	D	7–9	F–S	10'–15'	10'–15'	8'–12'	4.5–6.5	X	Native shrub to small understory tree with showy flowers. Bark not as showy as other *Stewartia* species. Growth rate is slow.

Small Trees — Less than 20 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height[3]	Width	Spacing	pH range	Native[4]	Comments
Mountain Stewartia	*Stewartia ovata*	D	5–8	F–S	10'–15'	10'–15'	8'–12'	4.5–6.5	X	Native to the eastern United States. Shrub to small understory tree with showy flowers. Bark not as showy as other Stewartia species. Growth rate is slow.
American Snowbell	*Styrax americanus*	D	5–9	F–P	6'–10'	5'–8'	4'–6'	5.5–6.5	X	Native wetland species. Flowers white and showy. Growth rate is slow to medium depending on landscape conditions.
Bigleaf Snowbell	*Styrax grandifolius*	D	7–9	F–P	8'–15'	8'–12'	6'–12'	5.5–6.5	X	Native upland, typically understory species. Flowers white and showy. May not be easy to transplant. Growth rate is slow to medium depending on landscape conditions.
Blackhaw Viburnum	*Viburnum prunifolium*	D	3–9	F–P	12'–15'	8'–12'	5'–10'	5.5–7.0	X	Usually a small understory tree. Easily transplanted. Flowers white. Bark corky. Growth rate is slow to medium.
Rusty Blackhaw	*Viburnum rufidulum*	D	5–9	F–P	10'–20'	10'–20'	10'–15'	5.5–7.0	X	Another small understory tree. Very similar to Blackhaw Viburnum. Growth rate is slow to medium.
Lilac Chastetree	*Vitex agnus–castus*	D	7–9	F–P	8'–10'	8'–10'	10'–15'	6.0–8.0		Often pruned into a single- or multi-trunked tree. Escaped in the U.S. and have seen it escaped in western Texas. Popular plant in old gardens. Foliage has pungent odor when crushed. Growth rate is medium to fast.
Chastetree	*Vitex negundo*	D	6–8	F–P	10'–15'	10'–15'	8'–15'	6.0–7.0		A few cultivars, but cutleaf forms usually sold. Fine-textured foliage. Growth rate is fast.
Hercules-club or Toothache Tree	*Zanthoxylum clava-herculis*	D	7–10	F–P	25'–30'	20'–25'	15'–20'	6.0–8.0	X	An unusual tree with spiny bark. Larger than Prickly-ash (*Zanthoxylum americanum*). Typically a tree of alkaline sites. Leaf texture fine. One for the collector.
Chinese Date or Jujube	*Ziziphus jujuba*	D	6–9	F–P	15'–20'	10'–15'	10'–15'	6.0–7.0		Sometimes grown for fruit, but rarely seen in cultivation. Spiny, small tree. Growth rate is slow to medium.

1 BE = Broadleaf Evergreen; D = Deciduous; NE = Needled Evergreen; SE = Semibroadleaf Evergreen; and V = Variable.

2 F = Full Sun; P = Part Sun to Part Shade; and S = Shade.

3 Heights provided in this table are general ranges, and some species may get larger over many years, as observed in record champion trees.

4 Native refers to species that are native to the southeastern United States.

Medium Trees — 20–40 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height[3]	Width	Spacing	pH range	Native[4]	Comments
Florida Maple	*Acer barbatum*	D	6–9	F–S	20'–25'	15'–25'	15'–25'	6.0–8.0	X	Better suited to Southern climate than sugar maple. Chalkbark maple (*Acer leucoderme*) is also better suited in the South. Growth rate is medium.
Paperbark Maple	*Acer griseum*	D	5–8	F–P	20'–35'	10'–30'	15'–30'	5.5–7.5		Exfoliating bark. Growth rate is slow.
Chalkbark Maple	*Acer leucoderme*	D	5–9	F–P	25'–30'	15'–25'	15'–30'	6.0–8.0	X	Bark whitish. Better suited to Southern climate than sugar maple. Florida maple (*Acer barbatum*) is also better suited in the South. Growth rate is medium.
Boxelder	*Acer negundo*	D	3–9	F–P	30'–50'	30'–50'	17'–25'	6.0–8.0	X	Wood weak and subject to wind damage. Tolerates dry soils, but usually found on flood plains. Fast grower. Short-lived tree. Has compound leaves. Growth rate is fast.
Shantung Maple	*Acer truncatum*	D	4–8	F–P	20'–25'	20'–25'	17'–25'	6.0–8.0		Painted maple is subspecies mono. Not common. Growth rate is slow.
Ohio Buckeye	*Aesculus glabra*	D	4–7	F–S	20'–40'	20'–40'	10'–30'	6.0–8.0	X	Rare in Mississippi and grows on damp, high-pH soils. Flowers are white to cream; tree larger than red buckeye. Growth rate is medium.
Charlotte Mimosa	*Albizia julibrissin* 'Charlotte'	D	7–9	F–P	20'–30'	20'–30'	23'–35'	5.0–7.0		See Mimosa in Table 2. May escape cultivation via seed dispersal and become invasive. Reported to be resistant to mimosa wilt. Not easily found in the nursery. Growth rate is medium to fast.
Rubra Mimosa	*Albizia julibrissin* 'Rubra'	D	7–9	F–P	20'–30'	20'–30'	23'–35'	5.0–7.0		See Mimosa in Table 2. Seed may revert to wild form and become invasive. Deep rose flowers. Growth rate is medium to fast.
American Hornbeam	*Carpinus caroliniana*	D	4–9	F–S	20'–30'	20'–30'	15'–25'	6.0–7.0	X	More tolerant in the South compared to many other *Carpinus*. In wild, typically grows on flood plains in shade. Bark smooth, ridged; sometimes called musclewood.
Southern Catalpa	*Catalpa bignonioides*	D	6–9	F–P	30'–40'	30'–40'	20'–30'	7.0–8.0	X	Often raised for worms used for fish bait that feed on leaves. Flowers white with yellow and purple spots in throat. Growth rate is medium to fast.
Chinese Catalpa	*Catalpa bungei*	D	5–8	F–P	20'–30'	20'–30'	10'–20'	6.0–7.0		Similar to native catalpa, but smaller. Flowers rose to white. Growth rate is medium to fast.
Chinese Catalpa	*Catalpa ovata*	D	5–8	F–P	20'–30'	20'–30'	10'–20'	6.0–7.0		Similar to native catalpa, but flowers yellowish-white and fruit very slender. Growth rate is fast.
Eastern Redbud	*Cercis canadensis*	D	4–9	F–P	20'–30'	25'–35'	10'–15'	5.5–8.0	X	Short-lived tree. Not well adapted to coastal areas. Grown as small tree for flowers in spring. A few cultivars and varieties. Growth rate is medium to fast.
White Flowering Eastern Redbud	*Cercis canadensis* 'Alba'	D	4–9	F–P	20'–30'	25'–35'	10'–15'	5.5–8.0	X	See Eastern Redbud. Growth rate is medium to fast.

Medium Trees — 20–40 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height[3]	Width	Spacing	pH range	Native[4]	Comments
Forest Pansy Eastern Redbud	*Cercis canadensis* 'Forest Pansy'	D	5–9	F–P	20'–30'	25'–35'	10'–15'	5.5–8.0	X	See Eastern Redbud. Growth rate is medium to fast.
Texas Redbud	*Cercis canadensis texensis*	D	6–9	F–P	15'–25'	15'–25	8'–15'	5.5–8.0		Native to Texas and Oklahoma. Similar to Eastern Redbud; leaves tend to be very glossy. Slightly smaller than Eastern Redbud. Growth rate is medium to fast.
Desert-willow	*Chilopsis linearis*	D	7–9	F	15'–25'	10'–15'	8'–15'	6.5–8.0		Native to the Southwest. Not a true willow (*Salix*) and does not like wet soils. A few cultivars available. Beautiful, fine-textured tree, but may not be easily cultivated in the Southeast. Growth rate is medium
Chinese Fringetree	*Chionanthus retusus*	D	6–8	F–P	15'–25'	15'–20'	15'–20'	6.0–7.0		Similar to White Fringetree, but shorter petals and probably less showy. Can grow to be a small tree. Growth rate is slow.
White Fringetree	*Chionanthus virginicus*	D	4–9	F–P	25'–30'	25'–30'	20'–25'	6.0–7.0	X	Also known as Grancy Gray-beard. Popular shrub or small tree with age. Male and female trees. Growth rate is slow.
Drummond's Dogwood	*Cornus drummondii*	D	4–9	F–P	20'–25'	10'–20'	10'–20'	5.5–7.0	X	Similar to Silky Dogwood, except fruit are white. Suckers profusely and can be aggressive. Growth rate is slow, but shoots are fast.
Flowering Dogwood	*Cornus florida*	D	5–9	F–S	20'–30'	20'–30'	17'–25'	5.0–6.5	X	Showy part of flower are bracts and not petals. Color white, pink, red. Wood is hard, heavy. Very sensitive to heavy, poorly drained soils. Growth rate is slow to medium.
Swamp Dogwood	*Cornus foemina*	D	6–9	F–P	20'–25'	10'–20'	10'–20'	5.5–7.0	X	Very similar to Silky Dogwood, except larger. Wetland shrub or small tree in the wild. Growth rate is medium to fast.
Kousa Dogwood	*Cornus kousa*	D	5–8	F–P	20'–30'	20'–30'	15'–25'	5.5–6.5		Many cultivars and not easy to cultivate in Zones 7 and 8. Bracts white and showy like Flowering Dogwood, but slightly smaller. Growth rate is slow to medium.
Cornelian Cherry Dogwood	*Cornus mas*	D	4–8	F–P	20'–25'	15'–20'	10'–15'	5.5–6.5		Flowers yellow, but bark is also an interesting landscape feature. Several cultivars. Growth rate is medium.
American Smoketree	*Cotinus obovatus*	D	4–8	F–S	20'–30'	20'–30'	20'–30'	6.0–8.0	X	Also called Chittamwood. Grows on high-pH soils or rock in the wild. Can become a small tree with age. Growth rate is slow to medium.
Cockspur Hawthorn	*Crataegus crus-galli*	D	4–7	F	20'–30'	20'–35'	15'–25'	6.0–7.0	X	Large hooked thorns, although var. inermis is thornless. Spring flowers showy. Growth rate slow to medium.
Washington Hawthorn	*Crataegus phaenopyrum*	D	4–8	F–S	25'–30'	20'–25'	13'–20'	6.0–7.0	X	One of the best of all the hawthorns. Tolerates city conditions well. One of later-flowering species. Fruit showy in winter. Native from Virginia to Alabama. Growth rate is medium to fast.
Mourning Cypress	*Cupressus funebris*	NE	8–11	F	30'–40'	25'–35'	25'–35'	6.0–7.5		Impressive weeping form in landscape. Have grown successfully in 7b for many years. Growth rate is medium.
Monterey Cypress	*Cupressus macrocarpa*	NE	7–9	F	30'–40'	25'–35'	25'–35'	6.0–7.5		Develops layered branches and flat top with age. Humidity difficult for this tree, though have had a tree for several years from seed. Numerous cultivars. Growth rate slow to medium.

Medium Trees — 20–40 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height[3]	Width	Spacing	pH range	Native[4]	Comments
Italian Cypress	*Cupressus sempervirens*	NE	7–9	F	30'–40'	3'–4'	3'–6'	6.0–7.5		Distinct columnar growth seen in West Coast and Mediterranean land- scapes. Very formal, although the wild form tends to be informal. Several cultivars, including the typical columnar forms. Needs well-drained soils. Growth rate is medium.
Dove-tree	*Davidia involucrata*	D	6–7	F–P	20'–40'	20'–40'	15'–30'	6.0–7.0		Fascinating tree with a fascinating cultural past. Flowers (bracts) with the apparance of flying doves, sometimes called Ghost Tree for similar reason. Not easily established as young plants, at least in Zone 7. Growth rate is slow to medium.
Japanese Persimmon	*Diospyros kaki*	D	7–9	F	20'–30'	20'–30'	7'–10'	5.5–7.0		Fruit may be nuisance in landscape, but when fruit is major consideration, plant two varieties. Refer to MSU publication IS1446 for more information on fruiting varieties and culture. Growth rate is medium.
Fortune Fontanesia	*Fontanesia fortunei*	D	4–8	F–P	20'–30'	15'–20'	8'–15'	5.5–7.0		Large shrub, but can be used as a small tree. Very fine texture in land- scape. Growth rate is medium.
Sunburst Thornless Honey Locust	*Gleditsia triacanthos inermis* 'Sunburst'	D	4–8	F	30'–35'	30'–35'	20'–25'	6.0–8.0	X	Thornless with yellow foliage, but other similar cultivars exist. Susceptible to canker. Growth rate is fast.
Loblolly-bay	*Gordonia lasianthus*	BE	7–9	F–P	30'–40'	20'–30'	15'–25'	5.5–6.5	X	Rare in Mississippi, both wild and in the landscape. Generally a species of wet, acid soils, but may favor well-drained soils in cultivation. Not easily cultivated, especially in Zone 7. Growth rate is medium.
Carolina Silverbell	*Halesia carolina*	D	4–9	F–P	30'–40'	20'–35'	15'–25'	6.0–8.0	X	Rare in Mississippi, occurring on rocky ridges in the northeast part of the state, usually as an understory tree. Showy white, bell-shaped flowers in spring. Growth rate is medium.
Two-winged Silverbell	*Halesia diptera*	D	5–8	F–P	20'–30'	20'–30'	15'–25'	5.5–7.5	X	Typically, an understory tree of floodplain forests in Mississippi. Very showy when blooming and seems to do well in land-scapes. Similar to other silverbells. Growth rate is medium.
Mountain Silverbell	*Halesia tetraptera*	D	4–9	F–P	30'–40'	20'–35'	15'–25'	6.0–7.5	X	Similar to Carolina Silverbell with showy white, bell-shaped flowers in spring. Growth rate is medium.
Common Witchhazel	*Hamamelis virginiana*	D	3–9	F–S	20'–30'	20'–25'	10'–15'	5.5–6.5	X	Difficult to move as a large plant. Trunk and bark are land-scape features. Does not flower well in deep shade. Growth rate is medium.
East Palatka Holly	*Ilex* x *attenuata* 'East Palatka'	BE	6–9	F–P	25'–30'	20'–25'	15'–20'	5.0–6.0		Very heavy berry producer. Supposed to be a female clone of American Holly. Growth rate is medium.
Foster's No. 2 Holly	*Ilex* x *attenuata* 'Foster #2'	BE	6–9	F–P	25'–30'	10'–18'	10'–15'	5.0–6.0		Hybrid between American Holly and Dahoon Holly. Leaves more narrow than American Holly. More tolerant of adverse conditions than American Holly. Growth rate is medium to fast.
Savannah Holly	*Ilex* x *attenuata* 'Savannah'	BE	6–9	F–P	25'–30'	20'–25'	15'–20'	5.0–6.0		Popular large holly. Leaves have wavy margin, 2–3 inches long, with several spines. Growth rate is medium.

Medium Trees — 20–40 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height[3]	Width	Spacing	pH range	Native[4]	Comments
Dahoon	*Ilex cassine*	BE	7–9	F–P	20'–30'	8'–15'	8'–15'	5.0–6.0	X	Native to the lower South. Foliage is somewhat fine in texture, compared to American Holly. Growth rate is slow to medium.
Possumhaw	*Ilex decidua*	D	5–9	F–P	20'–30'	15'–25'	10'–15'	5.0–6.5	X	Shrub to small tree. Birds reported to prefer red berries over orange ones. Common in low ground, either open or with overstory trees. Fruit not showy until after frost. Several cultivars. Georgia Holly (*Ilex longipes*) is very similar. Growth rate is medium.
Koehne Holly	*Ilex* x *koehneana*	BE	7–9	F–P	20'–25'	15'–25'	10'–15'	5.0–6.0		Shrub to small tree. Plant closer for screening. Fruit and foliage attractive. Growth rate is medium.
Lusterleaf Holly	*Ilex latifolia*	BE	7–9	P	20'–25'	15'–20'	15'–20'	5.0–6.0		Dioecious. Fruits on 2-year-old wood. Vigorous shoots may be injured by cold. May resemble magnolia at a distance. Growth rate is slow to medium.
Hollywood Juniper	*Juniperus chinensis* 'Kaizuku'	NE	5–9	F	20'–30'	10'–20'	5'–8'	6.0–8.0		Also known as 'Torulosa.' Growth shape apparently not drastically affected by pruning. Apparently not hardy in northern U.S. A popular, picturesque plant. Growth rate is medium to fast.
Rocky Mountain Juniper	*Juniperus scopulorum*	NE	3–7	F	30'–40'	3'–15'	10'–15'	6.0–8.0		Usually planted as a specimen. Native to the West with several cultivars, including 'Blue Heaven,' 'Moonglow,' 'Skyrocket,' and 'Wichita Blue' (all blue foliage forms with columnar to pyramidal form). Susceptible to foliar disease and may need staking when first planted. Growth rate is medium.
Canaert Eastern Red Cedar	*Juniperus virginiana* 'Canaertii'	NE	3–9	F	20'–30'	8'–15'	10'–15'	6.0–8.0	X	Heavy fruit producer. Very popular form of red cedar. Easily sheared to various shapes. Growth rate is medium.
Golden Rain Tree	*Koelreuteria bipinnata*	D	6–8	F–P	20'–30'	15'–25'	20'–30'	5.0–7.0		Subject to winter kill or severe injury every 10–15 years. Best suited for coastal Mississippi. Tree's form is unpredictable. Short lived. Growth rate is fast.
Panicled Golden Rain Tree	*Koelreuteria paniculata*	D	5–8	F–P	30'–40'	25'–35'	30'–45'	5.0–7.0		May not do well in northern Mississippi. Growth rate is medium to fast.
Bois-d-Arc, Bodark, or Osage-Orange	*Maclura pomifera*	D	4–9	F–P	20'–40'	20'–40'	30'–40'	6.0–7.5	X	Native west of Mississippi. Fruit and deadwood are a maintenance problem. Difficult to grow other plants beneath this one. Inner bark is orange. Root system shallow and competitive. Adapted to alkaline soils. Sap is milky, and female fruit can be a problem. Wood is very durable. Growth rate is fast.
Bigleaf Magnolia	*Magnolia macrophylla*	D	5–8	F–S	30'–40'	20'–30'	17'–25'	5.0–6.5	X	Flowers white and large, as much as 1 foot across. Leaves very large at 1–3 feet long. Open exposure may result in large leaves being beaten by the wind. Other similar species native to Southeast. Growth rate is fast.
Umbrella Magnolia	*Magnolia tripetala*	D	5–8	F–S	15'–30'	10'–25'	17'–25'	5.0–6.5	X	Difficult to transplant. Very similar to Bigleaf Magnolia. Open exposure may result in large leaves being beaten by the wind. Other similar species native to southeast. Growth rate is fast.

Medium Trees — 20–40 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height[3]	Width	Spacing	pH range	Native[4]	Comments
Japanese or Saucer Magnolia	*Magnolia* x *soulangeana*	D	4–9	F–P	20'–30'	20'–30'	15'–25'	5.0–6.0		One of the showiest plants in bloom. Flowers and buds may be injured by cold. Warm spell causes buds to open. Cultivars available: 'Alba' has white flowers; 'Alexandria' has rose-purple flowers; 'Burgandy' has deep purple flowers; and many others. Growth rate is medium.
Southern Crabapple	*Malus angustifolia*	D	4–9	F	20'–30'	20'–30'	15'–25'	5.0–6.5	X	Flowers pinkish, but probably not as showy as some hybrid cultivars, although it is native. Growth rate is slow to medium.
Japanese Flowering Crabapple	*Malus floribunda*	D	4–8	F	15'–25'	10'–20'	17'–25'	6.0–7.0		One of the oldest and most dependable crabapples. Flowers fairly early in its life. Bears every year. May not receive enough cold in Zone 8b for good flowering. Growth rate is medium fast.
Hybrid Flowering Crabapples	*Malus cultivars*	D	4–9	F	15'–25'	10'–20'	17'–25'	6.0–7.0		Variable group of trees with many cultivars. Cultivars vary in flower color, foliage color, height, disease resistance, and bark features. Growth rate is slow to fast depending on cultivar.
Fruitless White Mulberry	*Morus alba* 'Fruitless'	D	5–9	F–P	30'–50'	25'–45'	20'–25'	6.0–7.5		Many cultivars, but fruited forms can be invasive. Tolerates most soils. Growth rate is fast.
American Hophornbeam	*Ostrya virginiana*	D	4–9	F–P	25'–40'	15'–30'	15'–25'	6.0–6.5	X	Also known as ironwood. Generally an understory species. Leaves small, similar to elm or birch, a positive landscape feature. Growth rate is slow.
Sourwood	*Oxydendrum arboreum*	D	5–9	F–P	25'–30'	18'–20'	15'–25'	5.5–6.5	X	Related to azaleas, flowers more similar to Pieris. Fall color generally red, showy, but bark and branching an interesting landscape feature as well. Growth rate is slow.
Jerusalem Thorn	*Parkinsonia aculeata*	SE	9–11	F–P			13'–20'	6.0–7.5		Native to southern North America. In warm areas will flower from spring to fall. Stems remain green throughout the year. Thorns. Short-lived tree. Young trees grow rapidly and require staking for first 2 or 3 years. Tolerant of salt spray. Growth rate is fast.
Persian Parrotia	*Parrotia persica*	D	5–8	F–P	20'–40'	15'–30'	15'–20'	6.0–7.0		Similar to Witchhazel, with which it is related. Interesting bark. Growth rate is medium.
Swamp Redbay	*Persea borbonia*	BE	7–9	F–P	20'–30'	15'–25'	10'–20'	5.5–6.5	X	Plant of swamps, now threatened by invading disease-carrying beetles. Similar to Sweetbay Magnolia, but smaller. Growth rate is medium.
Amur Corktree	*Phellodendron amurense*	D	4–7	F–P	30'–45'	30'–45'	25'–35'	6.0–7.0		Fine-textured tree related to *Citrus*, but dioecious. Growth rate is medium.
Virginia Pine	*Pinus virginiana*	NE	4–8	F	15'–40'	10'–30'	13'–20'	5.5–6.5	X	Rare Mississippi pine generally found in rocky bluffs in northeast Mississippi. Often grown commercially in Christmas tree farms. Takes regular pruning at proper time well. Growth rate is fast.
Pistachio or Chinese Pistache	*Pistacia chinensis*	D	6–9	F	30'–35'	25'–35'	26'–40'	5.5–6.5		Drought tolerant. Planted for fall color of scarlet to golden yellow. Used as understock for edible nut tree. Durable tree, wind resistant. Growth rate is medium.

Medium Trees — 20–40 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height[3]	Width	Spacing	pH range	Native[4]	Comments
Platycarya	*Platycarya strobilacea*	D	6–8	F	20'–30'	20'–30'	15'–25'	6.0–7.0		Interesting uncommon tree in Mississippi landscapes, but certainly one for the collector. Growth rate is medium to fast.
Southern Yew	*Podocarpus macrophyllus maki*	BE	8–10	F–P	20'–35'	10'–15'	8'–10'	5.5–7.0		Can be sheared and shaped easily. Dioecious. Widely used on the coast. Several other species available, but uncommon in Mississippi landscapes. Growth rate is medium to fast.
Formosan Cherry	*Prunus campanulata*	D	8–9	F	20'–30'	15'–25'	20'–30'	6.0–7.0		Early flowering cherry with pink flowers. 'Okame' is the common cultivar sold and hardier. Growth rate is medium.
Carolina Cherry Laurel	*Prunus caroliniana*	BE	7–10	F–P	20'–30'	15'–25'	10'–15'	5.5–6.5	X	Native coastal plain species. Leaves and fruit poisonous when eaten. Best in full sun. A few compact forms available. Prefers well-drained soils. Subject to wind and ice storm damage. Growth rate is medium to fast.
Double Flowering Oriental Cherry	*Prunus serrulata* 'Kwansan'	D	5–9	F	30'–40'	25'–35'	20'–30'	6.0–7.0		Very attractive when in flower. New growth bronzy-green. One of the hardiest and most popular flowering cherries. Growth rate is medium.
Higan Cherry	*Prunus subhirtella*	D	5–8	F	20'–40'	15'–30'	10'–20'	6.0–7.5		Pink flowering in early spring. Showy with both weeping and double- flowering forms. Growth rate is slow to medium depending on cultivar.
Yoshino Cherry	*Prunus* x *yedoensis*	D	5–8	F	20'–30'	20'–30'	23'–35'	6.0–7.0		Makes excellent show in early spring. Growth rate is medium.
Blue Japanese Oak	*Quercus glauca*	BE	7–9	F–P	20'–30'	15'–20'	13'–20'	5.5–6.5		Difficult to find in the trade, but escapes in cultivation. Leaves very dark green, but severe winters may kill the foliage. Excellent tree for coastal areas and somewhat shrubby when young. Growth rate is medium to fast.
Chinese Sumac	*Rhus chinensis*	D	5–8	F–P	20'–25'	20'–25'	13'–20'	5.0–6.0		Leaves generally coarser than native species. Like native species, root suckers can be a problem in the landscape. Growth rate is medium to fast.
Flameleaf Sumac	*Rhus copallina*	D	4–9	F–P	20'–30'	20'–30'	7'–10'	5.5–7.0	X	Suckers freely, forming a large colony. One of the earliest woody plants to appear on cleared land. Large specimens rarely seen. Growth rate is medium.
Staghorn Sumac	*Rhus typhina*	D	4–8	F–P	15'–30'	15'–30'	13'–20'	5.0–6.0	X	Cutleaf forms available. Easily damaged by ice storms, and root suckers can be a problem. Tolerates poor dry soils. Branching habit often resembles a stag's horns. Growth rate is medium.
Black Locust	*Robinia pseudoacacia*	D	4–9	F–P	30'–50'	20'–35'	13'–20'	6.0–8.0	X	Tends to sucker readily, forming large clumps. Several cultivars including purple flowering forms. Wood highly resistant to decay. Growth rate is medium to fast.
Babylon Weeping Willow	*Salix babylonica*	D	5–8	F–P	30'–40'	30'–40'	20'–30'	5.0–6.0		Now considered a hybrid. Very fast grower near water sources. Brittle wood subject to storm damage. Short-lived. Shallow, competitive root system. Growth rate is fast.

Medium Trees — 20–40 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height[3]	Width	Spacing	pH range	Native[4]	Comments
Corkscrew Willow	*Salix matsudana* 'Tortuosa'	D	4–7	F–P	20'–30'	15'–25'	10'–15'	6.0–8.0		Twisted branch form is Peking Willow. Short-lived tree in Mississippi heat and humidity. Wood is weak and subject to storm damage. Roots may clog sewer lines. Landscape asset is the twisted branches resembling a cork screw. Nice effect when foliage is not present. Growth rate is medium to fast.
Western Soapberry	*Sapindus drummondii*	D	6–9	F	25'–30'	25'–30'	20'–30'	6.0–8.0		Southwestern native. Fruit reported to be mildly poisonous. Fruit, when crushed in water, will form lather like soap. Not readily available in trade but should be used more. Growth rate is medium.
Sassafras	*Sassafras albidum*	D	4–9	F–P	30'–50'	25'–40'	13'–20'	6.0–8.0	X	Sassafras tea is made from roots. Difficult to transplant, especially if large. Stems remain green. Often found growing in colonies. Three different leaf shapes on same tree: right mitten, left mitten, and three-lobed. Growth rate is medium to fast.
Tall Stewartia	*Stewartia monadelpha*	D	6–8	F–P	20'–40'	20'–40'	10'–20'	5.5–6.5		Flowers and bark not as showy as Japanese Stewartia, but still worth consideration, especially since it may be more heat tolerant. Growth rate is medium.
Japanese Stewartia	*Stewartia pseudocamellia*	D	4–7	F–P	20'–40'	20'–40'	10'–20'	5.5–6.5		Both flowers and bark are attactive landscape features. Tall Stewartia may be more adaptable statewide. Growth rate is slow to medium.
Japanese Snowbell	*Styrax japonicus*	D	5–8	F	20'–30'	20'–30'	10'–15'	6.0–7.0		Larger than native *Styrax* species. Flowers showy and generally white, but pink flowering forms available. Growth rate is medium.
Japanese Tree Lilac	*Syringa reticulata*	D	3–7	F	20'–30'	15'–25'	15'–25'	6.0–7.0		Flowers typically white, but showy and fragrant. Not common in Mississippi landscapes. Growth rate is medium.
Stinking Cedar	*Torreya taxifolia*	NE	6–9	P–S	30'–35'	20'–25'	15'–20'	6.0–7.0	X	Federally endangered. Only *Torreya* in U.S., although other species occur in Asia. Very dark green foliage on horizontal branches. Very interesting tree and certainly one for the collector. Growth rate is slow to medium.

1 BE = Broadleaf Evergreen; D = Deciduous; NE = Needled Evergreen; SE = Semibroadleaf Evergreen; and V = Variable.

2 F = Full Sun; P = Part Sun to Part Shade; and S = Shade.

3 Heights provided in this table are general ranges, and some species may get larger over many years, as observed in record champion trees.

4 Native refers to species that are native to the southeastern United States.

Large Trees — More than 40 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height[3]	Width	Spacing	pH range	Native[4]	Comments
Momi Fir	*Abies firma*	NE	4–9	F	40'–50'	20'–30'	10'–20'	6.0–7.0		Hard to find firs like Momi hardy in the South. Probably cooler parts of Tennessee where a number of firs, foreign and domestic, would be suited, but not the Deep South. Growth rate is medium.
Crimson King Norway Maple	*Acer platanoides* 'Crimson King'	D	4–7	F–S	40'–50'	30'–40'	27'–40'	6.0–8.0		See Norway Maple in Table 2. Holds red to reddish-purple leaf color during growing season. Fall color may not be compatible in some situations. Growth rate is medium to fast.
Emerald Queen Norway Maple	*Acer platanoides* 'Emerald Queen'	D	4–7	F–S	40'–50'	30'–40'	27'–40'	6.0–8.0		See Norway Maple in Table 2. Leaves green during growing season. Growth rate is medium to fast.
Jade Green Norway Maple	*Acer platanoides* 'Jade Glen'	D	4–7	F–S	40'–50'	30'–40'	27'–40'	6.0–8.0		See Norway Maple in Table 2. Rapid grower with straight limbs. Growth rate is medium to fast.
Schwedleri Norway Maple	*Acer platanoides* 'Schwedleri'	D	4–7	F–S	40'–50'	30'–40'	23'–35'	6.0–8.0		See Norway Maple in Table 2. Slightly smaller than parent plant. Leaves red in spring, turning green in summer. Growth rate is medium to fast.
Superform Norway Maple	*Acer platanoides* 'Superform'	D	4–7	F–S	40'–50'	30'–45'	27'–40'	6.0–8.0		See Norway Maple in Table 2. Rapid grower with dark green leaves. Growth rate is medium to fast.
Red Maple	*Acer rubrum*	D	3–9	F–P	40'–60'	40'–60'	33'–50'	6.0–8.0	X	Tolerates poorly drained soils. Good fall color. Many cultivars. Growth rate is fast.
Autumn Flame Red Maple	*Acer rubrum* 'Autumn Flame'	D	5–9	F–P	40'–60'	40'–60'	27'–40'	6.0–7.5	X	See Red Maple. Large globular tree with slightly smaller leaves. Colors early in fall. Growth rate is fast.
Columnar Red Maple	*Acer rubrum* 'Columnare'	D	5–9	F–P	60'–80'	15'–25'	27'–40'	6.0–7.5	X	See Red Maple. Tree densely upright in form, giving it a columnar appearance. Growth rate is fast.
October Glory Red Maple	*Acer rubrum* 'October Glory'	D	5–9	F–P	40'–50'	40'–50'	27'–40'	6.0–7.5	X	See Red Maple. Large globular tree with glossy green leaves. Turns scarlet to crimson in the fall. Growth rate is fast.
Red Sunset Red Maple	*Acer rubrum* 'Red Sunset'	D	5–9	F–P	45'–50'	35'–40'	27'–40'	6.0–7.5	X	See Red Maple. Large upright tree with glossy green leaves. Good fall color. Growth rate is fast.
Drummond Red Maple	*Acer rubrum drummondii*	D	5–9	F–P	40'–50'	40'–50'	27'–40'	6.0–7.5	X	See Red Maple. Leaves with three to five lobes, wooly white beneath. Fruit generally larger than Red Maple. Relatively short-lived tree. A wetland variety of *A. rubra*. Growth rate is fast.
Silver Maple	*Acer saccharinum*	D	3–9	F–P	50'–100'	30'–70'	20'–30'	6.0–7.5	X	Short-lived tree. Not well adapted for lower South. Wood is brittle. Good fall color. Shallow root system may cause heaving of walks, etc. Growth rate is medium to fast.
Sugar Maple	*Acer saccharum*	D	4–8	F–P	60'–100'	30'–70'	27'–40'	6.0–7.5	X	Commonly sold, but better suited for cooler and more humid regions of the United States. Several cultivars. Not recommended below Zone 7. Florida or Southern Sugar Maple better suited. Growth rate is slow to medium.

Large Trees — More than 40 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height[3]	Width	Spacing	pH range	Native[4]	Comments
Yellow Buckeye	*Aesculus flava*	D	4–8	F–S	60'–75'	40'–50'	30'–40'	6.0–8.0	X	Flowers yellow, but not aways visible high in canopy. Fruit can be smaller than Ohio and Red Buckeye. Growth rate is medium.
Monkey Puzzle	*Araucaria araucana*	NE	7–10	F–P	50'–80'	30'–50'	20'–30'	6.0–7.0		Related to Norfolk Island Pine, but native to South America. Unique tree, but not easily established in the South. Growth rate is medium.
River Birch	*Betula nigra*	D	4–9	F–P	40'–70'	40'–60'	20'–30'	5.0–6.5	X	Aphids may be severe on young leaves, causing distortion. Exfoliating bark. Some cultivars. May be multitrunked. Chlorosis above pH of 6.5. Growth rate is medium.
California Incense Cedar	*Calocedrus decurrens*	NE	5–8	F–P	30'–50'	8'–10'	8'–10'	6.0–7.0		Western native and can get very large with age. Growth rate is slow to medium (faster when established).
European Hornbeam	*Carpinus betulus*	D	5–7	F–P	40'–60'	30'–40'	25'–35'	6.0–7.0		Several cultivars, including columnare, compact, and weeping forms. Better for northern Midsouth zones. Growth rate is slow to medium.
Water Hickory	*Carya aquatica*	D	6–10	F–P	60'–90'	25'–40'	25'–25'	5.5–7.0	X	Tree of very wet soils. Leaf texture fine, comparable to Pecan. Nuts small and slightly flattened. Growth rate is medium.
Southern Shagbark Hickory	*Carya carolinae-septentrionalis*	D	5–8	F–P	60'–80'	35'–55'	27'–40'	6.4–8.0	X	Similar to Shagbark Hickory. Bark peels in long strips. Nut is edible. Nut may be food for wildlife such as squirrels and birds. Growth rate is medium.
Bittternut	*Carya cordiformis*	D	4–9	F–P	50'–75'	30'–40'	25'–35'	6.0–7.0	X	Native bottomland hardwood, with relatively fine leaf texture. Similar to Water Hickory. Bark rather smooth. Growth rate is medium.
Pignut Hickory	*Carya glabra*	D	4–9	F–P	50'–60'	25'–35'	30'–50'	5.5–7.0	X	Common hardwood in a wide range of habitat. Bark rather smooth. Fall color typically yellow. Nuts may be food for wildlife such as squirrels and birds. Growth rate is medium.
Pecan	*Carya illinoensis*	D	5–9	F	70'–100'	40'–75'	27'–40'	6.4–8.0	X	Leaves fall early and appear late. Wood brittle and subject to storm damage. Nuts are edible. Nuts may be food for wildlife such as squirrels and birds. Growth rate is medium.
Big Shellbark	*Carya laciniosa*	D	5–8	F–P	60'–80'	35'–55'	27'–40'	6.4–8.0	X	Leaves fall early and appear late. Bark peels in long strips. Nuts are edible. Nuts may be food for wildlife such as squirrels and birds. Growth rate is medium.
Shagbark Hickory	*Carya ovata*	D	4–8	F–P	60'–80'	35'–55'	27'–40'	6.4–8.0	X	Leaves fall early and appear late. Bark peels in long strips. Nuts are edible. Nuts may be food for wildlife such as squirrels and birds. Growth rate is medium.
Nutmeg Hickory	*Carya myristiciformis*	D	6–8	F–P	60'–80'	35'–55'	25'–35'	6.5–8.0	X	Tree of calcareous soils. Texture relatively fine, with yellowish-copper leaf undersides most notable in fall. Nuts are small, blotched. Growth rate is medium.
Mockernut Hickory	*Carya tomentosa*	D	4–9	F–P	50'–60'	25'–35'	30'–50'	6.4–8.0	X	Bottomland hardwood. Bark peels in long strips. Nuts are edible. Nuts may be food for wildlife such as squirrels and birds. Growth rate is medium.

Large Trees — More than 40 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height[3]	Width	Spacing	pH range	Native[4]	Comments
Chinese Chestnut	*Castanea mollissima*	D	4–8	F–P	40'–60'	40'–60'	25'–35'	5.5–6.5		Sometimes used as replacement for American Chestnut. Spiny fruit husk can be a problem in landscape. Fruit is edible. Growth rate is slow to medium.
Northern Catalpa	*Catalpa speciosa*	D	4–8	F–P	40'–60'	20'–40'	15'–30'	6.0–7.0	X	Larger relative of Southern Catalpa. Leaves coarse-textured; fruits long, pendant pods. Leaves eaten by worms that are sometimes used for fish bait. Growth rate is medium to fast.
Atlas Cedar	*Cedrus atlantica*	NE	6–9	F	40'–60'	30'–40'	15'–30'	6.0–7.0		Usually used as an accent tree. Gray and weeping forms typically sold. Prefers well-drained soils. Growth rate is slow.
Deodar Cedar	*Cedrus deodara*	NE	7–8	F	40'–70'	30'–40'	20'–30'	6.0–7.0		Tops may die because of borers and destroy symmetry. Branches pendulous when young. Reported to be drought tolerant. Growth rate is medium.
Cedar of Lebanon	*Cedrus libani*	NE	5–7	F	40'–60'	30'–40'	15'–30'	6.0–7.0		Similar to Deodar Cedar in form. Available but rarely seen in Mississippi. Some cultivars available. Growth rate is slow.
Sugar Hackberry	*Celtis laevigata*	D	5–9	F–P	50'–70'	40'–60'	33'–50'	6.0–8.0	X	Long-lived tree. Bark interesting with warty outgrowths. Zigzag stems. Good for chalky or alkaline soils. Roots shallow and dense. Growth rate is medium.
Common Hackberry	*Celtis occidentalis*	D	3–9	F–P	40'–60'	30'–50'	25'–40'	6.0–8.0	X	Similar to Sugar Hackberry. A few cultivars. Growth rate is medium to fast.
Katsuratree	*Cercidiphyllum japoncium*	D	4–8	F–P	40'–60'	20'–35'	15'–25'	6.0–7.0		Leaf similar to Redbud but opposite and unrelated and without showy flowers. Good shade tree with yellowish fall color. Growth rate is medium to fast.
Hinoki Falsecypress	*Chamaecyparis obtusa*	NE	5–8	F	50'–75'	10'–20'	8'–15'	5.5–7.5		Standard form described here, but several cultivars available that will remain very small. Growth rate on standard is medium, but dwarf forms are slow.
Sawara Falsecypress	Chamaecyparis pisifera	NE	4–8	F	50'–70'	10'–20'	8'–15'	5.5–7.5		Standard form described here, but several cultivars available that will remain very small. Threadleaf (filifera) forms common and often used as shrubs. Growth rate on standard is medium, but dwarf forms are slow.
Atlantic Whitecedar	*Chamaecyparis thyoides*	NE	4–9	F–P	40'–50'	10'–20'	8'–15'	5.5–6.5	X	Native to swamps in the South. Have seen large trees along tributaries in Southeast Mississippi. Many cultivars, including dwarf and gray forms. Growth rate is medium to fast.
American Yellowwood	*Cladrastis kentukea*	D	4–8	F–P	30'–50'	40'–55'	25'–40'	5.5–7.0	X	Rather rare in Mississippi, generally occurring on limestone bluffs. Both bark and white flowers of interest in the landscape. Growth rate is medium.
Japanese Cryptomeria	*Cryptomeria japonica*	NE	5–8	F	50'–60'	20'–30'	15'–25'	5.5–7.0		Nice pyramidal tree, although can develop some disease problems with age. Several cultivars, including dwarf or more compact forms like 'Black Dragon.' Growth rate is medium.
Common Chinafir	*Cunninghamia lanceolata*	NE	7–9	F	30'–75'	10'–30'	13'–20'	6.0–8.0		Overall appearance of plant is coarse, though foliage is small. Sensitive to poorly drained soils. Can get unusually shaggy with age. A gray form is available. Growth rate is slow to medium.

Large Trees — More than 40 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height[3]	Width	Spacing	pH range	Native[4]	Comments
Leyland Cypress	X *Cupressocyparis leylandii*	NE	6–10	F–P	60'–70'	12'–20'	10'–15'	5.0–7.0		This plant is an intergeneric hybrid. Transplants easily from containers. Tolerant of salt spray. Varieties include 'Castlewellan' with yellow foliage; 'Green Spire' with a narrow, columnar form; 'Leighton Green' with heat resistance; 'Naylor's Blue' with grayish-green foliage; 'Silverdust' with bluish-green foliage with white variegations. Growth rate is very fast.
Arizona Cypress	*Cupressus arizonica*	NE	7–9	F–P	40'–50'	25'–30'	15'–25'	6.0–8.0		Has very attractive blue-gray needles. Responds well to fertilizer. May get too big for many locations. Growth rate is medium.
Common Persimmon	*Diospyros virginiana*	D	4–9	F	35'–60'	20'–35'	20'–30'	5.0–6.5	X	One of the most durable of small trees, growing in a wide variety of habitats. Male and female trees. Difficult to transplant. Growth rate is medium.
Cider Gum	*Eucalyptus gunnii*	BE	7–11	F–P	40'–50'	30'–40'	20'–30'	6.0–8.0		Unusual landscape tree with gray foliage. Many species from Australia and Tasmania. The similar Silver Dollar Tree (*E. cinerea*) is listed for Zone 8 south, but have had one in 7b for several years. Too many Zone 7 south species to address here. Another group for the collector. Growth rate is medium.
American Beech	*Fagus grandifolia*	D	4–9	F–P	50'–70'	50'–70'	30'–50'	5.0–6.7	X	Sensitive to overly wet areas. Roots are shallow and tolerate very little soil disturbance around plant once established. Not tolerant of city conditions. Growth rate is medium.
European Beech	*Fagus sylvatica*	D	4–7	F	50'–60'	35'–45'	30'–40'	5.0–6.7		Sensitive to very wet areas. Does not tolerate soil disturbance around roots once established. Many cultivars, including purple leaf forms. Growth rate is medium.
White Ash	*Fraxinus americana*	D	4–9	F	50'–80'	50'–80'	30'–40'	6.0–7.5	X	Not tolerant of poorly drained soils and should not be used in suburban areas with no topsoil or where soil is a heavy clay. Several cultivars. Now threatened by the emerald ash borer. Growth rate is medium.
Green Ash	*Fraxinus pennsylvanica lanceolata*	D	2–9	F	50'–60'	25'–30'	30'–40'	6.0–7.5	X	Leaves more lance-shaped than regular Green Ash. Occurs over much of United States. Avoid poorly drained soils, although commonly grows in flood plain forest. Several cultivars, including seedless. Now threatened by the emerald ash borer. Growth rate is medium to fast.
Marshall's Seedless Green Ash	*Fraxinus pennsylvanica lanceolata*	D	3–9	F	50'–60'	40'–50'	30'–40'	6.0–7.5	X	One of male (seedless) varieties. Does not have litter problem as with 'Marshall's Seedless' Green Ash. Old cultivar selected in Nebraska. Drought resistant. Now threatened by emerald ash borer. Growth rate is medium to fast.
Blue Ash	*Fraxinus quadrangulata*	D	4–7	F–P	50'–70'	30'–50'	20'–30'	6.0–8.0	X	Short-lived tree, with unusual four-winged twigs. Tolerates alkaline soils and dry conditions. Growth rate is medium to fast.

Large Trees — More than 40 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height[3]	Width	Spacing	pH range	Native[4]	Comments
Ginkgo	*Ginkgo biloba*	D	4–8	F–P	50'–80'	30'–40'	30'–40'	6.0–7.0		Many cultivars, including male and female cultivars. Fruit is produced on female trees and often has an unpleasant odor. Select a male variety. Long-lived with good fall gold color. Fossils of leaves over 150 million years old. Growth rate is medium.
Thornless Honey Locust	*Gleditsia triacanthos inermis*	D	4–8	F	30'–70'	25'–60'	20'–35'	6.0–8.0	X	This selection has no thorns, but there are several thornless cultivars. May develop thorns with age. Growth rate is fast.
Moraine Thornless Honey Locust	*Gleditsia triacanthos inermis* 'Moraine'	D	4–8	F	40'–50'	35'–45'	20'–35'	6.0–8.0	X	Thornless cultivar with good gold fall color. First patented thornless honey-locust. Growth rate is fast.
Kentucky Coffeetree	*Gymnocladus dioicus*	D	4–8	F	60'–75'	40'–50'	25–35'	6.0–7.5	X	Another rare tree both in the landscape and wild. Very large compound leaves. Seeds once used as a coffee substitute after roasting. Legume, so rather tolerant of poor soils. A few cultivars. Growth rate is slow to medium.
Igiri Tree	*Idesia polycarpa*	D	6–9	F	40'–60'	40'–60'	30'–40'	6.0–7.0		Unusual tree, particularly in fruit. Uncommon in Mississippi landscapes. Growth rate is fast.
American Holly	*Ilex opaca*	BE	5–9	F–P	40'–50'	18'–40'	13'–20'	5.0–6.0	X	Often an understory tree in woodlands. Numerous varieties. Some with yellow fruit. Dioecious. Difficult to transplant in larger sizes. Fruits on new wood. Growth rate is medium.
Howard American Holly	*Ilex opaca* 'Howard'	BE	6–9	F–P	40'–50'	18'–40'	13'–20'	5.0–6.5	X	See American Holly. Heavy berry producer. Female clone. Not as hardy as American Holly. Growth rate is medium.
Butternut or White Walnut	*Juglans cinerea*	D	3–7	F	40'–60'	30'–50'	25'–40'	6.0–8.0	X	Rare in Mississippi and over much of its native range. Roots give off toxic substance, making it difficult to grow other plants nearby. Fruit can be a nuisance. Difficult to transplant. Growth rate is slow to medium.
Black Walnut	*Juglans nigra*	D	4–9	F	50'–75'	45'–70'	30'–40'	6.0–8.0	X	Roots give off toxic substance, making it difficult to grow other plants nearby. Fruit can be a nuisance. Difficult to transplant. Growth rate is slow to medium.
English Walnut	*Juglans regia*	D	6–9	F	40'–60'	40'–60'	25'–40'	6.0–8.0		Smooth, whitish bark an interesting feature in the landscape. Fruit can be a nuisance, but easier to shell. Difficult to transplant. Growth rate is slow to medium.
Eastern Red Cedar	*Juniperus virginiana*	NE	2–9	F	40'–50'	8'–20'	13'–20'	5.5–8.0	X	Usually dioecious. Fruit matures in 1 year. May be difficult to transplant when large. Lends itself to formal landscapes. Many cultivars. Growth rate is medium.
American Sweetgum	*Liquidambar styraciflua*	D	5–9	F	60'–75'	40'–50'	30'–40'	6.0–7.0	X	One of better trees for fall color for Deep South. Usually maroon but may be red or yellow. Seed balls may be a nuisance in landscapes. They do not decay readily. Roots shallow and not easily transplanted in larger sizes. One of few trees that tolerates topping at an old age. Growth rate is medium.

Large Trees — More than 40 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height[3]	Width	Spacing	pH range	Native[4]	Comments
Tulip Magnolia	*Liriodendron tulipifera*	D	4–9	F–P	70'–90'	35'–50'	30′–40′	6.0–7.0	X	Does not transplant easily in larger sizes. Sensitive to poorly drained soils or soils with high water table. Rapid growth when fertilized in late winter with high nitrogen fertilizer. Growth rate is medium.
Cucumbertree Magnolia	*Magnolia acuminata*	D	4–8	F–S	50'–80'	40'–70'	30′–40′	5.0–7.0	X	Not very common in landscapes. Pyramidal in form when young. Flowers greenish to yellow, unlike native, deciduous, white-flowered magnolias. Several cultivars. Growth rate is medium to fast.
Yulan Magnolia	*Magnolia denudata*	D	5–8	F–P	30'–40'	25'–35'	15′–25′	5.0–6.0		Difficult to transplant. Needs plenty of room to develop. Rose-colored flowering form available. Growth rate is medium.
Southern Magnolia	*Magnolia grandiflora*	BE	7–10	F–S	60'–80'	30'–50'	30′–40′	5.0–6.0	X	Leaf litter objectionable. Best when the lower branches are retained and allowed to sweep the ground. Difficult to transplant in large sizes. Many cultivars, some dwarf. Growth rate is slow to medium.
Sweetbay Magnolia	*Magnolia virginiana*	BE	5–9	F–S	60'–70'	30'–50'	30′–40′	5.0–6.0	X	Sheds leaves in spring. Roots shallow and difficult to transplant. Sprouts readily from the roots. Typically grows in Southern swamps and not drought tolerant. Foliage silvery below. Several cultivars. Not to be confused with true bays (Lauraceae) used in cooking. Growth rate is medium fast.
Dawn Redwood	*Metasequoia glyptostroboides*	D	5–8	F–P	70'–100'	25'–30'	30′–40′	5.5–6.5		Prior to 1944 this tree was known only by its fossil records. It existed in the small Chinese province of Szechuan-Hupeh for over a million years until its discovery. Much variation found in seedlings and some cultivars available. Growth rate is fast.
Red Mulberry	*Morus rubra*	D	5–9	F–P	40'–70'	40'–50'	20'–30'	5.5–6.5	X	Fruit red to black, although White Mulberry may also have black fruit. Usually a woodland understory tree. Leaves large and branches usually horizontal and open. Growth rate is medium to fast.
Water Tupelo	*Nyssa aquatica*	D	6–9	F–P	80'–90'	40'–50'	30'–40'	5.5–6.5	X	Swamp species with rather coarse texture and high canopy. Trunk swollen (buttressing) on wet sites, but no knees like Baldcypress. Growth rate medium.
Swamp Tupelo	*Nyssa biflora*	D	7–10	F–P	40'–50'	20'–25'	15'–25'	5.0–6.5	X	Swamp or bog very similar to Tupelo Blackgum but grows in wetter soils, sometimes very acidic. Growth rate slow to medium depending on soils.
Tupelo Blackgum	*Nyssa sylvatica*	D	4–9	F–P	30'–50'	20'–30'	20′–30′	6.0–7.0	X	Generally distributed along streams and floodplains. Early fall color and leaf drop. A few cultivars. Growth rate is medium.
Shortleaf Pine	*Pinus echinata*	NE	6–9	F	50'–75'	25'–50'	20'–25'	5.5–6.5	X	Upland tree with small cones. Timber tree and generally not a landscape tree, but may be found in natural home landscapes. Growth rate is fast.

Large Trees — More than 40 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height[3]	Width	Spacing	pH range	Native[4]	Comments
Slash Pine	*Pinus elliottii*	NE	8–10	F	50'–75'	25'–50'	30'–40'	5.0–7.0	X	Tree of wet soils and also has some salt tolerance in coastal areas. Cones 2–6 inches long and stalked. Can be damaged by ice storms. Difficult to transplant past the seedling stage. Excellent canopy tree for azaleas and camellias. Growth rate is fast.
Spruce Pine	*Pinus glabra*	NE	8–10	F–P	40'–60'	20'–30'	15'–20'	5.5–7.0	X	Floodplain species that will tolerate heavier soil conditions than other pines. Bark smooth similar to oaks. Branches smooth. Cones remain on tree for 2–3 years. Cones 1–2.5 inches. Growth rate is medium to fast.
Austrian Pine	*Pinus nigra*	NE	4–7	F	50'–60'	20'–40'	10'–20'	5.5–6.5		Occasionally sold in Mississippi with a few cultivars, but tends to be short- lived. Needles coarse, stiff. Similar to Japanese Black Pine in form. Growth rate is medium.
Longleaf Pine	*Pinus palustris*	NE	7–10	F–S	50'–75'	25'–50'	30'–40'	4.5–5.0	X	Sometimes confused with Slash Pine, but generally a tree of more upland sandy and poor soils. Slow growth for first 2–3 years, then fast. Needles 8–18 inches long. Easily damaged by ice storms. Excellent canopy for camellias and azaleas. Growth rate is fast.
White Pine	*Pinus strobus*	NE	3–7	F–P	50'–80'	20'–40'	20'–40'	5.0–6.0	X	Very soft-textured pine. Bark smooth on young limbs and trunks. Not recommended for Lower South, at least parts of Zone 7 and south. Plant is affected by day length, which varies less in the Deep South. Growth rate is fast.
Loblolly Pine	*Pinus taeda*	NE	6–9	F–S	60'–90'	30'–40	30'–40'	5.0–6.0	X	Difficult to transplant in large sizes. Excellent canopy for azaleas and camellias, but not generally recommended for landscapes. Cones 3–6 inches long with almost no stem. Needles 6–9 inches long. Growth rate is fast.
Japanese Black Pine	*Pinus thunbergii*	NE	6–8	F	20'–80'	15'–50'	30'–40'	5.5–6.5		Needles 3–4 inches long. Ideal for Japanese garden effect. Similar to Austrian Pine in form. Growth rate is fast.
London Plane Tree	*Platanus* x *acerifolia*	D	4–9	F	70'–100'	65'–80'	30'–40'	6.0–7.5		Cross between American and Oriental Sycamores. Reported to be less susceptible to anthracnose. Is very similar to American Sycamore except smaller in scale. Growth rate is fast.
American Sycamore	*Platanus occidentalis*	D	4–9	F	75'–100'	65'–80'	30'–40'	6.0–7.5	X	Short-lived tree well recognized by brown bark exfoliating to smooth white under bark. Due to disease and insect problems, it is questionable if this tree should be planted in the Deep South. Leaves may be a litter problem. Growth rate is fast.
Bolleana Poplar	*Populus alba* 'Pyramidalis'	D	3–8	F–P	50'–60'	5'–10'	17'–25'	5.5–7.0		Very formal. Leaf silvery-white beneath. May show dust and soot. Suckers readily from roots. Tolerates poor to fertile soils. Growth rate is medium to fast.
Eastern Poplar	*Populus deltoides*	D	3–9	F	75'–100'	50'–75'	30'–40'	5.5–7.0	X	Male trees preferred due to nuisance, cottony seeds of female trees. Quick shade but short-lived. A major tree for pulpwood because of rapid growth. Massive fibrous root system may invade sewer lines and fertile, moist planting beds. Leaves a litter problem. Growth rate is fast.

Large Trees — More than 40 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height[3]	Width	Spacing	pH range	Native[4]	Comments
Lombardy Poplar	*Populus nigra* 'Italica'	D	3–9	F	50'–60'	5'–15'	20'–30'	5.5–7.0		Formal columnar tree. Short-lived tree. Highly advertised tree through mail order sources. Shallow roots with many suckers. Growth rate is fast.
Black Cherry	*Prunus serotina*	D	3–9	F–P	50'–60'	40'–50'	20'–30'	6.0–7.5	X	Fruit favored by many forms of wildlife. Short-lived tree with brittle wood. Volunteer seedling common along fence rows. Fast growth with fertile, moist, well-drained soils. Growth rate is fast.
Chinese Wingnut	*Pterocarya hupehensis*	D	6–9	F	60'–80'	50'–70'	30'–40'	6.0–7.0		Fine foliage, related to Hickory. Other large species of Wingnuts are available for shade. Growth rate is medium.
Sawtooth Oak	*Quercus acutissima*	D	5–9	F	40'–60'	30'–50'	30'–40'	5.0–6.5		Can escape cultivation. Acorn about 1 inch in diameter with long scales covering about half the acorn. Sometimes confused with chestnut oak. Growth rate is medium to fast.
White Oak	*Quercus alba*	D	4–9	F–P	50'–80'	50'–80'	30'–40'	5.0–6.5	X	Attains a massive size but is slow-growing. Not easily adaptable to city conditions. Leaves are large and provide fairly dense shade. Acorns attract deer and other wildlife. Growth rate is slow.
Southern Red Oak	*Quercus falcata*	D	6–9	F–P	70'–80'	60'–70'	30'–40'	4.0–5.0	X	Bark dark brown or black and deeply fissured. Easily transplanted. One of the best oaks for the South. Grows better in drier locations. Galls can be a problem. Growth rate is medium to fast.
Swamp Red Oak	*Quercus pagoda*	D	7–9	F–P	70'–80'	60'–70'	30'–40'	4.0–5.0	X	Easily transplanted. Taller growing than Southern Red Oak and generally on lower ground. Galls may be unsightly. Growth rate is medium to fast.
Laurel Oak or Diamond Oak	*Quercus laurifolia*	SE	6–9	F–P	70'–80'	60'–70'	30'–40'	5.0–6.0	X	Acorn half-inch long. Plant difficult to transplant. Long-lived tree. Attractive, symmetrical tree. Similar and often confused with *Quercus hemisphaerica*. Growth rate is medium.
Overcup Oak	*Quercus lyrata*	D	5–9	F–P	40'–60'	30'–50'	20'–30'	5.0–6.0	X	Wetland species and included here for very wet areas in landscapes. Acorns float and can be a problem in landscape. Growth rate slow to medium.
Bur Oak	*Quercus macrocarpa*	D	3–8	F–P	70'–80'	60'–70'	30'–40'	6.0–8.0	X	Acorn large and possible problem in landscape. Rare in Mississippi and adapted to alkaline soils. Foliage and bark dark. Growth rate is slow.
Chinkapin Oak	*Quercus muehlenbergii*	D	4–7	F–P	70'–80'	60'–70'	30'–40'	5.0–8.0	X	Also known as Yellow Chestnut Oak and leaves similar to Swamp Chestnut Oak. Bark ashy-gray and flaky. Acorn about half-inch long, oval, dark brown with cap covering about one-fourth of acorn. Not especially well-suited for coastal counties, but does well in alkaline soils. Growth rate is slow to medium.
Water Oak	*Quercus nigra*	D	6–9	F–P	40'–70'	50'–80'	30'–40'	5.5–6.5	X	Bark grayish-black, rough. Excellent for city conditions. Leaves may be retained part of the winter. A good oak for the landscape. Leaves spatulate at the end, often developing three lobes. Acorns small and attract wildlife. Growth rate is medium to fast.

Large Trees — More than 40 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height[3]	Width	Spacing	pH range	Native[4]	Comments
Pin Oak	*Quercus palustris*	D	4–8	F	60'–70'	25'–40'	30′–40′	5.0–6.5	X	Easily transplanted. Typically a bottomland tree and not very drought tolerant. Becomes chlorotic if grown in alkaline soils. Leaves deeply cut with five to nine lobes. Tolerates city conditions. Growth rate is medium to fast.
Willow Oak	*Quercus phellos*	D	5–9	F–P	40'–60'	30'–40'	30′–40′	5.0–6.0	X	Retains leaves late in fall. Leaves fine and resemble those of Black Willow. Long-lived tree. Acorn about half-inch long, oval to flattened, with cap covering about one-fourth of acorn. Growth rate is medium to fast.
Swamp Chestnut Oak	*Quercus michauxii*	D	5–9	F–P	70'–80'	60'–70'	30′–40′	5.0–6.0	X	Difficult to transplant. Bottomland hardwood. Excellent fall color not found in other chestnut oaks. Acorn large, about 1½ inch long, lustrous brown, with cap covering about one-third of acorn. Growth rate is medium.
English Oak or British Oak	*Quercus robur*	D	4–8	F–P	40'–60'	30'–40'	30′–40′	5.5–6.5		Many cultivars available. More columnar forms can be planted closer together. Difficult to transplant. Acorn 1 inch long on stalk. Growth rate is slow.
Shumard Oak	*Quercus shumardii*	D	5–9	F–P	40'–60'	30'–50'	30′–40′	6.0–7.5	X	Good substitute for Scarlet Oak. Very attractive symmetrical tree. Acorn ¾ to 1¼ inch long. Growth rate is medium to fast.
Post Oak	*Quercus stellata*	D	5–9	F–S	60'–70'	40'–60'	30′–40′	5.0–6.0	X	Rather difficult to transplant. Dead leaves fall throughout the winter. Not often used in the landscape. Will tolerate moist, well-drained areas. Acorn about half-inch long with cup covering a fourth to half of the acorn. Growth rate is slow to medium.
Live Oak	*Quercus virginiana*	BE	7–10	F	40'–80'	60'–100'	50′–75′	5.0–6.0	X	Largest on record has a 38-foot trunk circumference, 168-foot spread, and 75-foot height. Other Live Oak species and varieties exist in the United States. Easily transplanted when young. Needs plenty of room to develop. Acorns three-fourths inch long, narrow, black. Thought to be slow-growing, but proper care indicates otherwise. Growth rate is medium.
White Willow	*Salix alba*	D	2–9	F	75'–100'	50'–100'	30'–50'	5.0–6.0		Escaped in the United States. Large willow with fine texture. A few cultivars, including yellow twig forms. Growth rate is fast.
Black Willow	*Salix nigra*	D	3–9	F–P	40'–60'	30'–50'	20′–30′	5.5–7.0	X	Easily escapes in the landscape by wind-dispersed seed. Very fine texture, but branches brittle and problem in the landscape. Tree of little landscape value, but adaptable to very wet sites. Growth rate is fast.
Japanese Pagodatree	*Sophora japonica*	D	4–7	F	50'–75'	50'–75'	30'–50'	5.5–6.5		Fine-textured tree with creamy-white flowers. Legume adaptable to poor soils. Can reseed in the landscape. A few cultivars. Growth rate is medium to fast.
Common Baldcypress	*Taxodium distichum*	D	4–11	F–P	50'–70'	20'–30'	25′–35′	5.5–6.5	X	Tolerates very dry to very wet sites. Cypress knee production occurs in wet or poorly drained soils. Growth rate is slow to medium.

Large Trees — More than 40 feet

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height[3]	Width	Spacing	pH range	Native[4]	Comments
American Arborvitae	*Thuja occidentalis*	NE	3–7	F	40'–60'	10'–15'	8'–15'	5.5–7.0		Native to North America with many cultivars. Commonly sold, but often suffers in Zone 7 south. Growth rate is slow to medium depending on cultivar and growing conditions.
Giant Arborvitae	*Thuja plicata*	NE	5–7	F–P	50'–70'	15'–25'	10'–20'	5.5–7.0		Native to western North America with many cultivars. Commonly sold, especially 'Green Giant,' which may or may not be Giant Arborvitae. Growth rate is slow to medium.
American Linden	*Tilia americana*	D	4–8	F–P	60'–80'	40'–50'	30'–40'	5.0–6.5	X	More than one botanical variety and cultivar in the United States. Flowers attract bees in large numbers, since they are a good source of nectar for honey. Tolerant of most soils but does well in moist, fertile, well-drained ones. Growth rate is medium to fast.
Littleleaf Linden	*Tilia cordata*	D	4–7	F	60'–70'	40'–50'	30'–40'	5.5–7.5		Many cultivars. One of several exotic Tilia species in cultivation. An attractive tree. More tolerant of alkaline soils. Does not tolerate dry sites. Drainage must be good. Growth rate is fast.
Canadian Hemlock	*Tsuga canadensis*	NE	4–7	F–S	40'–70'	25'–35'	10'–15'	5.5–6.5	X	Many cultivars. Native Alabama north. Asian and western species are also cultivated. Beautiful tree in nature producing intense shade. Large and sometimes old stands in the Appalachian Mountains are dying from the invasive woolly adelgid. Growth rate is medium.
Winged Elm	*Ulmus alata*	D	6–9	F–P	50'–60'	45'–55'	30'–40'	5.5–6.5	X	Noted for the cork-winged branches. Very tolerant of difficult sites. Growth rate is medium to fast.
American Elm	*Ulmus americana*	D	3–9	F–P	60'–80'	40'–50'	30'–40'	5.5–6.5	X	A nice, well-recognized shade tree with several cultivars, some of which were developed for Dutch elm disease resistance. Growth rate is medium to fast.
Cedar Elm	*Ulmus crassifolia*	D	7–9	F–P	50'–70'	40'–60'	30'–40'	5.5–7.0	X	Similar to Winged Elm, but without the wings. Withstands a wide range of conditions from wet to dry. Seen more west of Mississippi. Growth rate is slow to medium.
Japanese Zelkova	*Zelkova serrata*	D	5–8	F–P	50'–80'	30'–60'	20'–40'	6.0–7.0		Many cultivars. Has been promoted as an elm replacement. Other Zelkova species have been introduced. Foliage very similar to elm, but bark tends to be smooth. Growth rate is medium.

1 BE = Broadleaf Evergreen; D = Deciduous; NE = Needled Evergreen; SE = Semibroadleaf Evergreen; and V = Variable.

2 F = Full Sun; P = Part Sun to Part Shade; and S = Shade.

3 Heights provided in this table are general ranges, and some species may get larger over many years, as observed in record champion trees.

4 Native refers to species that are native to the southeastern United States.

TABLE 2. Invasive landscape trees and suggested alternatives for each.

Common Name	Scientific Name	Foliage[1]	Zones	Light[2]	Height[3]	Width	Spacing	pH range	Regulated[4]	Reason[5]	Suggested Alternatives
Trident Maple	*Acer buergerianum*	D	5–8	F–P	20'–35'	20'–35'	15'–30'	5.5–6.5		S	Other medium-height Maple species (*Acer* spp.)
Norway Maple	*Acer platanoides*	D	4–7	F–S	40'–50'	30'–40'	27'–40'	6.0–8.0		S	Native maple (*Acer*) species
Tree of Heaven	*Ailanthus altissima*	D	4–8	F–P	40'–60'	30'–50'	15'–25'	5.5–8.0		B	Other pinnate-leaved trees, such as Pecan
Mimosa	*Albizia julibrissin*	D	7–9	F–P	20'–30'	20'–30'	23'–35'	5.0–7.0		S	Thornless Honeylocust
Tung-oil Tree	*Aleurites (Vernicia) fordii*	D	8–10	F–P	10'–20'	10'–20'	8'–15'	6.0–7.0		S	Southern Catalpa (*Catalpa bignonioides*)
Common Paper Mulberry	*Broussonetia papyrifera*	D	6–10	F–P	20'–40'	20'–40'	20'–30'	5.5–7.0		V	Other mulberries (*Morus* spp.), native or fruitless
Camphor Tree	*Cinnamomum camphora*	BE	9–11	F–P	40'–60'	40'–60'	20'–40'	5.5–7.0		S	Live Oak, Sweetbay Magnolia, or Southern Magnolia
Harlequin Glorybower	*Clerodendrum trichotomum*	D	7–9	F–S	5'–10'	5'–8'	5'–8'	5.5–7.0		V	Seven-son Flower (*Heptacodium miconioides*)
Russian-olive	*Elaeagnus angustifolia*	D	2–7	F	12'–20'	12'–20'	8'–12'	6.0–8.0		S	Pineapple Guava for grayish foliage
Autumn Elaeagnus	*Elaeagnus umbellata*	SE	4–8	F	12'–20'	15'–25'	8'–12'	6.0–8.0		S	Pineapple Guava for grayish foliage
Common Pearlbush	*Exochorda racemosa*	D	4–8	F–S	10'–15'	10'–15'	8'–12'	5.5–7.5		S	Small cherry species (*Prunus* spp.), snowbells (*Halesia* spp. or *Styrax* spp.), or hawthorns (*Crataegus* spp.)
Chinese Parasol Tree	*Firmiana simplex*	D	7–9	F–P	30'–45'	20'–35'	10'–25'	5.0–7.0		S	Bigleaf or Umbrella Magnolia
Japanese Privet	*Ligustrum japonicum*	BE	7–10	F–S	6'–12'	6'–10'	6'–10'	6.0–7.0		S	*Osmanthus* spp., or other small broadleaf evergreen tree
Glossy Privet	*Ligustrum lucidum*	BE	7–10	F–S	20'–25'	20'–25'	10'–15'	6.0–7.0		S	*Osmanthus* spp., or other small broadleaf evergreen tree
Chinaberry	*Melia azederach*	D	7–10	F–P	30'–40'	25'–35'	15'–20'	5.0–7.0		B	Lilac Chastetree (*Vitex agnus-castus*) or Chastetree (*Vitex negundo*)
White Mulberry	*Morus alba*	D	5–9	F–P	30'–50'	25'–45'	20'–25'	6.0–7.5		S	Fuitless variety, or native
Royal Paulownia	*Paulownia tomentosa*	D	5–9	F	30'–40'	30'–40'	20'–25'	6.0–8.0		S	*Catalpa bignonioides* or *speciosa*; *Tilia americana*
Chinese Photinia	*Photinia serrulata*	BE	6–9	F–P	20'–25'	15'–20'	10'–15'	6.0–7.0		S	Banana Shrub, Swamp Redbay, Blue Japanese Oak, or other
Trifoliate-orange	*Poncirus trifoliata*	D	6–9	P–S	8'–20'	4'–15'	4'–15'	5.5–6.5		S	*Citrus* cultivars where hardy, or Wafer-ash
Callery Pear	*Pyrus calleryana*	D	5–8	F	30'–50'	20'–35'	17'–25'	5.5–6.5		S	Includes 'Aristocrat,' 'Bradford,' 'Capital,' and other cutlivars. Replace with medium-height cherry species (*Prunus* spp.)
Chinese Tallow Tree	*Triadica sebifera*	D	7–10	F–P	30'–40'	30'–40'	15'–30'	5.5–6.5	X	S	Golden Rain Tree or Panicled Golden Rain Tree
Lacebark Elm	*Ulmus parvifolia*	D	5–9	F	40'–50'	40'–50'	13'–20'	5.0–7.5		S	Japanese Stewartia, or other tree with attractive bark feature
Siberian Elm	*Ulmus pumila*	D	4–9	F–P	50'–70'	40'–50'	13'–20'	5.5–7.5		S	Japanese Zelkova or native elms (*Ulmus* spp.)
Linden Viburnum	*Viburnum dilatatum*	D	5–7	F–P	8'–10'	6'–8'	5'–8'	6.0–7.0		S	Blackhaw Viburnum or Rusty Blackhaw

1 BE = Broadleaf Evergreen; D = Deciduous; NE = Needled Evergreen; SE = Semibroadleaf Evergreen; and V = Variable.

2 F = Full Sun; P = Part Sun to Part Shade; and S = Shade.

3 Heights provided in this table are general ranges, and some species may get larger over many years, as observed in record champion trees.

4 Regulated as a noxious weed in Mississippi by the Mississippi Department of Agriculture and Commerce.

5 Primary reason species is invasive: S=Seed; V=Vegetative Spread; B=Both Seed and Vegetative.

Landscape renderings by
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MISSISSIPPI STATE UNIVERSITY EXTENSION

Drought-Tolerant Trees for Mississippi Landscapes

Mississippi has a humid, subtropical climate. Summers are long and hot, but winters are relatively mild. Northern Mississippi experiences three to four summer months with temperatures above 86°F, whereas south Mississippi experiences four to five months of such temperatures. Much of the year, prevailing southerly winds bring humid air from the Gulf of Mexico across the state.

Precipitation is abundant and distributed through the year. Northern Mississippi receives about 55 inches of precipitation annually, while southern Mississippi receives about 65 inches. Southern Mississippi experiences more thunderstorms during the summer, as well as tropical storms and hurricanes.

Despite the abundant annual precipitation, seasonal droughts typically occur each year. It is usually driest between September and November. Therefore, when planting trees, it is important to consider drought tolerance. This is particularly true for drier upland sites, non-irrigated yards, and along streets. Often, trees in cities have very limited rooting space, so being able to tolerate drought is important.

Water Conservation

Trees that are adapted to the landscape will need minimal irrigation. Native trees have evolved with the soil, drainage, climatic, and weather conditions found across Mississippi. These should be the first choice when selecting material to plant.

Mississippi soils tend to be low in organic matter, which decomposes quickly in the warm and humid climate. Adding organic matter is a great way to enhance soil fertility and structure and retain moisture and plant nutrients, especially in sandy or clay soils. It is best to add organic matter when planting a new bed, so you can treat the entire area. Add several inches of organic material to the top of the soil, and then disk or till to a depth of 6–10 inches.

Adding mulch around trees also helps conserve moisture. Organic mulches such as pine straw or cypress bark can improve soil organic matter content in established beds. Mulch can also reduce competition from unwanted weeds and stabilize soil temperature in the rooting zone by keeping roots warmer in winter and cooler in summer. Ideally, the mulched area should extend to the canopy dripline, spread about 2–4 inches deep, but not cover the flare at the root collar where roots meet the stem. In addition, mulched beds will keep mowers and string trimmers away from trees, preventing damage to the trunk and roots.

Finally, if supplemental watering is necessary, drip irrigation is best for conserving water. Tree roots respond best to watering over a long period of time, which wets the soil deeply. This encourages tree roots to grow deeper. When using a soaker hose, spread it under the tree canopy, letting the water run for several hours once per week during drought. This will help improve tree survival. This is especially useful for mature, established trees that do not tolerate environmental stresses as well as vigorously growing younger trees. Move the hose to water other trees in the yard as needed.

Tree Selection and Establishment

Besides matching trees to the appropriate site conditions, it is very important to consider the growing space available. When selecting trees for planting, consider the mature size. Trees that grow large, such as oaks or pines, may not be the best selection for planting in cityscapes where rooting space is limited and overhead utilities abound. Call 8-1-1 to locate buried utilities before digging. This is a free service that also functions as a safety precaution against damaging buried electric or gas lines. If you use this service and still hit a buried utility, this program limits your liability for damages.

Given Mississippi's warm climate, soils do not freeze through the winter. The best time to plant container or balled/burlapped trees is in the fall. Since soils are

above freezing, tree roots remain active through the winter. This enhances the ability of a recently planted tree to adapt to its new environment, which can take 8–10 weeks. In addition, the cooler temperatures during fall are less stressful to transplanted trees than warming temperatures in the spring. Many trees planted in autumn will become established before the summer heat, which reduces the need for supplemental watering. On the other hand, trees planted in the spring often require additional care through the first growing season. However, transplant bareroot trees, or move established trees in the landscape, only during dormancy in the winter (late December to early March).

Dig the planting hole two to three times the diameter of the root ball. This allows tree roots to grow freely into the soil. Also, the hole should be only as deep as the current root ball. When removing the container, look for circling roots. Roots grow in the direction they are pointing, so prune circling roots so that they point outward from the stem before planting. Use the soil you removed to backfill the planting hole. Apply water generously while backfilling so the roots will make good contact with soil. Use any extra soil to form a small berm along the perimeter of the planting hole. This berm will hold water over the new planting site. Cover with 2–4 inches of mulch.

Drought-Tolerant Trees

Drought tolerance involves several characteristics that allow the tree to conserve moisture. It does not mean the trees *prefer* dry sites, just that they can tolerate them. One of the most important characteristics is the well-developed root system of an established tree. It can take 2 months to a year for a newly planted tree to acclimate. This is an important consideration when planting trees, especially in environmentally challenging areas such as dry sites.

Like many plants, trees can reduce transpiration through their leaves to save moisture. Those that are adapted to dry sites do this more effectively than other species. Smaller leaves allow trees to cool more easily. Deeper crowns with multiple layers of leaves allow trees to reduce transpiration to outer leaves exposed to direct sun, but still transpire through shaded leaves within the canopy. Waxy coatings on leaves (common with evergreen trees) reduce moisture loss. Early successional species adapted to growing in full sun are more efficient at conserving moisture than late successional species that are used to growing in the shade of other trees.

There are many examples of drought-hardy trees. One of the more notable species is shortleaf pine (*Pinus echinata*; Figure 1). Shortleaf pine is also unique among pine species for being able to sprout from its roots as a juvenile tree; this is an adaptation to frequent ground fires. It also has the most extensive range of the southern yellow pines. It is found in 23 states from southern New York to northern Florida, and west to eastern Texas and Oklahoma. It grows inland across western Pennsylvania, southern Ohio, Illinois, and Missouri. It is adapted to drier, upland sites.

Another example of a drought-tolerant tree is southern magnolia (*Magnolia grandiflora*; Figure 2). This evergreen hardwood species is the Mississippi state tree and flower. Its leaves have a thick, waxy cuticle that allows them to survive winter temperatures. While native to southern Mississippi, southern magnolia has been widely planted across the state and the country.

These are just two examples of drought-tolerant trees. Table 1 lists others, with the major common name for a tree followed by its scientific name in italics. The table presents drought tolerance for established trees with well-developed root systems, not recently planted trees. Tree species are listed with their approximate total height and canopy spread when mature. There are some additional comments about environmental preferences for each species. Photos for many of the trees listed can be found in **Mississippi Trees**.

Not all of the listed trees will grow everywhere in Mississippi. The state spans several plant hardiness zones north to south. Some species, like wax myrtle (*Morella cerifera*), will grow only in southern Mississippi, whereas other species, like bur oak (*Quercus macrocarpa*), are better suited to northern Mississippi.

Several drought-tolerant tree species are not necessarily suitable to plant for other reasons. These include red maple (*Acer rubrum*) and green ash (*Fraxinus pennsylvanica*). Red maple has brittle wood, so it should not be planted near structures, driveways, or roads. Green ash is susceptible to an invasive insect, the emerald ash borer (*Agrilus planipennis*). Once this borer attacks an ash, the tree will be killed within a few years. At this time, the emerald ash borer has not been documented in Mississippi, but it is found in every adjacent state. Finally, make sure your selected tree is not an invasive plant. If you are not sure, contact **your local Extension office**.





Figure 1. Shortleaf pine (*Pinus echinata*) is a native conifer to Mississippi. It is well adapted to dry, upland sites. It also has the widest natural range of the southern pines.





Figure 2. Southern magnolia (*Magnolia grandiflora*) is an evergreen hardwood that is drought-tolerant. This species is also the Mississippi state tree and flower.

Table 1. Drought-tolerant trees for Mississippi.

Tree	Species	Mature height (ft)	Canopy width (ft)	Comments
American holly	*Ilex opaca*	50	40	Prefers full sun to partial shade
American smoketree*	*Cotinus obovatus*	30	30	Requires full sun; multi-stemmed; beautiful fall color
American witch-hazel	*Hamamelis virginiana*	30	20	Prefers growing on northern exposures or in shade
Arizona cypress*	*Hesperocyparis arizonica*	50	30	Native to the southwestern U.S.; adapted to dry soils
Bald cypress	*Taxodium distichum*	75	25	Requires full sun; slow-growing; deciduous conifer
Black oak	*Quercus velutina*	60	60	Prefers acidic, well-drained soils in full sun
Black walnut	*Juglans nigra*	75	75	Requires full sun and rich, well-drained soils
Blackgum	*Nyssa sylvatica*	50	30	Tolerates full sun to partial shade; prefers moist soil
Blackjack oak	*Quercus marilandica*	35	25	Scrub oak commonly found on poor sites
Bur oak*	*Quercus macrocarpa*	80	80	Native to the Midwest; suitable for north-central MS
Cabbage palm	*Sabal palmetto*	65	15	Coastal tree suitable for growing in southern MS
Carolina buckthorn	*Frangula caroliniana*	40	40	Prefers partial shade; excellent wildlife tree
Carolina laurelcherry	*Prunus caroliniana*	40	25	Small tree suitable for growing in southern MS
Cedar elm	*Ulmus crassifolia*	70	60	Requires full sun
Chalk maple	*Acer leucoderme*	25	25	Prefers shade; commonly multi-stemmed
Chickasaw plum	*Prunus angustifolia*	25	15	Prefers full sun but tolerates partial shade
Chinese elm*	*Ulmus parvifolia*	50	45	Prefers full sun but tolerates partial shade
Chinese magnolia*	*Magnolia × soulangiana*	30	25	Requires full sun; prefers fertile, well-drained soil
Chinese pistache*	*Pistacia chinensis*	35	35	Requires full sun; fast-growing
Chinquapin	*Castanea pumila*	30	20	Prefers full sun to partial shade; nuts attract a variety of wildlife
Chinquapin oak	*Quercus muehlenbergii*	50	60	Requires full sun; moderate growth rate
Common persimmon	*Diospyros virginiana*	60	35	Prefers full sun and moist, well-drained soils
Crape myrtle*	*Lagerstroemia indica*	variable	variable	Multi-stemmed; cultivars in various sizes and flowers of all colors
Deodar cedar*	*Cedrus deodara*	70	40	Requires full sun; moderate growth rate
Darlington oak	*Quercus hemisphaerica*	60	40	Requires full sun and drier upland sites; fast-growing
Desert willow*	*Chilopsis linearis*	30	20	Requires full sun; multi-stemmed; native to the southwestern U.S.
Eastern redbud	*Cercis canadensis*	30	35	Beautiful lavender flowers in early spring
Eastern redcedar	*Juniperus virginiana*	50	20	Prefers full sun but tolerates partial shade; slow-growing
Green ash	*Fraxinus pennsylvanica*	60	25	Requires full sun; fast-growing; susceptible to emerald ash borer
Honeylocust	*Gleditsia triacanthos*	70	50	Requires full sun; does have thorns
Japanese zelkova*	*Zelkova serrata*	80	75	Prefers full sun and deep, well-drained soils
Laurel oak	*Quercus laurifolia*	70	45	Requires full sun; fast-growing; evergreen
Lilac chastetree*	*Vitex agnus-castus*	20	20	Requires full sun
Live oak	*Quercus virginiana*	80	120	Prefers full sun; canopy grows wider than tall; evergreen
Loblolly pine	*Pinus taeda*	100	35	Prefers full sun; avoid planting near structures (wood is brittle)

Tree	Species	Mature height (ft)	Canopy width (ft)	Comments
Longleaf pine	*Pinus palustris*	120	40	Requires full sun; adaptable to many soil conditions
Maidenhair tree*	*Ginkgo biloba*	80	40	Tolerates urban plantings; use male trees ornamentally
Nuttall oak	*Quercus texana*	60	50	Requires full sun; fast-growing
Osage-orange*	*Maclura pomifera*	60	60	Naturalized from the southern plains
Overcup oak	*Quercus lyrata*	70	50	Adapted to wet soil conditions
Pawpaw	*Asimina triloba*	40	25	Prefers full sun to partial shade; suitable for north-central MS
Pecan	*Carya illinoinensis*	100	75	Requires full sun; tolerates alkaline soil
Pignut hickory	*Carya glabra*	60	35	Requires full sun; tolerates alkaline soil
Pond cypress	*Taxodium ascendens*	80	15	Requires full sun; tolerates very wet soil; suitable for southern MS
Possumhaw	*Ilex decidua*	30	20	Prefers full sun but tolerates partial shade
Post oak	*Quercus stellata*	50	40	Slow-growing; adapted to dry, upland sites
Red buckeye	*Aesculus pavia*	20	20	Prefers full sun to partial shade; blooms attract hummingbirds
Red maple	*Acer rubrum*	60	40	Prefers full sun; avoid planting near structures (wood is brittle)
Sand live oak	*Quercus geminata*	50	50	Prefers full sun; evergreen; suitable for coastal MS
Sassafras	*Sassafras albidum*	60	40	Prefers full sun to partial shade
Sawtooth oak*	*Quercus acutissima*	60	60	Requires full sun; fast-growing
Saw palmetto	*Serenoa repens*	10	10	Prefers full sun to partial shade; suitable for southern MS
Shortleaf pine	*Pinus echinata*	100	35	Prefers full sun to partial shade; adapted to dry, upland sites
Shumard oak	*Quercus shumardii*	60	60	Requires full sun; tolerates alkaline soil
Slash pine	*Pinus elliottii*	100	50	Prefers full sun to partial shade; tolerates wet soils
Sourwood	*Oxydendrum arboreum*	30	20	Prefers full sun; moderate growth rate; excellent fall color
Southern catalpa	*Catalpa bignonioides*	60	40	Prefers full sun to partial shade; tolerates alkaline soil
Southern magnolia	*Magnolia grandiflora*	80	40	Prefers full sun to partial shade; evergreen
Southern sugar maple	*Acer floridanum*	40	25	Prefers full sun to partial shade; beautiful fall color
Spruce pine	*Pinus glabra*	90	45	Prefers full sun; suitable for southern MS
Staghorn sumac	*Rhus typhina*	25	25	Requires full sun; tolerates alkaline soil
Sugarberry	*Celtis laevigata*	60	60	Prefers sun or shade
Trident maple*	*Acer buergerianum*	35	30	Prefers full sun; slow-growing
Tuliptree	*Liriodendron tulipifera*	90	40	Requires full sun; fast-growing
Water oak	*Quercus nigra*	80	80	Prefers full sun to partial shade
Wax myrtle	*Morella cerifera*	20	20	Prefers full sun to partial shade; suitable for southern MS
White oak	*Quercus alba*	80	80	Prefers full sun to partial shade
Yaupon	*Ilex vomitoria*	20	12	Prefers full sun to partial shade; evergreen

*Non-native ornamental.
The taxonomy for common and scientific names presented is in accordance with the United States Department of Agriculture, Natural Resources Conservation Service, **National PLANTS Database**.

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Publication 3569 (POD-03-24)

Reviewed by **Jeff Wilson**, PhD, Assistant Professor, North Mississippi Research and Extension Center, from an earlier edition by John D. Kushla, PhD, Extension/ Research Professor (retired), North Mississippi Research and Extension Center.

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Soil pH and Fertilizers

The pH of a soil refers to how acid or alkaline the soil is. The letters "pH" mean "potential hydrogen." The availability of nutrients is directly affected by soil pH. If the soil's pH is too high or too low, some nutrients become insoluble, limiting the availability of these nutrients to the plant root system.

The acidity-alkalinity scale ranges from 0 to 14. Soils are referred to as being acid, neutral, or alkaline, depending on their pH levels. A pH of 7 is neutral, while a pH lower than 7 is acid, and a pH higher than 7 is alkaline (basic).

A logarithmic scale is used to measure a soil's pH. That is, a change of one unit in the pH scale represents a 10-fold change in acidity or alkalinity. A soil with a pH of 5.0 is 10 times more acidic than a soil with a pH of 6.0 and 100 times more acidic than a soil with a pH of 7.0. This is one good reason to be very careful in trying to increase or lower soil pH. Some factors, including soil type and organic matter, affect the amount of materials needed to change soil pH.

Fertilizers and rain affect soil pH. Organic matter and soil microorganisms are a few other factors that affect soil pH. Agricultural limestone normally is used to increase the soil's pH. Sulfur is normally used to lower the soil pH. But fertilizer and water normally change the soil pH more rapidly.

Plants have specific pH requirements for normal growth. Most ornamental plants grow well in a pH range of 6.0 to 7.0. But azaleas, gardenias, camellias, and related plants require a soil pH level between 4.5 to 5.5.

It is important to know the pH levels and nutrient requirements of your ornamental plants to ensure normal growth and success. The following table lists some woody and herbaceous landscape plants and their desired soil pH ranges.

Shrubs	**Preferred pH**
Azalea	4.5–6.0
Barberry	6.0–7.5
Buddleia (Butterfly Bush)	6.0–7.5
Camellia	4.5–5.5
Crapemyrtle	5.0–6.0
Deutzia	6.0–7.5
Euonymus	6.5–7.0
Flowering Almond	6.0–7.0
Gardenia	5.0–6.0
Hibiscus	6.0–8.0
Holly	5.0–6.0
Huckleberry	5.0–5.5
Hydrangea (blue)	4.5–5.0
Hydrangea (pink)	6.0–7.0
Japanese Quince (flowering quince)	6.0–7.0
Ligustrum	6.0–7.0
Lilac	6.0–7.5
Oleander	5.0–7.5
Philadelphus (English Dogwood)	6.0–8.0
Pyracantha (Firethorn)	6.0–7.0
Spiraea spp.	6.0–7.0
Tea Roses	5.5–7.0
Viburnum	6.5–7.5
Weigela	6.0–7.0

Trees	**Preferred pH**
Apple, Peach, Pear, Cherry	6.5–7.0
Dogwood	5.0–7.0
Elm	6.0–7.5
Flowering Crab Apple	5.0–6.5
Holly	5.0–6.0
Magnolia	5.0–6.0
Maple	6.0–7.5
Oak Group	
Pin Oak	5.0–6.5
Scarlet Oak	6.0–7.0
Red Oak	5.0–7.5
Pine	5.0–6.0
Redbud	5.5–6.5
Vitex	6.0–7.0
Weeping Willow	5.0–6.0

Garden Flowers	**Preferred pH**
Amaryllis	5.5–6.5
Baby's Breath	6.5–7.0
Balsam (Touch-Me-Not)	6.5–7.0
Begonia	5.5–7.5
Caladium	6.0–7.0
Candytuft	6.5–7.0
Canna	6.0–7.0
Carnation	6.5–7.0
Chrysanthemum	6.0–8.0
Cockscomb (Celosia)	6.0–7.5
Coleus	6.0–7.0
Cornflower	6.0–7.5
Cosmos	6.5–7.0
Daffodil	6.0–7.5
Dahlia	6.5–7.0
Day Lily	6.0–8.0
Easter Lily	6.0–7.5
Four-O-Clock	6.0–7.5
Foxglove	6.5–7.0
Geranium	6.0–8.0
Gladiolus	6.5–7.0
Hollyhock	6.0–8.0
Iris	6.5–7.0
Larkspur	6.5–7.0
Lupine	6.5–7.0
Marigold	6.0–7.5
Nasturtium	6.5–7.0
Narcissus	6.0–7.5
Pansy	5.0–6.0
Periwinkle	6.5–7.0
Petunia	6.5–7.0
Phlox	5.0–6.0
Poppy	6.5–7.0
Salvia	6.0–7.0
Shasta Daisy	6.0–8.0
Snapdragon	6.0–7.5
Sweet Alyssum	6.5–7.0
Sweetpea	6.5–7.0
Sweet William	6.5–7.0
Tuberose	6.0–7.0
Tulip	6.0–7.0
Verbena	6.0–8.0
Zinnia	5.5–7.5

The following table lists fertilizer materials that supply certain nutrients and change the soil pH. Use this table as a reference. It does not take the place of a soil test.

		Rate of application per 100 square feet			
Material	**Analysis N-P-K**	**Dry**	**Liquid**	**Speed of Reaction**	**Effect on pH**
Ammonium Sulfate	20-0-0	½–1 lb	1 oz per 2–3 gal	Rapid	Very acid
Sodium Nitrate	15-0-0	¾–1¼ lb	1 oz per 2 gal	Rapid	Basic
Calcium Nitrate	15-0-0	¾–1½ lb	1 oz per 2 gal	Rapid	Basic
Potassium Nitrate	13-0-44	½–1 lb	1 oz per 3 gal	Rapid	Neutral
Ammonium Nitrate	34-0-0	¼–½ lb	1 oz per 5 gal	Rapid	Acid
Urea	45-0-0	¼–½ lb	1 oz per 5–7 gal	Rapid	Slightly acid
Mono-ammonium Phosphate	11-48-0	1 lb	1 oz per 3 gal	Rapid	Acid
Di-ammonium Phosphate	18-46-0	½–¾ lb	1 oz per 4–5 gal	Rapid	Acid
Triple Superphosphate	0-46-0	1–2½ lb	Insoluble	Medium	Neutral
Superphosphate	0-20-0	3–5 lb	Insoluble	Medium	Neutral
Potassium Chloride	0-0-60	½–¾ lb	1 oz per 4–5 gal	Rapid	Neutral
Potassium Sulfate	0-0-50	½–1 lb	Not advisable	Rapid	Neutral
Complete Soluble (mixtures)	20-20-20 20-5-30 12-12-12	Not advisable	1 oz per 3–5 gal	Rapid	Various
Complete Dry (mixtures)	10-10-10 5-10-10	2 lb 2–3 lb	Relatively insoluble	Various Various	Various Various
Limestone	None	5–20 lb	Insoluble	Slow	Basic
Hydrated Lime	None	2 lb	Relatively insoluble	Rapid	Basic
Gypsum (calcium sulfate)	None	2–5 lb	Insoluble	Medium	Neutral
Sulfur	None	1–2 lb	Insoluble	Slow	Acid
Epsom Salts (magnesium sulfate)	None	8–12 oz	1 oz per 5 gal	Rapid	Neutral
Aluminum Sulfate	None	Not advisable	1 oz per 5 gal	Rapid	Very acid
Urea Formaldehyde	38-0-0	3–5 lb	—	Slow	Slightly acid
Magnesium Ammonium Phosphate	7-40-6	Variable	—	Slow	Neutral
Dried Blood	12-0-0	2–3 lb	—	Medium	Acid
Steamed Bone Meal	Usually	5 lb	—	Slow	Basic
Castor Pumice	5-1-1	3–5 lb	—	Slow	—
Cottonseed Meal	7-2-2	3–4 lb	—	Slow	Acid
Hardwood Ashes	0-1-5	3–10 lb	—	Medium	Basic
Hoof and Horn Meal	13-0-0	2–3 lb	—	Slow	—
Seaweed (Kelp)	Usually	2–3 lb	—	Slow	—
Linseed Meal	5-1-1	3–5 lb	—	Slow	Acid
Soybean Meal	6-0-0	3–5 lb	—	Slow	—
Trace Elements	—	3–6 oz	—	0	—
Iron Sulfate	—	8–12 oz	1 oz per gal	—	—
Chelated Iron	—	1–2 oz	1 oz per 25 gal	—	—
Borax	—	½ oz	—	—	—
Copper Sulfate	—	1–2 oz	—	—	—

Information Sheet 372 (POD-09-15)

Revised by **Dr. Keith Crouse**, Associate Extension Professor, and **Dr. Geoff Denny**, Assistant Extension Professor, Plant and Soil Sciences.

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Pruning Landscape Plants

Pruning is one of the least understood practices of landscape maintenance. Before trying to prune your landscape shrubs and trees, consider the basic principles of pruning. Review the following considerations before starting to prune your landscape plants.

Reasons for Pruning

- Control the size and shape of a plant to keep it from overpowering the landscape.
- Remove undesirable growth that distracts from plant balance or symmetry.
- Remove diseased, insect-infested, dead, or abnormal plant tissue.
- Stimulate flowering and/or fruit production of older plants.
- Develop a specific plant form, such as a hedge, topiary, or espalier, as in formal landscape designs.
- Direct or train trees to grow in a particular form to eliminate problems.
- Remove plant parts that may interfere with structures or utility lines or that may create a visibility problem.

How to Prune

How to prune depends on the plant type. Most woody landscape plants can be put in one of these categories: broadleaf evergreens, narrowleaf evergreens, or deciduous plants. Each type has specific responses to pruning. Know your plant type before pruning.

The shedding of old leaves and the growth of new ones on evergreen plants are timed so the plant is rarely, if ever, without leaves. That is why we call these plants evergreen.

Broadleaf evergreen plants are the most popular landscape plants used in the South. They have broad, wide, or flat leaves. Examples of broadleaf evergreen plants are hollies, ligustrum (privet), photinia (red tip), elaeagnus, euonymus, cleyera, azaleas, pyracantha, nandina, gardenia, pittosporum, sweet olive, boxwood, camellia, aucuba, mahonia, fatsia, and southern magnolia.

Along the limbs, branches, and trunks of broadleaf evergreen plants are specialized cells (latent buds) that can become growing buds. A latent bud remains dormant until stimulated into growth. If these latent buds are present, you can prune the plant drastically and not worry about killing it.

Some broadleaf evergreens may be dwarf plants. Dwarf plants normally have a compact, dense growth habit and do not need much pruning to control size or shape. "Dwarf" means that the plant is smaller than the standard version. For example, the standard yaupon can reach 20 feet tall, whereas the dwarf yaupon reaches only 4 to 6 feet tall. You can tip-prune to encourage a thick, well-shaped plant, but after many years, some dwarf shrubs may need rejuvenating. They can be pruned severely (cut to 6 to 12 inches from the ground) with satisfactory results. Prune this way in early spring, before new growth begins.

Narrowleaf evergreens have tiny, scale-like or needle-like leaves, and many produce cones. That is why we call them conifers. Examples are junipers, arborvitae, pine, cedar, hemlock, and spruce. Narrowleaf evergreen shrubs need occasional foliage shearing in early spring to control size. Narrowleaf evergreens do not have latent buds, so you can't prune them as severely as broadleaf evergreens. Narrowleaf evergreens often are thought of as having a "dead zone" on the older parts of the branches. If you remove all the scales or needles with a pruning cut, no new growth will occur on the remaining limb. Drastic pruning of narrowleaf evergreen plants can kill them. To avoid the "dead zone," never remove more than one-third of the foliage of a narrowleaf evergreen.

Prune conifers, such as pines, by removing a portion of the candle-like new growth on the tips of pines in early spring. Once the so-called candle has matured, the buds on it won't usually develop and grow. But removing the tip of the candle before it matures can stimulate buds into growth.

Deciduous landscape plants shed their leaves in the fall. Like broadleaf evergreens, deciduous plants can be severely pruned without fear of killing them.

Deciduous plants may be shrubs, trees, or vines. Some common deciduous shrubs and trees used in Mississippi landscapes include forsythia, spiraea, weigela, lilac, rose, crape myrtle, quince, honeysuckle, hydrangea, oak, maple, and poplar. Deciduous shrubs may need pruning to control their size and shape. Light to moderate tip-pruning encourages thick new growth, resulting in bushy plants. Deciduous plants may also be pruned by rejuvenation and thinning. You would normally do this before new growth begins in the spring.

Pruning Methods

Tip-pruning encourages a thick, well-shaped plant. Light tip-pruning removes only a few inches of stem tips and is usually done in early spring after new growth has occurred.

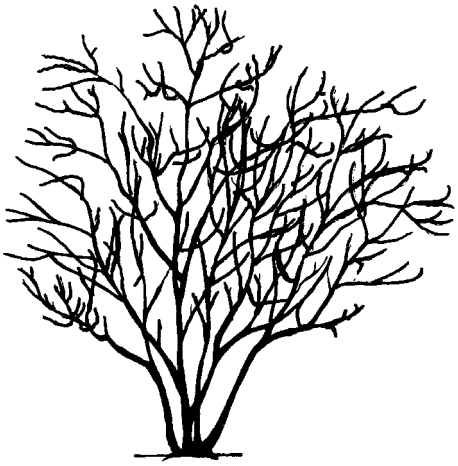


Figure 1. Keep the plant's natural shape when tip-pruning.

Thinning is used on broadleaf, deciduous landscape plants to encourage flowering and strong growth. Thin in early spring before new growth begins by removing older or weaker branches back to a lateral branch or completely to the ground.

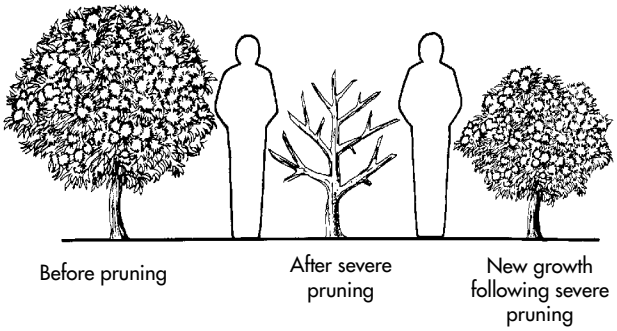


Figure 2. Properly pruned plants retain their natural shape.

Shearing controls the shape and size of all types of shrubs. Shearing calls for clipping the newest foliage, usually 1 to 2 inches of new growth. Shearing is actually a type of tip-pruning that removes minimal foliage. Broadleaf evergreen hedges and screens are often sheared to promote thick, dense foliage. Always use sharp shears.

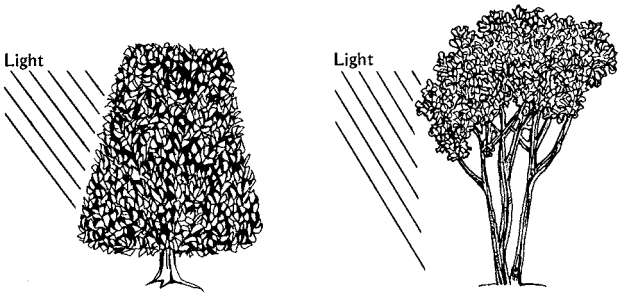


Figure 3. (Left) Shear hedges narrower at top so sunlight can reach bottom branches. (Right) Shade will kill the bottom branches of shrubs pruned broad at the top.

Rejuvenation is severe pruning used only on broadleaf evergreens and deciduous plants to control overgrown, leggy, and straggly plants. Use this method of pruning in early spring before the beginning of new growth. A special form of rejuvenation pruning is used for clump-forming shrubs, such as nandina and mahonia. One-third of the oldest limbs are removed each year.

Espalier plants are trained to grow against a wall. A tall wall is best for espaliered plants. Pruning may be necessary several times throughout the growing season to get the desired shape and form.

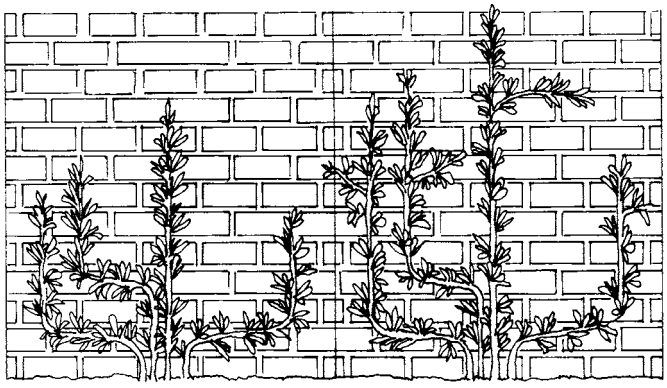


Figure 4. Examples of espalier pruning.

Topiary is the art of shaping plants into fantastic or ornamental forms by careful pruning or trimming. Topairy pruning may be necessary several times during the growing season. Broadleaf and narrowleaf trees and shrubs normally perform well as topiaries.

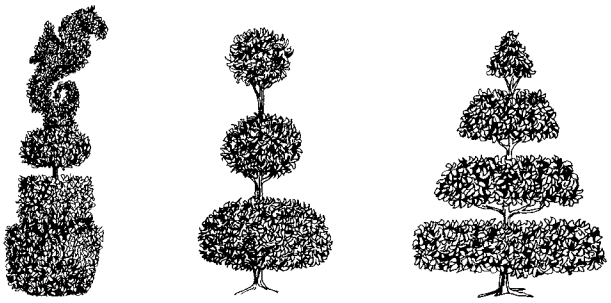


Figure 5. Examples of topiary pruning.

Removing tree limbs requires a special pruning technique. Tree limbs that need pruning should be cut so no stub remains. Do not remove the branch collar (D). Make three cuts as shown in the drawing. This lets the limb fall without ripping the bark down the tree trunk.

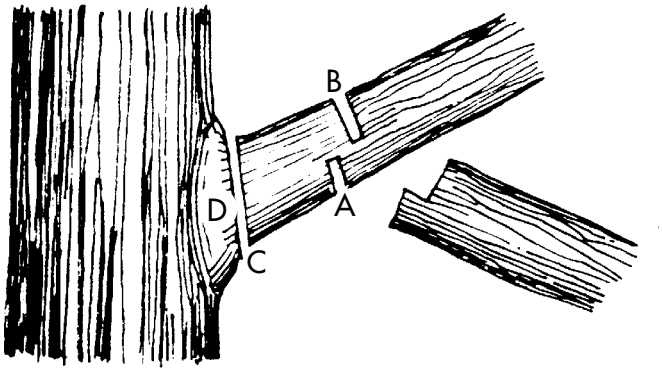


Figure 6. Removing tree limbs.

Timing

The time of year that you prune plants is important. Pruning at the wrong time may stimulate new growth that could be damaged by early frosts or freezes. It could also remove flower buds that have formed, reducing next year's flowers. The following guidelines will help you prune your plants at the proper time. Most pruning is for size control and is best done in late winter through early spring (February through April).

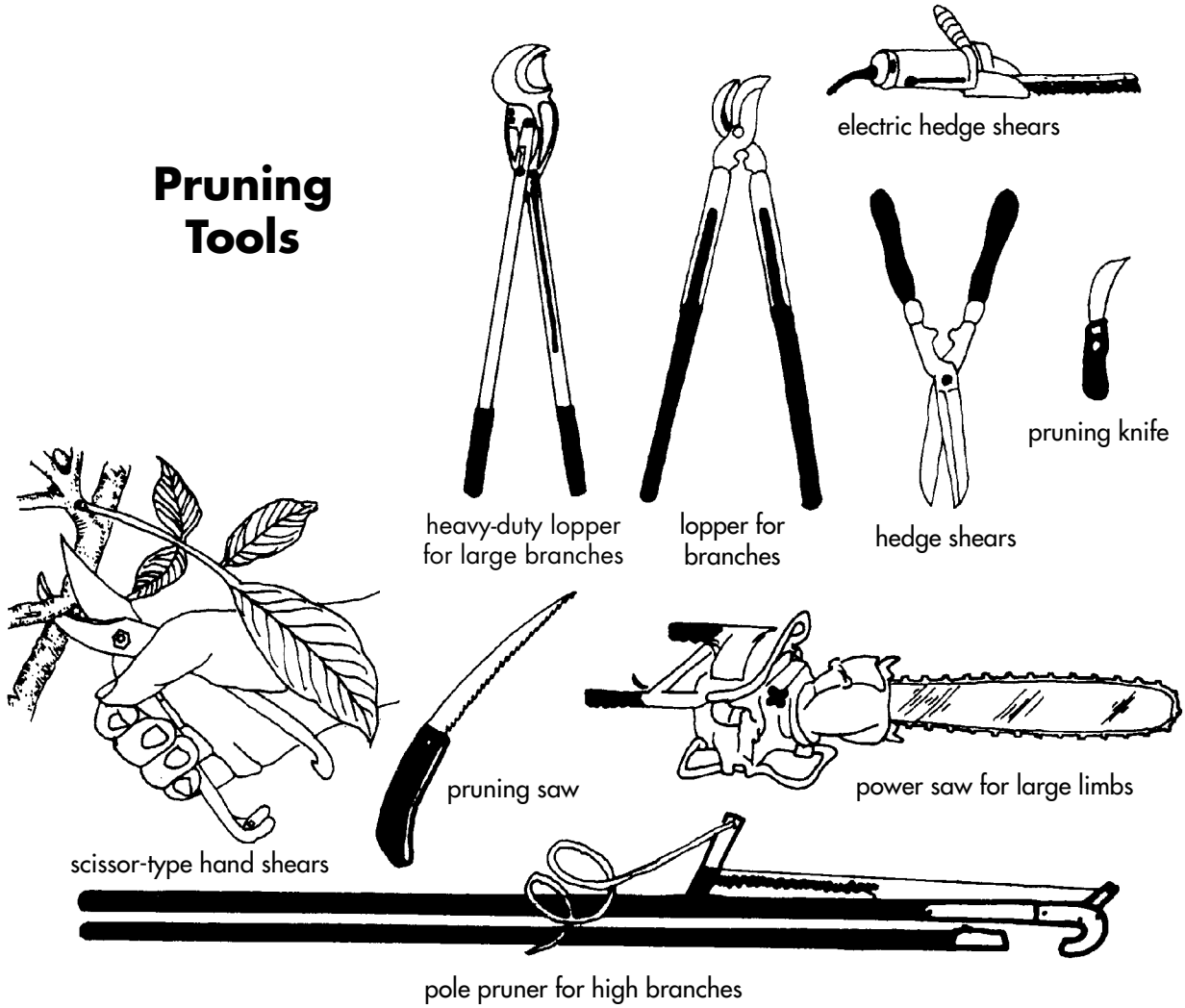
Prune after the landscape feature of your plant has passed. For spring flowering plants, prune in late spring as the flowering season is ending. This allows for adequate growth during the summer to produce flower buds for the next year. For fall-flowering plants, such as some of the camellias, use tip-pruning or thinning. Prune as the flowering season is ending. For plants with colorful berries, prune after the berries are gone.

For plants that produce flowers on 1-year-old wood (usually those that bloom after June), such as hydrangeas, glossy abelia, and crape myrtle, cut away only branches with spent flowers, or prune (thinning method) in late winter to promote vigorous spring growth.

Easy and Safe Pruning

Plants that need pruning regularly because they have overgrown their planting space may need to be removed and replaced with one more suited to the available space.

Be sure your equipment is sharp and clean. Clean equipment helps prevent the spread of disease organisms. Sharp equipment makes cutting easier and helps avoid tearing plants.



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Revised by **Jeff Wilson**, PhD, Assistant Professor, North Mississippi Research and Extension Center.

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Establish and Manage Your Home Lawn

The home lawn and turf areas surrounding churches, parks, and office buildings do more than just serve as pleasant green backdrops. The grass plants that make up the lawns serve as miniature air-conditioners and pollution-abatement centers.

On a block of eight houses, the front lawns have the cooling effect of 70 tons of air-conditioning. The plants, in transpiring water to cool themselves, also cool the surrounding area. Roughly 50 percent of the heat striking a turf area is eliminated by transpiration. When the temperature of the sidewalk is 100°F, the temperature of the adjacent turf remains near 75°F. This cooling may last into the night, with studies showing a 13-degree cooling at 9 p.m.

This air-conditioning is not free, however. An average 5,000-square-foot lawn transpires about 3,000 gallons of water on a hot summer day. If this water is not supplied by rain, it must be applied by some other means.

Turfgrass also functions as a noise barrier. Studies at the Riverbank Acoustical Laboratory in Geneva, Illinois, found Kentucky bluegrass turf more sound-absorbent than a heavy carpet on a felt pad.

One of the most significant byproducts of a living, green backdrop is its effect upon the atmosphere. A 250-square-foot lawn produces enough oxygen for a family of four. The average lawn traps significant amounts of carbon dioxide, peroxyacetyl nitrates, and ozone, as well as particulate matter.

A most important effect is the prevention of soil erosion and enhancement of groundwater recharge. Research shows infiltration is much higher on turfed areas than on areas of bare ground. The higher infiltration prevents water from running off and encourages it to enter the groundwater stream. Grass roots bind the soil more effectively than any other plant.

Many gardeners enjoy maintaining a quality turf. Others despise lawn work and demand a low-maintenance turfgrass. Still others are confused about how to keep a lawn. You don't have to be an expert to have a quality lawn; neither do you have to spend all your leisure time working on it. By learning a few basic facts about turfgrass, you can have the best lawn on the block. Also, you can choose a turfgrass to suit the time and money you have for maintenance.

The question is, "What is the best lawn grass for you?" Choosing the best grass involves personal judgment based on your needs and the conditions of your property. Each variety of grass has its advantages and disadvantages. Some grow in the shade; others need full sun. Some grow in all parts of the state; some grow only in certain areas. Some require lots of time and patience; others are less troublesome. Some are fast growers, and some are slow growers.

Sound confusing? It really isn't. Be aware of the great versatility of lawn grasses and the choices you have. Remember, a quality lawn can make or break your landscape design. Learning the basics of turfgrass establishment and care, followed by a little hard work, will ensure success.

Select the Right Grass

Turfgrasses are divided into two groups by the temperature range under which they grow best. Warm-season grasses grow best at temperatures above 80°F, while cool-season grasses grow best at temperatures between 60 and 75°F.

Warm-season grasses form a thick mat of turf through horizontal growing stems called stolons or rhizomes. Stolons are stems that grow above the ground, and rhizomes grow just beneath the surface of the soil.

Cool-season grasses, with the exception of the bluegrasses, do not have these specialized stems. Cool-season grasses are referred to as "bunch" grasses, since each grass plant forms one clump (or bunch) and does not spread extensively.

The warm-season grasses are native to tropic and subtropic Africa, South America, or Asia. The adaptation of bermudagrass to Mississippi's climate is apparent when you see it establishing in any bare patch of soil.

Other warm-season grasses grown for turf in Mississippi include St. Augustinegrass, centipedegrass, zoysiagrass, carpetgrass, and bahiagrass. These grasses grow actively in the spring, summer, and fall and go dormant when the temperature cools in the winter.

The brown color of winter can be relieved by seeding a cool-season grass into the dormant turf as discussed in Establishing Winter Lawns on page 14 or by painting the dormant turf with specially developed dyes. Many people appreciate the warm brown hue of bermudagrasses and zoysiagrasses in the winter and wouldn't think of changing it.

The cool-season grasses grown in Mississippi originated in Europe. Only the northern counties in Mississippi can successfully grow these species as a permanent lawn. Zone 7a is an area where warm- or cool-season grasses can be grown. The choice is a warm-season grass that may be winter-killed in a severe winter or a cool-season grass that must be nurtured through the long, hot days of summer. Cool-season grasses that can be grown in this area include tall fescue, Kentucky bluegrass, and creeping red fescue. Annual ryegrass and perennial ryegrass can be grown throughout the state as winter lawns but should not be considered permanent lawn species for any region of Mississippi.

Choosing the best grass for your situation involves four basic factors:

- sunlight
- temperature extremes
- maintenance work and costs
- soil

Sunlight—The most important factor in selecting the grass to grow is the amount of sunlight and shade you have. **No species of turfgrass will grow in complete shade.** If the area receives at least a half-day of direct sunlight, you can grow any of the grasses adapted to your region.

Bermudagrasses require the most light, followed by carpetgrass, bahiagrass, zoysiagrass, centipedegrass, Kentucky bluegrass, tall fescue, and red fescue. St. Augustinegrass is the most shade-tolerant, and it requires at least 3 hours of direct or high-quality, filtered sunlight a day to grow properly.

One deviation from the more-light-is-better rule of thumb is tall fescue. The temperature reduction from shade allows this cool-season grass to persist longer in summer in the shade than in full sun.

If you have areas (under trees or between buildings) that do not receive direct sunlight, consider other landscaping options, such as ground covers, mulched beds, or no plants at all.

Temperature—Temperature is important in determining which grasses will grow. Only in the northern tier of counties should cool-season lawns be expected to thrive. The climate zone map on page 4 indicates in which climate zone you



Figure 1. Half-day sun (top) and half-day shade (bottom).

live. The description of the individual grasses tells you which grasses are adapted to which climate zones.

The major limiting factor for warm-season grasses in Mississippi is the low temperatures experienced in winter. People who grow St. Augustinegrass or centipedegrass in zone 7a and the northern areas of zone 7b should expect to have some damage in severe winters. Carpetgrass growers in the northern counties should expect some damage every winter. The grasses can be grown outside their adapted areas, but efforts outside the ordinary are required to maintain them.

Maintenance—After you have narrowed the possibilities by eliminating grasses that won't grow due to light and temperature factors, decide how much work you want to put into this lawn. Some grasses are easily established with seed, while others require sprigs or plugs.

After the lawn is established, some grasses require little care other than occasional mowing, while others require almost constant attention to fertility, water, and pest control. If you want to take advantage of the ability of hybrid bermudagrass to give you a green carpet effect, plan on investing large amounts of time and money in fertilizing, watering, and mowing. If all you want is something to keep the mud off your shoes when you walk from the car to the door, consider centipedegrass or carpetgrass.

Soil—Each species of grass has a soil type to which it is best adapted. All the grasses perform well in well-drained, loamy soils, but most Mississippians do not have this ideal soil. The acid sandy soils of southeast Mississippi are very suitable for growing centipedegrass. Areas that stay too wet for centipedegrass support carpetgrass nicely. The heavy clay soils of the Blackland Prairie and Delta will not support good growth of bahiagrass, centipede, or carpetgrass.

The most important consideration of soils is the ability of water to move into and through the soil. No grass survives long in standing water. A second factor is the acidity level, or pH, of the soil. Although the pH is modified by adding limestone or sulfur, it is easier to plant an adapted grass than to constantly fight to adjust the pH.

Table 1. Turfgrass selection guide. (For winter hardness, see Figure 2 on state climate zones.)

	Light Requirements			Establishment					
Turfgrass	Half Day or More Sun	Filtered Sunlight	Shade	Seeding*	Sprigs, Plugs	Rate of Growth	Normal Color	Maintenance Requirements	Recovery from Stress
bahiagrass	Yes	Yes	No	Yes	No	Fast	Yellow green	Medium	Good
bermudagrass	Yes	No	No	Yes	Yes	Fast	Medium green	High	Excellent
St. Augustine-grass	Yes	Yes	Yes	No	Yes	Moderate	Medium green	High	Good
centipedegrass	Yes	Yes	No	Yes	Yes	Slow	Yellow green	Low	Fair
carpetgrass	Yes	Yes	No	Yes	Yes	Moderate	Yellow green	Low	Fair
zoysiagrass	Yes	Yes	Yes	No*	Yes	Slow	Medium green	Medium	Good
Kentucky bluegrass	Yes	Yes	No	Yes	Yes	Moderate	Blue green	Medium	Fair
tall fescue	Yes	Yes	Yes	Yes	Yes	Fast	Dark green	Low	Fair
creeping red fescue	Yes	Yes	Yes	Yes	Yes	Moderate	Yellow green	Low	Fair

*Some bermudagrass and zoysiagrass cultivars can be seeded and others established vegetatively only.

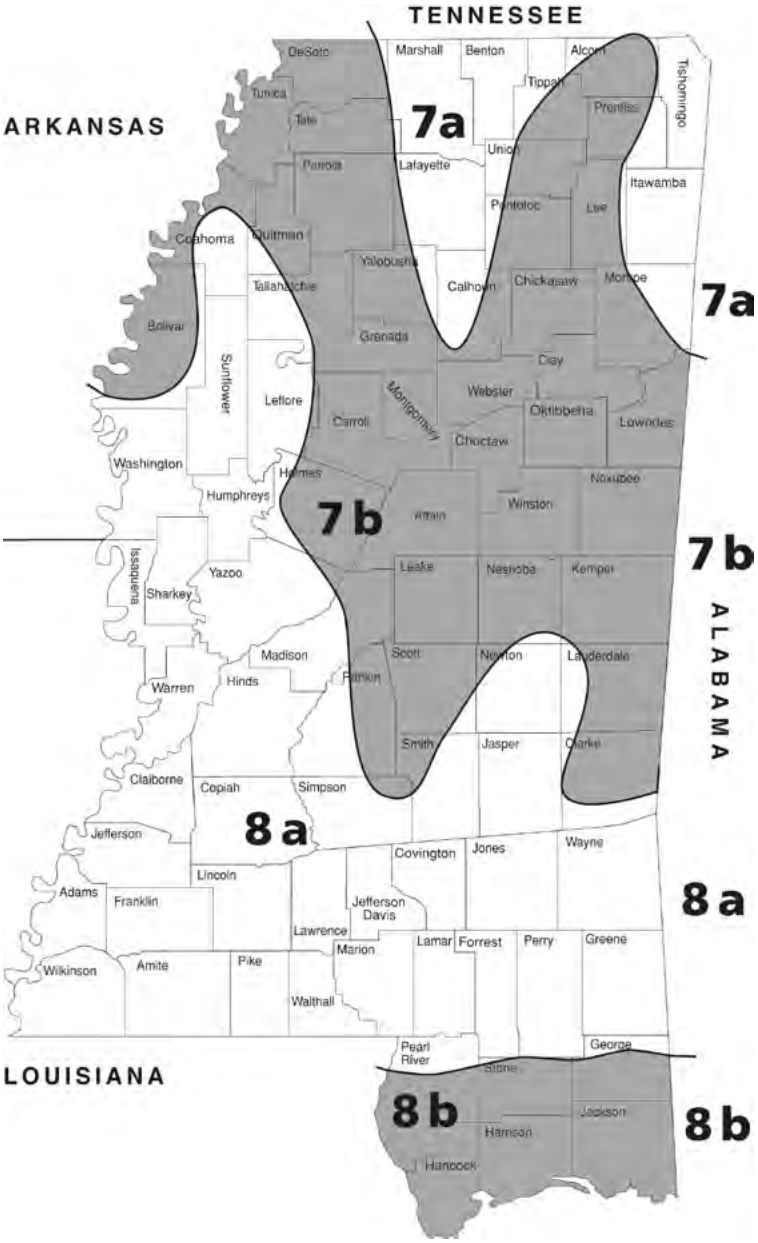


Figure 2. Climate zone map.

Warm-Season Grasses

Bermudagrasses—Despite its name, bermudagrass came to America from Africa in 1751. Also known as devilgrass, wiregrass, and couchgrass, it is a serious weed problem in cropland and flower beds due to its rapid growth and persistence. Bermudagrass is the most widely grown turfgrass in Mississippi because of its adaptation to climates and soil types.

Bermudagrass forms a dense, attractive sod. It spreads primarily through stolon growth, although rhizomes do play a part in its aggressive growth habits. It is not unusual for a stolon to grow 6 feet in 1 year when spreading over bare ground.

This aggressiveness makes bermudagrass the preeminent turf for areas of high traffic, since it can spread quickly to cover damaged areas. Bermudagrasses also have good wear tolerance.

The major limiting factor to bermudagrass growth is the amount of sunlight it requires. It does not tolerate full shade and only tolerates partial shade for half of a day. It is best to have full sun for the highest quality lawn.

Bermudagrass is responsive to management. Quality lawns require large amounts of fertilizer and water and frequent mowing. Although bermudagrass is drought-tolerant, it has a high water requirement to produce an attractive turf.

Bermudagrass is adapted to a range of soil types and survives in alkaline and acid conditions, but it prefers well-drained soils with a pH of 6 to 7. The vigor of bermudagrass is reduced on poorly drained soils, but it produces an acceptable turf on clay soils. Bermudagrass is the most tolerant turfgrass to being submerged and is the preferred grass for stream banks.

Bermudagrass is easily planted and is the most rapidly established of all the grasses. Common bermudagrass is established from seed. There are improved varieties that can be seeded, but the hybrids and other improved types are established vegetatively.

Seeded Types

Common bermudagrass (*Cynodon dactylon L. Pers.*) is found everywhere in Mississippi. The seed found in most outlets was probably grown in Arizona and may be called "Arizona common." It is well adapted to all of Mississippi as long as there is sufficient sunlight. When compared to other species, it is heat- and drought-tolerant and has excellent wear tolerance and recovery from injury. Common bermudagrass may not be cold hardy in zone 7a.

Common bermudagrass is a good, inexpensive choice for areas that receive heavy traffic, such as school yards, athletic fields, play areas, and rights of way. It is susceptible to several pest problems (dollar spot, melting out, and nematodes), but these can be controlled through proper maintenance and correct use of pesticides.

Improved seeded types of bermudagrass include Princess 77, Savanna, Sultan, Sydney, Sunstar, Mohawk, Yuma, Yukon, and Riviera. These grasses have been shown to produce significantly better quality lawns since they are finer textured and more dense than common bermudagrass.

These grasses are for people who want something better than common bermudagrass but do not want the problems or expense associated with the vegetatively propagated grasses. They do not produce a lawn as attractive as the vegetatively

propagated grasses. The availability of these new seeded types may be limited.

Vegetatively Propagated Types

Many hybrid bermudagrasses have been developed by crossing common bermudagrass with African bermudagrass (*Cynodon transvaalensis* Burtt Davy). These hybrids have short internodes that give a dense, lower growing turf.

Do not grow these hybrids unless you are willing to devote much time and effort to the higher levels of management they require. Tifdwarf and Tifgreen were developed at Tifton, Georgia, for use on golf greens. Most homeowners should avoid these grasses because of the daily mowing required.

Tifway and Tifway II were developed to be used on golf course fairways and tees and athletic fields. Tifway is the standard for high-quality lawns. These grasses can be grown by homeowners who want the highest quality lawns.

Grasses developed at Mississippi State University for home lawns include MS-Choice and MS-Pride. MS-Choice is a naturally dark green grass that seldom produces seed heads. It is shade tolerant for a bermudagrass. This does not mean it is as shade tolerant as St. Augustinegrass, just that it will grow better than other bermudagrasses in the shade. MS-Pride is a dense, finely bladed grass that will compare favorably with Tifway.

These bermudagrasses do not produce viable seed. They must be established vegetatively. This adds to the expense of establishing a lawn from these types.

Centipedegrass (*Eremochloa ophiuroides*) is rapidly becoming the grass of choice for some Mississippians. The low level of maintenance required is a joy to those who want an acceptable quality of turf with the least amount of effort. The problems with centipedegrass often are caused by overzealous homeowners trying to make centipedegrass look better.

Centipedegrass is a slow growing, naturally lime green, somewhat coarse turfgrass adapted to growing in acid sandy soils. Centipedegrass grows best in a slightly moist, well-drained soil with a pH of 4.5 to 6.0. Iron deficiency causes the leaves to have a bleached appearance when the grass is grown on high-pH soils. Centipedegrass responds to foliar iron applications by giving a darker green color.

Centipedegrass can be established from seed, but the germination period is 21 days, and the seedling centipedegrass is slow growing. Vegetative propagation is preferred, and if expense is not a primary consideration, solid sodding gives the most satisfactory result.

Centipedegrass has poor wear tolerance and is slow to recover from injury because of its slow growth rate. Shade tolerance is better than bermudagrass, but not as good as St. Augustinegrass. **Do not grow common centipedegrass in zone 7a**, and some winter injury may occur in northern sections of zone 7b. TifBlair, Oklawn, and Tennessee Hardy have better cold tolerance than does common centipedegrass.

Supplemental iron applications can have a marked effect on the appearance of centipedegrass. Many people object to the natural light green color and tend to overfertilize with nitrogen trying to darken the hue of the turf.

Iron in the form of iron sulfate, ferrous ammonium sulfate, or chelated iron applied to the foliage often provides a noticeably darker color. The darker color lasts until the leaf that has been sprayed grows enough to be mowed. The iron must then be reapplied to the new growth. The advantage to iron is that it does not increase the growth rate of the grass and, therefore, decreases the risk of disease and insect pressure.

The major factor in centipedegrass popularity is the low level of care it requires. If left alone, the height of turf rarely exceeds 4 inches, and the thick turf crowds out most weeds. The seedheads do not extend much above the canopy and are not objectionable. It is often called the poor or lazy man's grass for this ability to thrive under neglect.

Centipedegrass has a shallow root system and is more subject to drought stress than bermudagrass or St. Augustinegrass. Since it is slow to recover from stress, you should water on a timely basis.

Centipedegrass has one other strong point: professional applicators can apply sethoxydim herbicide to remove most other species of grass.

St. Augustinegrass (*Stenotaphrum secundatum*) is a popular choice for lawns in south and central Mississippi. Outstanding shade tolerance makes this grass the overwhelming favorite for lawns under the stately live oaks of the Gulf Coast as well as the tall pines midstate. Winter damage occurs to lawns in zone 7a and the northern reaches of zone 7b. Severe winters may cause damage as far south as the northern reaches of zone 8a. St. Augustinegrass is the most cold-sensitive of all of the turfgrasses grown in Mississippi.

St. Augustinegrass is propagated by sprigging, plugging, or sodding. Some seed of St. Augustinegrass may be available, but the cost of seed and the ease of establishment from stolons make vegetative establishment the preferred method.

St. Augustinegrass is a coarse to very coarse turf that is quick to establish and recover from injury due to aggressive stolon

growth. It is not unusual to have St. Augustinegrass stolons grow right over the top of established centipedegrass turf. The grass has only fair wear tolerance and will not tolerate long periods of water stress.

Most problems with St. Augustinegrass are caused by disease and insect pressure made worse by heavy fertilization. Chinch bugs are a serious insect problem, and brown patch is a major disease. Both of these problems are encouraged by the application of too much nitrogen fertilizer and too much water. Although St. Augustinegrass grows rapidly, it requires only a moderate level of fertility.

One problem of St. Augustinegrass is not due to mismanagement. St. Augustine decline (SAD) is a disease caused by a virus. It is present in Mississippi and cannot be alleviated once it is present in a lawn. The only control measure is to plant a resistant variety.

Many varieties of St. Augustinegrass have been released. Those resistant to SAD include Raleigh, Palmetto, Mercedes, Captiva, and Delmar, which are more cold-tolerant than common. None of these are resistant to chinch bugs. Varieties resistant to chinch bugs include Floratam and Floratam II, which have shown some resistance to SAD. It is recommended that any new lawn established to St. Augustinegrass in Mississippi be of a SAD-resistant variety.

Zoysiagrass (Zoysia species) is gaining popularity as a choice for lawns in the central and northern portions of the state. The zoysiagrasses have superior cold tolerance to the above-named grasses and are not as likely to sustain winter damage. The zoysiagrasses form dense, thick sods of high quality. They have more shade tolerance than bermudagrass and form a finer, more attractive lawn than St. Augustinegrass or centipedegrass.

Three zoysia species are grown for turf in Mississippi. The least cold-tolerant is mascarenegrass or Korean velvetgrass (*Zoysia tenuifolia*). It is recommended only for zones 8b and 8a. It forms a fine-textured, dense turf. It has severe thatch tendencies and should be grown only by those who want an unusually thick and distinctive lawn. Manilagrass (*Zoysia matrella*) is intermediate in cold tolerance and fineness. It is increasingly popular in Mississippi and produces a good quality lawn. Japanese lawngrass (*Zoysia japonica*) is coarser in texture but much more cold-hardy than the other species. It is grown as far north as coastal New England, although it has a very short season in that climate. A hybrid between *Z. japonica* and *Z. tenuifolia* called Emerald is also widely grown in Mississippi.

Rapid improvement has been made in the use of zoysiagrass establishment from seed. Seeds are treated by the supplier to produce a more uniform, higher percentage germination. The seed still require excellent moisture management during germination. Placing a spun-bonded polyester cloth over the seedbed during germination has improved the initial stand and early growth. Better quality varieties are now available from seed and are much finer textured and more dense than Chinese or Korean common.

Trials in Mississippi have shown Zenith to grow acceptably from seed and produce a good quality turf. Solid sodding is still the preferred method of establishment. The slow lateral growth rate makes strip sodding and plugging a 2-year project in most lawns.

Zoysiagrasses have good drought tolerance. Their ability to form a very thick sod makes weed control easy, and they do not produce objectionable seedheads. The zoysiagrasses are relatively free of disease problems, but they do suffer from rust, unlike most of the other turf species.

Stems and leaves of zoysiagrasses are tough and difficult to mow with a rotary mower unless the blades are kept very sharp and the grass is not allowed to get tall. Motors have been ruined on rotary mowers trying to cut a too-tall zoysiagrass turf. For these reasons, you should mow zoysiagrass with a reel mower.

Meyer, also known as Z-52, is the most widely available improved variety of *Z. japonica*. Emerald was developed to compete with the hybrid bermudagrasses. It will form a very dense, beautiful lawn that can be cut at a lower level than other zoysiagrasses.

Several new cultivars have been recently released with qualities that include faster establishment, disease resistance, and shade tolerance. These new varieties include Empire, Cavalier, Palisades, Royal, Diamond, and Zorro.

Zoysiagrasses require a moderate level of management. They do not grow well in clay soils or other poorly drained sites. They require less fertilization than the bermudagrasses but more than centipedegrass. They prefer a pH of 6 to 7 but tolerate a wide range.

Carpetgrass (*Axonopus affinis*) and tropical carpetgrass (*A. compressus*) are coarse, low-growing turfgrasses adapted to the wet, acidic, sandy soils of southeast Mississippi. They form a moderately dense, light green turf that is similar to centipedegrass in color and texture. Individual carpetgrass plants resemble St. Augustinegrass.

Tolerance to drought, wear, and cold is poor, and the rate of recovery from damage is slow. Carpetgrass develops many tall, unattractive seedheads that require frequent mowing to keep the turf attractive, even though the foliage may not have grown sufficiently.

Even with all these drawbacks, carpetgrass is widely grown as a turfgrass. The major advantages are its ability to survive wet soil, its easy establishment from seed, and its low fertility requirements.

Bahiagrass (*Paspalum notatum*) is grown more as a mistake than as a planted turfgrass in Mississippi. It is native to South America and is widely used as a pasture species. Bahiagrass has short stolons, but it does not spread well and often makes an open, almost clumpy turf. It has good wear tolerance but recovers slowly from damage. Shade tolerance is better than bermudagrass, and it is extremely drought-tolerant because of an extensive root system. It is this extensive root system that enables bahiagrass to invade lawns during times of drought and displace more desirable species.

The main disadvantage to bahiagrass is the tall seed stalk that grows quickly when the grass is under stress. One story told is that only a very small lawn can be completely free of seedheads, because they arise so quickly that the started edge will have new seedheads before the far edge is cut. The "V" of the bahiagrass seedhead is a common sight throughout southern Mississippi in the summer.

Two varieties are commonly available. Pensacola is a fine-textured cultivar used for roadsides. Argentina is coarser but has superior color and density. A new variety, Wilmington, develops fewer seedheads and is finer textured.

Seashore paspalum (*Paspalum vaginatum*), although having been in existence for thousands of years, is a relative newcomer to Southern lawns with attributes that certainly fit some specific niches. Seashore paspalum is a warm-season grass having excellent tolerance to high salt levels found in reclaimed water, effluent, salt spray, and seawater. It tolerates a wide range in soil pH and requires relatively low inputs of fertility, irrigation, and pesticides. It adapts well to variable mowing heights, has good wear tolerance, and does well in wet conditions. Cold tolerance is somewhat limited.

Several cultivars are available, making seashore paspalum suitable for use on golf courses, athletic fields, and commercial and residential lawns. Presently, cultivars available vegetatively include Aloha, SeaDwarf, SeaIsle I, Sea Way, and others.

Cool-Season Grasses

Only those people living in zone 7a should attempt to grow cool-season grasses as permanent lawns in full sun. People with shady lawn areas in zone 7b north of Highway 82 could attempt the cool-season grasses, but the heat of Mississippi summers causes these species to go dormant, and could shorten the life of these grasses.

Fescues

The fescue group of turfgrasses has greatly improved in the last decade. The "turf-type" tall fescues were selected and extensively bred to improve heat and drought tolerance and to have narrower leaves. Red and chewings fescues were evaluated for disease and heat resistance. These grasses are not widely grown in Mississippi, but you should try the improved varieties.

Tall fescue (*Festuca arundinacea*) is a relatively coarse-leaved, dark green grass that is almost as shade-tolerant as St. Augustinegrass. Consider it as a permanent lawn for shady areas in the northern portion of the state. Tall fescue has short rhizomes, but it does not spread well and should be managed as a bunch-type grass. It goes dormant in summer in sunshine and eventually thins out in the shade; so you should expect to reseed on a regular basis. Fortunately, the seed is not expensive and does not require extensive soil preparation to accomplish a successful reseeding.

Mow tall fescue high, about 3 inches. The leaves are relatively tough and require a sharp blade to keep from having a ragged edge.

Tall fescue has a deep root system and tolerates short periods of drought, but it turns brown from lack of water, so adequate watering is necessary. Water is especially critical in the summer to keep the grass from going dormant. Tall fescue is susceptible to several diseases, including brown patch and fescue leaf spot. Since it most often is grown in the shade, arrange the watering regime so the leaves are dry by nightfall.

There are many improved turf-type tall fescues. Do not plant the forage-type tall fescues such as Kentucky 31 or Alta. Recommended new varieties include Faith, Falcon V, Monet, Firenza, and Catalyst. In Mississippi conditions, the differences among the turf-type tall fescues are small, so the differences in appearance may not be great.

Fine-leaved fescues are not grown often in Mississippi but can produce a good quality lawn in the northern counties. Creeping red fescue (*Festuca rubra*) and chewing fescue (*Festuca rubra*) are fine-leaved fescues that are shade-tolerant. Chewing fescues do not have rhizomes. They will not grow in moist conditions, however, so well-drained soil is a must.

These grasses have a low fertility requirement and a limited root system. They are not as tolerant as tall fescue to alkaline soil conditions. They can be cut shorter than tall fescue, have a finer leaf, and produce a less coarse lawn. They are susceptible to several diseases, so water carefully to provide enough to maintain the grass with its shallow root system but not to keep the foliage wet for a great length of time.

These fescues are similar to centipedegrass in that too much fertilizer is more dangerous than not enough. As little as 1 pound of nitrogen per year is enough to produce an excellent turf. Overfertilization leads to problems with diseases (dollar spot and red thread).

Recommended varieties of red fescue include Ruby, Flyer, and Pennlawn. Recommended chewing fescues include Atlanta, Jamestown, and Banner.

Kentucky bluegrass

Kentucky bluegrass (*Poa pratensis*) is the king of the turfgrasses in the northern United States. Unfortunately, it does not grow well in Mississippi, even in the northern counties. It does not tolerate shade very well, so it cannot hide from the summer sun the way tall fescue does. It is a rhizomaceous and stoloniferous grass that forms a dense sod.

It is fine-leaved and dark green and forms an excellent quality turf. The aggressive root system makes it the most drought-tolerant of the cool-season grasses. It is more shade-tolerant than bermudagrass. It tends to go dormant in the summer but recovers when temperatures fall. It requires more maintenance than the fescues, but it gives an attractive turf that can be mowed at 2 inches in the cool season.

Kentucky bluegrass requires a well-drained and slightly acidic soil. It does not thrive in alkaline soils. It depends on correct management, especially in the summer months. Proper fertilizing, watering, and mowing are necessary to have the dormant turf survive the summer heat.

Recommended varieties include Everglade, Bar, Impact, Rhythm, and Granite. The bluegrasses are easily established from seed, and the seed is relatively inexpensive.

Ground Covers

Use ground covers where shade is too dense or the terrain is too rough for turfgrass. Many types of ground covers can provide color and texture differences in the landscape and keep soil in place.

Ground covers are less than 18 inches in height and generally require little maintenance once they are established. Some, such as mondo grass, resemble grass in growth form while others, such as Sweet William and violets, are grown as much for flower color as for the foliage.

Select ground covers to blend with the overall landscape plan. While the dark green of mondo grass or English ivy blends well with well-maintained bermudagrass or St. Augustinegrass, it contrasts sharply with carpetgrass or centipedegrass.

Tables 2–4 help to determine how much square footage can be planted with 100 plants when spaced at various measurements.

Table 2. Ground cover planting guide (per 100 plants).

Spacing (in apart)	Coverage (sq ft)
4	11
6	25
8	44
10	70
12	100
15	156
18	225
24	400

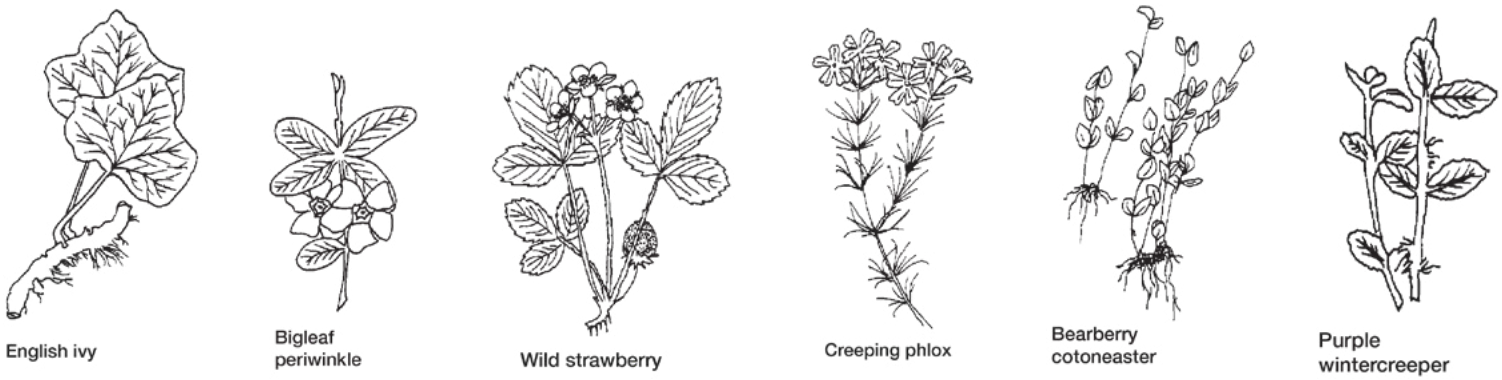


Figure 3. Common ground cover varieties.

Table 3. Number of ground cover plants needed for planting areas.

Planting Area (sq ft)	Spacing in Both Directions (in)					
	6	8	9	12	18	24
100	400	225	178	100	45	25
200	800	450	356	200	90	50
300	1200	675	534	300	135	75
400	1600	900	712	400	180	100
500	2000	1125	890	500	225	125
600	2400	1350	1068	600	270	150
700	2800	1575	1246	700	315	175
800	3200	1800	1425	800	360	200
900	3600	2025	1602	900	405	225
1000	4000	2250	1780	1000	450	250

Table 4. Guide for selecting a ground cover and lawn substitute.

Common Name	Botanical Name	Plant Spacing	Sun	Part Shade	Shade	Remarks
bigleaf periwinkle	*Vinca major*	18 in	X	X	X	Vigorous. Spreads rapidly. Prefers some shade. Easy to establish and grow. Difficult to confine in small areas. Variegated form available.
blue rug juniper	*Juniperus horizontalis* "Blue Rug"	3–4 ft	X			6 in high and 6–8 ft spread. Bright silver-blue foliage. Hugs ground more than most junipers.
creeping phlox	*Phlox subulata*	12 in	X	X		Long-standing, excellent ground cover and rock garden plant. Propagate by seed or division. Massive flower display in spring. Flowers are available in white, blue, pink, and fuschia.
dwarf sweetwilliams	*Dianthus deltoides*	12 in	X	X		Plants spread to give full color if planted 9 in × 9 in. New cultivars are excellent. Brilliant flowers in spring; most are susceptible to foliar diseases.
English ivy	*Hedera helix*	18 in	X	X	X	Many new cultivars available. Deep-rooted. Will take sun,but needs close watering.
mondo grass or little monkey grass	*Ophiopogon japonica*	9 in	X	X	X	9 in high. Spreads by underground stolons. Vigorous, dependable; adapted to variety of soil conditions. Excellent ground cover.
monkey grass	*Liriope muscari*	12 in	X	X	X	Excellent border and ground cover. Spreads slowly; space 12 in × 12 in for quick cover. Many varieties available, including those with variegated foliage. Responds well to fertilizers.
sweet violets	*Viola odorata*	9 in		X	X	Many new cultivars are available. Need well-drained and high-organic matter to perform well. Try Royal Robe and White Czar.
wild strawberry	*Fragaria chiloensis*	18 in	X	X	X	Excellent, vigorous ground cover for wide range of zones and soils. Easy to grow and propagate. Susceptible to spider mites. May be invasive.

Establish Your Lawn

Planting a new lawn is not hard if you plan and manage carefully. Lack of planning is a serious error that often leads to failure. Organization is needed for successful lawn establishment.

Planting time. The time of year is crucial in successful establishment of turfgrasses. A turfgrass planted at the wrong time of year will be a disaster, so don't waste time and money by planting at the wrong time of year.

Prepare for Planting

Cleanup. The first step is cleanup. Remove all construction materials such as scrap lumber, gravel, concrete, mortar and brick chips, shingles, and other debris.

Drainage. When the planting area is clean, check drainage patterns and runoff of surface water. Check the soil for compacted areas by inserting a 6-inch knife blade or screwdriver. The blade should slip into the soil with minimal effort. If great effort is required to push the blade into the soil, it is mostly clay or is compacted. Clay soils must have surface drainage since water movement through the soil is too slow for good grass growth.

Compaction is often caused by the heavy equipment used by contractors to move soil. (The soil is squeezed together by the weight of the machinery.) Grass roots cannot penetrate the compressed layer, and the root zone is limited to the soil above the compaction. The problem can be relieved by an aerator if the compaction is near the surface, or it can be relieved by a chisel plow or deep-tined aerator if the compacted layer is more than 3 inches deep.

Identify low, wet areas that need correction for proper drainage. Drain water away from the house and toward the street. Do not channel water onto the neighbor's property. Water can be directed by constructing shallow drainage ditches or swales or by constructing subsurface drainage ways.

Slope and grading. The slope of your property is important. A 3 to 5 percent slope is ideal. Lots that slope more than 20 percent will be difficult to mow and maintain. If your property poses a difficult situation for grading and drainage, ask for help from a licensed landscape architect or nursery person. A small cost to correct these problems is money well spent. You will have a lawn that drains well and prevents erosion. This helps protect the house and foundation from structural damage caused by soil settlement, erosion, or water seepage.

Save topsoil. When grading is needed, be sure to stockpile the topsoil for later use. In most cases, the top 3 inches should be stockpiled as topsoil. After the rough grading is completed, the topsoil can be spread and made ready for planting.

Soil test. The next step is soil testing, an important step in establishing a new lawn. Many soils in Mississippi lack the proper amounts of nutrients necessary for establishment and development of turfgrasses.

The soil testing can be conducted by the Soil Testing Laboratory at Mississippi State University. There is a minimal charge. Ask your county Extension agent for soil sample boxes and instruction sheets for sampling. The benefits of soil testing are discussed under "Fertilization" in this publication.

Correct nutrient deficiencies. Use a fertilizer spreader to distribute the recommended amount of fertilizer and lime before soil preparation. This will ensure the materials are worked into the soil during preparation. This procedure encourages deep rooting of the new grass seedling.

Prepare soil. Immediately after you spread the fertilizer, prepare soil for planting. This involves disking or tilling, followed by harrowing or hand-raking to the finished grade or slope. You are now ready for planting.

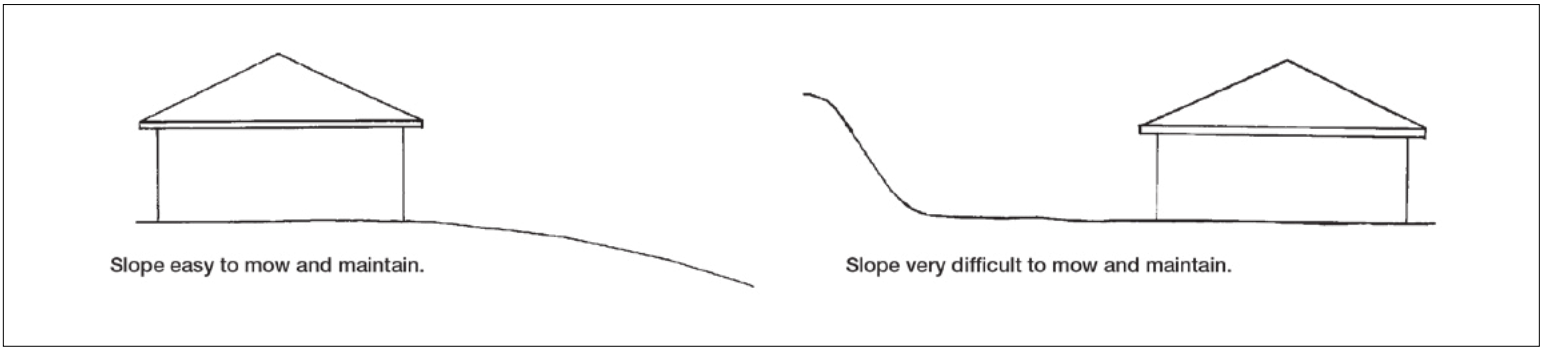


Figure 4. The slope of property is a very important consideration.

Table 5. Planting time for warm- and cool-season grasses.

Grass	Gulf Coast Zone 8b*	South and Central Zones 7b and 8a*	North Zone 7a*
Warm-season grasses			
bermudagrass	4/15–9/30	5/1–8/1	5/15–7/15
St. Augustinegrass	3/15–9/15	4/15–8/1	N/R*
centipedegrass	4/15–9/15	5/1–8/1	N/R
carpetgrass	4/15–9/15	5/1–8/1	N/R
zoysiagrass	3/1–9/15	4/1–8/1	5/1–8/1
Cool-season grasses (seeding only)			
Kentucky bluegrass	N/R	N/R	9/1–11/1
tall fescue	N/R	9/15–11/1 (7b only)	9/1–11/1
creeping red fescue	N/R	N/R	9/1–11/1

*N/R = not recommended

Planting Method

When you select a turfgrass for your lawn, consider the method of establishing the grass. Some grasses can be seeded. Others must be planted by vegetative sprigs, plugs, or solid sod. Table 1 on page 3 lists the method of planting for each turfgrass. Also refer to Table 6 on page 13.

Seed. When seeding, use top-quality seed from a reliable nursery or seed company. Seed should be fresh and certified as to purity and germination percentage. Do not buy old seed left over from the last planting season. They are not a bargain at any price.

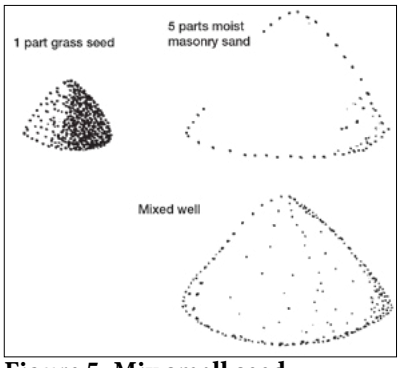


Figure 5. Mix small seed with moist masonry sand for even spreading.

The seeds of many turfgrasses are extremely small and difficult to plant. This is especially true of bermudagrass, centipedegrass, and carpetgrass. They are also expensive. To prevent waste and ensure even spreading, you can mix these seeds with moist masonry sand before planting. For best results, mix five parts moist sand with one part seed in a dry container; then use a fertilizer spreader to distribute the seed evenly. Be sure to calibrate the fertilizer spreader to deposit seed in small amounts. Spread the seed with several applications, using crisscrossing patterns.

Determine how much seed you need before buying grass seed. The planting rates are given in pounds needed per 1,000 square feet of planting area. The amount of sprigs, plugs, and sod are also shown per 1,000 square feet in Table 6. To find how many square feet you have, measure the length and width of the area to be planted. Then multiply the length times the width.

Here is an example: The lawn measures 110 feet by 80 feet. Multiply 110 feet by 80 feet to get 8,800 square feet of total area. You would need 4.4 pounds of common bermudagrass seed to plant this lawn.

Scarify. After seeding, harrow or scarify the planting area lightly. You can do this with a conventional farming harrow or with a yard rake. You also can make a homemade

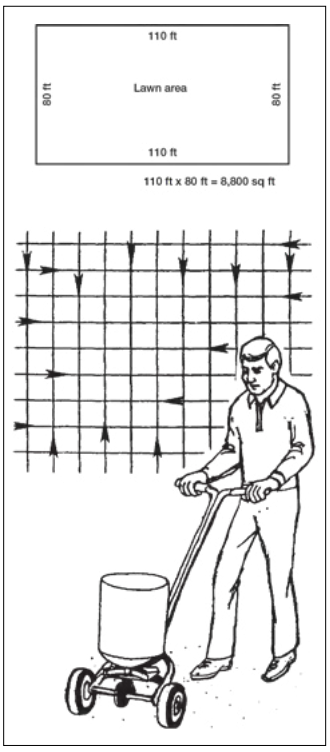


Figure 6. Spread the seed with several applications, using a crisscrossing pattern.

scarifier. The harrowing or scarifying ensures a shallow coverage of the seed. If you do this with power equipment, be sure the seeds are covered with no more than one-eighth inch of soil. Don't scarify Kentucky bluegrass, since the seed need light for best germination.

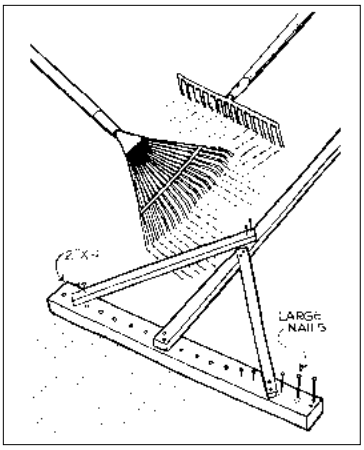


Figure 7. Make your scarifier from scrap lumber. Use large nails for the teeth.

After the seeds are covered by scarification, roll or pack the planting area. Homeowners sometimes skip this step, since lawn rollers and cultipackers are difficult to find in some communities. However, if you can find this equipment, roll the planted area to firm the soil and seed.

Seed germination is more rapid if you water the planting area immediately after planting and keep it moist, but not wet, during germination. However, it is almost impossible to water large areas evenly without irrigation equipment, and many homeowners, therefore, wait for rain rather than trying to moisten large planting areas.

Don't overwater, since this can wash the seed away. Be sure to keep the planted area moist by shallow watering during germination. Once the grass has sprouted and begins active growth, apply more water less frequently to promote deeper root growth.

Vegetative planting with sprigs, plugs, and solid sod. If you use sprigs, plugs, or solid sod to establish your lawn, be well organized for the planting procedure. You will be using live turfgrass rather than seed. The planting area must be prepared and "all systems go" before you purchase your planting stock.

The amount of sprigs, plugs, or sod you need is determined by the size of the planting area. It is a good idea to contact your nursery before the planting day, since certain varieties of turfgrass may not be available and must be ordered.

Vegetative planting takes more time than planting seed. Be sure to budget your time for the amount of area you are planting. A good worker can plant about 300 plugs in an hour. That covers about 300 square feet on 12-inch spacing. It takes about the same amount of time to plant sprigs in rows 12 inches apart.

Plan your time carefully when dealing with live sod. If you must hold your sod for several days, be sure to protect it properly. Unstack it and unroll the single sheets of turf. Place the turf in an area protected from sun and drying wind. Water as needed to keep turf moist. Do not allow sod to dry. Plant it within 3 days.

Preparing vegetative stock for planting. Turfgrasses are sold in solid strips about 18 inches wide and 30 inches long. An easy way to change sod to plugs is to use a sharp butcher's knife or axe to cut the plugs approximately 2 inches square. Solid sods can be changed to sprigs by shredding the sod in a clean soil/leaf shredder commonly used for composting in the home garden.

Another commonly used method for shredding sod is cutting long, narrow strips approximately 1 inch wide from the solid sod. These strips are then planted continuously in the rows that have been prepared in the planting area. Rolling and cultipacking are important for sprig and plug planting. This ensures firmly planted sprigs or plugs.

Planting solid sod is the easiest method of vegetative establishment. It is also the most expensive, since it requires more turfgrass per planting area. The sod is laid, individually, side by side and end to end. The process is similar to laying tile blocks on a floor. Cultipacking or rolling is recommended to firm and even the planting area.

Watering is crucial. When planting sprigs, plugs, or solid sod, water immediately after planting. This is crucial. The sprigs, plugs, or sod have few roots when planted. The foliage can dry very quickly. Drying can occur within a few minutes when planted in hot summer sun. You should water sprigs, plugs, and sod within 5 minutes after planting.

It is necessary to have a helper responsible for watering during planting. You should closely monitor the watering procedure to avoid overwatering, which can cause erosion, especially between the rows of plugs or sprigs. When watering solid sod, be sure to check several areas to ensure that water is being applied evenly and thoroughly. The soil beneath the sod must be moist during establishment. Applications of water may be necessary each day for sprigs, plugs, or sod. Within 2 weeks, vegetative plantings should show obvious signs of establishment, and watering can be less frequent and at greater depth to encourage deeper root growth.

Get ready to mow. When a new lawn is planted, there will always be weed competition. Weed seeds are turned up in planting. They sprout and grow more quickly than desirable

grasses. Mowing height is a major method of controlling weed growth during the establishment of a new lawn. Weeds can quickly overgrow and shade out desirable turfgrasses and must be mowed regularly for best control. The mowing height for newly established lawns, therefore, is critical.

Mow new grasses at 2 inches to ensure more leaf area to make food for new roots. Mowing heights can be adjusted to normal height in 6 weeks. Chemical weed control is not recommended on newly planted grasses until at least 2 months after establishment.

Table 6. Recommended rates for planting turfgrass.

Kind	Planting Method	Germination Time	Seed Amount / 1,000 sq ft of Planting Area
seeded bermudagrass	Seeding	10 days at > 70°F	½ lb seed*
centipedegrass	Seeding	21 days at > 70°F	4 oz seed**
carpetgrass	Seeding	10 days at > 70°F	1 lb seed*
Kentucky bluegrass	Seeding	14 days at > 70°F	1½ lb seed*
creeping fescue	Seeding	14 days at > 70°F	3 lb seed*
tall fescue	Seeding	10 days at > 70°F	4 lb seed*
bermudagrass centipedegrass St. Augustinegrass carpetgrass zoysiagrass	Vegetative sprigs *Set sprigs in rows 12 in apart*		10 yd of solid sod; shred into sprigs or cut into thin 1-in strips. Plant strips in rows 12 in apart.
bermudagrass centipedegrass St. Augustinegrass carpetgrass zoysiagrass	Vegetative plugs *Place 2-in × 2-in-size plugs 12 in aprt in rows that are 12 in apart*		3½ yd solid sod; this yields about 1,000 plugs if cut 2 in × 2 in when planted 12 in × 12 in
all grasses, if available	Solid sod		112 sq yd of sod

*Mix seed with clean masonry sand as described in the Planting Method section (page 11). Use fertilizer spreader for even distribution.

**Quicker coverage will occur if 8 oz. are used.

Renovating Your Lawn: Work with What You Have

If your current lawn is not all you want it to be, you may need to renovate—to make it new again. The first step in renovation is to determine if you have enough of the desired turfgrass present to make renovation more feasible than just starting over from scratch.

If you do not have at least one live plant per square foot of the grass you want, or if you do not have at least 30 percent cover of the grass you want, you should start at the beginning of this publication. If you have

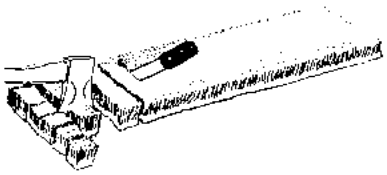


Figure 8. Cut the sod into 2-inch squares for plugging.

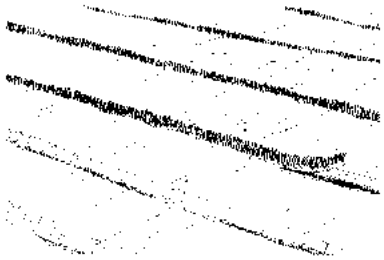


Figure 9. Plant the 1-inch strips in continuous rows.

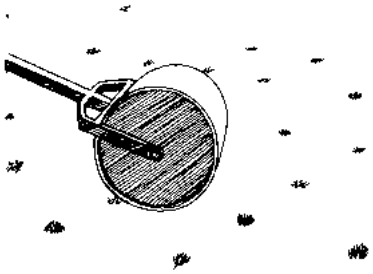


Figure 10. Roll or cultipack the plugs and strips to firm the soil around the roots.



Figure 11. Alternate the ends and middles when laying solid sod. Butt each piece tightly against the other.



Figure 12. Water immediately after planting.

patches of the grass you want, the next step is to see why the grass isn't growing in other places.

Shade is the problem we face most often in Mississippi. When we start our lawn, we put out sapling oaks, maples, and pines, and we plant bermudagrass. The lawn does well for several years, but then we notice the grass is thinning out and weeds are invading. The problem is the trees have grown enough to shade the bermudagrass. The option is to cut the trees to allow light to penetrate or to shift to a more shade-tolerant grass.

The second major reason turf does not thrive is soil compaction. As we walk on, drive our vehicles across, mow with our riding lawn mowers, and have our children play games on our lawn, the large pores in the soil are destroyed. This slows the rate at which water and air move through the soil and acts as a barrier to root growth. You can solve this problem through aeration or by physically disrupting the compacted layer with a plow. To check for a compacted layer, insert a knife or screwdriver blade 6 inches into the soil. If you feel significant resistance, you probably have a compacted layer.

Lawns thin out for several other reasons. Drought stress thins out the desirable species, and disease pressure causes the lawn to thin. Insects will kill the turf. After the turfgrass is gone, weeds move in. The presence of a great number of weeds is a sign the turfgrass is not thriving.

Before you can make the lawn succeed, you need to find the cause of its decline. Weed growth is a result, not a cause. Killing the weeds will not cause the grass to grow. You must discover if the turf needs nutrients, water, protection from pests, better drained soil, or whatever it lacks to grow a successful lawn.

Establishing Winter Lawns

Sometimes the occasion arises when it is just too late in the fall for the establishment of the desired turf species. Many people do not appreciate the brown color of the warm-season grasses during the winter months and prefer to have something green. The ryegrasses are well suited to take care of these two problems.

There are two types of ryegrass grown for lawns in Mississippi. Annual ryegrass (*Lolium multiflorum*) is commonly grown in Mississippi as a forage for winter grazing. It also is referred to as Italian ryegrass.

Annual ryegrass is quick to germinate and is often used to overseed the warm-season grasses. The warm-season turf is sometimes vertically mowed lightly to allow the ryegrass seed to get good soil contact, but the seed is often just spread on top of the established turf and watered in.

Annual ryegrass is lighter green and coarser than perennial ryegrass. It also is less heat-tolerant than perennial. This could be an advantage for overseeding since ryegrass should disappear before it interferes with the growth of the warm-season grass.

Perennial ryegrass (*Lolium perenne*) is one of the major turfgrasses in the northern United States. It does not act as a perennial in Mississippi, however. It is used in the same way as annual ryegrass—to establish temporary lawns and to overseed warm-season grasses. Perennial ryegrass is finer leaved and darker green than annual and is the preferred grass for overseeding athletic fields.

Planting time is important in ryegrass establishment. Seed planted after the dates in the table may not have time to grow into plants that can survive freezing temperatures. Seeding rate is also important. The ryegrasses are bunch grasses, so not planting enough seed produces a thin, clumpy turf.

Seed perennial ryegrass at 8 to 10 pounds of seed per 1,000 square feet; seed annual ryegrass at 10 to 12 pounds. After seeding, remember that ryegrass is a living turf just like the warm-season ones. It requires fertilizing, watering, mowing, and other care to produce the desired effect.

Table 7. Planting dates for temporary winter lawn grasses (seeding only).

Grasses	Gulf Coast Zone 8b	South and Central Zones 7b and 8a	North Zone 7a
perennial ryegrass	10/15–11/30	10/1–11/15	9/15–11/1
Italian ryegrass (annual ryegrass)	10/15–11/30	10/1–11/15	9/1–11/1

Manage Your Lawn

The quality of turf depends on color, density, and absence of insects and disease. Color has long been overrated as a standard for a quality lawn. In many cases, a normal high-quality color should not be dark green. This is the case with centipedegrass and carpetgrass, both of which are naturally yellow-green. Overfertilizing to get a dark green color generally leads to problems. Sod density and absence of insects and diseases are just as important as turf color.

Certain maintenance requirements are necessary for quality lawns. Basic chores for having a quality lawn include proper fertilizing, watering, mowing, and controlling weeds, diseases, and pests.

Fertilization

Turfgrasses must be properly fertilized to stay the right color, thickness, and health. Also, a well-fed grass recovers more quickly from stress and is more aggressive against weeds. As with all living things, proper nutrition is important to prevent diseases and insects. The lawn grasses discussed in this publication have different fertilization requirements, depending on the type of soils you have and the climate zone where you live.

Fertilization programs. A fertilization program begins with soil testing, which tells the status of nutrients in your soil. Recommendations then can be made specifically for your lawn. If you have taken soil samples before planting, refer to the report for the recommendation needed to correct your soil problems.

If you have not taken soil samples, ask your county Extension agent for soil sampling boxes and an instruction sheet. Send soil samples to the Soil Testing Laboratory at Mississippi State University for analysis. There is a small fee. Be sure to indicate what kind of grass you will be using for your lawn.

Fertilizer and lime recommendations will be made for your own grass and soil needs. Results and recommendations will be returned directly to you from the Soil Testing Lab. If you have any questions about the report, feel free to contact your Extension agent.

Once you have corrected the early soil nutrition problems according to the recommendations from the Soil Testing Lab, you can follow the suggested fertilization programs shown in this publication. These programs suggest certain nutrients and when to apply them.

Soil testing should then become routine for managing the home lawn. A sample taken once every 3 years is ideal. This periodic sampling is necessary because of the changing conditions of soil chemistry.

Liming. When soil tests indicate the need for lime, be sure to follow the recommendations carefully. Two common sources of lime are calcitic lime (ground agricultural lime) and dolomitic lime (dolomite). You can apply lime any time in the year, but you should apply no more than 50 pounds per 1,000 square feet to actively growing turf.

Several applications may be necessary to apply the total amount recommended by the soil test report. For example, if the soil test report recommends 100 pounds of lime per 1,000 square feet, you should split the amount into two applications, each using 50 pounds per 1,000 square feet.

Soil acidity varies according to soil type. A soil test shows the soil acidity level, commonly referred to as "soil pH." The degree of soil acidity is indicated by pH numbers ranging from 1 (very acid) to 14 (alkaline).

Maintaining a proper pH for your lawn grass is important, because soil pH determines how the soil nutrients are used. Fertilizers work much better when you keep the proper pH.

Table 8. Acceptable pH ranges for turfgrasses.

Grass	Acidity	pH
centipedegrass	very acid to acid	4.5–6
carpetgrass	very acid to acid	5–6
fescue bermudagrass zoysiagrass	acid	5.5–6.5
Kentucky bluegrass ryegrass St. Augustinegrass	acid to neutral	6–7.5

Nutrients Are Needed

The major nutrients needed for quality lawns are nitrogen, phosphorus, potassium, and iron. All are needed for quality turf, but some are more important than others.

Grasses use **nitrogen** more than any other nutrient. Bermudagrass and zoysiagrass require large amounts of nitrogen during the growing season. Others, including centipedegrass, carpetgrass, and creeping red fescue, require only small amounts of nitrogen for best growth. In all cases, however, you must add nitrogen by proper fertilization.

Some soils in Mississippi indicate a need for **phosphorus**. However, many soils will have enough phosphorus for most lawn grasses. Soil testing can identify the existing levels of phosphorus in your soil. Don't add phosphorus unless the soil test shows the need.

Potassium is also called potash. Most soils in Mississippi need it. Potassium is important for proper maturity of turfgrasses. In addition, it helps prevent winter injury and susceptibility to disease.

An important nutrient often overlooked is iron, which is necessary for proper growth and color. In soils with a high pH, iron is often lacking (turf looks yellow-green, similar to lack of nitrogen). Centipedegrass, St. Augustinegrass, and carpetgrass are most affected by iron deficiencies. You can correct an iron deficiency with granular or foliar fertilizer products. Popular materials to add include iron sulfate, chelated iron, and specialty fertilizers with iron. Use each of these according to label directions.

Turfgrasses use various amounts of the different nutrients. Nitrogen is used in the greatest quantity, followed by potassium and phosphorus. Turfgrass research scientists are in general agreement that turfgrasses prefer a 3-1-2 ratio (nitrogen-phosphorus-potassium). This ratio is commonly used in fertilizer recommendations. After the basic soil deficiencies identified by soil testing have been corrected, the 3-1-2 ratio is ideal for most maintenance programs. Often the last application (winter fertilizers) is higher in K than N or at least nearer to a 1-0-1 ratio.

When should you start fertilizing your lawn? This perennial question has been complicated in recent years by data that do not support some long-held beliefs. There are two trains of thought:

1. "What is best for the turfgrass plant?" Ideally, you should not apply the fertilizer until the turfgrass is actively growing and can readily use the nutrients. Arguments that support this theory include not encouraging weed growth, reducing loss of nutrients to erosion, and not encouraging rapid, succulent growth that is easily damaged by cold.
2. "What is best for the lawn?" Fertilizing before transition (from dormant to full growth) aids in weed control by causing the turfgrass to grow more rapidly and provide a quicker canopy to shade out weed growth. The lawn achieves a darker color and looks better sooner.

There is a problem with early fertilization if the weather gets into a repeated cycle of temperatures warm enough to start top growth, but too short in duration to allow the newly developed leaves to provide carbohydrates to the roots before the leaves are destroyed by cold. All of the carbohydrate stored from last year can be used, and the roots will die from lack of food. This has been quite rare in Mississippi.

Lawn-care providers have several options. Users of conventional, quick-release fertilizers have two options. The old, tried and true method is to wait 2 to 3 weeks after green-up to apply the first fertilizer. The grass plant will come through transition upon stored carbohydrate and residual nutrients from last year.

The second option is to fertilize lightly at the first signs of green-up. This provides additional nutrition for the plants quickly to crowd out weeds. This option makes it possible to use "weed and feed" formulations since the preemerge fertilizers need to be out before germination of the weed seeds. Homeowners can achieve an even distribution of preemerge weed control most easily with these herbicide-carrying fertilizers.

Slow-release nitrogen fertilizers offer the best of both worlds. The fertilizers are available over an extended period of time and will help prevent flushes of rapid growth but will supply additional nutrition for the turfgrass to get off to a rapid start. Slow-release sources, which are temperature dependent (urea formaldehyde, sulfur-coated urea), somewhat match fertilizer release with grass growth.

Winterizing Fertilizers

Late-season or "winterizing" fertilizer applications to warm-season turfgrasses in Mississippi are a controversial management practices. The discussion concerns the potential for winterkill, disease promotion, and the effect on total nonstructural carbohydrates (TNC) from late-season nitrogen applications. For high-maintenance turfgrasses (particularly bermudagrass), nitrogen and potassium are nutrients that are required in fairly large amounts during the growing season to provide good growth and quality.

A late-fall application of potassium has been a standard practice because research indicates that potassium promotes winter hardiness and disease resistance in turf. Although some research has indicated an increased vulnerability to winterkill and the promotion of winter diseases from late-season nitrogen applications, similar research studies have shown that late applications of nitrogen prolonged desirable color of Tifgreen bermudagrass into the fall, promoted its recovery in the spring, and had no direct correlation with susceptibility to winterkill.

Research trials conducted at Mississippi State University were designed to simulate a worst-case scenario in which bermudagrass would have an increased likelihood of winterkill resulting from late-season growth stimulation, particularly with a water-soluble nitrogen source. Applications of nitrogen alone or in combination with potassium improved fall turfgrass color through October and gave significantly higher spring turfgrass color ratings with little effect on rhizome TNC levels.

There was no indication that nitrogen fertilization increased bermudagrass winterkill potential. The data indicate that the winterkill phenomenon is probably the result of a combination of factors such as previous cultural and chemical management practices, the environment, or pathogens, and it cannot be attributed solely to late-season fertilization.

Regardless of the time of year, lush turf that is stimulated by excessive nitrogen may be more susceptible to certain diseases. However, properly fertilized turf will have a quicker recovery if it becomes diseased.

A dense, healthy turf is much less likely to have heavy weed populations. Also, people who maintain their lawns with relatively high fertility programs most likely also will maintain good disease and weed management programs.

Although this publication provides general guidelines for fertilization and timings of applications for different turf species in different zones of the state, it does not exclude additional winterizing fertilization to meet specific needs. Winterizing fertilizers are generally formulated to contain lower ratios of nitrogen to potassium, and often the nitrogen sources are not water soluble and are not readily available.

Base your turf fertilization program on soil test analysis, turf use requirements, and grower expectations. Time the application of winterizing fertilizer in the fall, when temperatures begin to moderate and days begin to shorten, but before the turf goes dormant.

Fertilizers: What To Know

Fertilizers come in different strengths. All fertilizers have three numbers on the label. These numbers indicate the kind and strength of fertilizer materials. The first number indicates the percent of nitrogen. The second number indicates the percent of phosphate. The third number indicates the percent of potassium (potash). Many kinds and strengths of fertilizer materials are available.

A mixed fertilizer has nitrogen (N), phosphorus (P), and potassium (K) combined. Other examples of mixed fertilizers are 24-4-12, 8-8-8, 20-5-10, 24-4-4, 5-10-5, and 13-13-13.

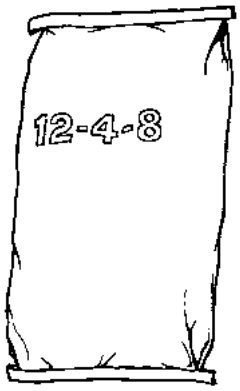


Figure 13. The numbers indicate the kind and strength of fertilizer materials in the bag. The example here is 12% nitrogen, 4% phosphorus, and 8% potassium.

In addition to mixed fertilizers, there are single-source fertilizer materials. These contain only one nutrient. Examples include 21-0-0, a nitrogen fertilizer called ammonium sulfate; 0-20-0, a phosphorus fertilizer called superphosphate; and 0-0-60, a potassium fertilizer called muriate of potash.

Not all fertilizers are the same strength. After determining your fertilization program for the year, choose the fertilizer materials compatible with the nutrients recommended for your lawn grass.

Your fertilizer program depends on three things:

1. Which grass you are growing.
2. Which zone you live in.
3. What kind of fertilizer is available.

Begin a fertilization program after you correct liming needs and soil deficiencies. The program shows the nutrient units needed per 1,000 square feet of lawn area for the entire growing season. The rates are based on a 3-1-2 (N-P-K) maintenance ratio.

Since fertilizers are not the same strength, you have to calculate the number of pounds of the fertilizer you plan to use to have the correct recommendation. This is easy to do using this formula:

Pounds of actual nutrients needed divided by percent strength of fertilizer material to be used × 100 = pounds of fertilizer material from the bag that must be applied to 1,000 square feet of lawn area during the entire growing season.

An example: You live in zone 8b and have a bermudagrass lawn. From Table 9, the recommended rate is 6 pounds of actual nitrogen per 1,000 square feet for the growing season. Let's suppose you wanted to use ammonium sulfate (21 percent nitrogen strength) as the fertilizer material. It is easy to calculate the amount of ammonium nitrate needed to supply a total of 6 pounds of actual nitrogen by using the formula:

$$(6 \div 21) \times 100 = 28.57 \text{ lb.}$$

Therefore, nearly 29 pounds of ammonium sulfate (21 percent nitrogen strength) will be needed to supply the 6 pounds of actual nitrogen needed per 1,000 square feet of lawn area for the entire growing season. This 29 pounds should be split into six equal applications as suggested in Table 9. You, therefore, need to apply 5 pounds of ammonium sulfate per 1,000 square feet each of the six times you apply fertilizer to the lawn.

Example: You have a St. Augustinegrass lawn and live in zone 8a. The table recommends you use 2 pounds actual nitrogen per 1,000 square feet per growing season. Assume you want to use a 24-4-12 fertilizer material. Use the formula to determine how many pounds of fertilizer material are needed to supply the 2 pounds of actual nitrogen needed for the entire growing season.

$$(2 \div 24^*) \times 100 = 8.33 \text{ lb.}$$

*Note: Use the largest number of a mixed fertilizer in the formula.

Table 9. Fertilizer programs for turfgrasses.*

Type of grass	Where you live	Recommended amount of actual nutrient for soils testing medium in phosphorus and potassium.**			No. of applications	Optimum dates of application
hybrid bermudagrass	Zone 7a	3 nitrogen	1 phosphate	2 potash	3	5/15, 6/15, 8/15
	Zone 7b	4 nitrogen	1 phosphate	3 potash	4	5/1, 6/1, 8/1, 9/1
	Zone 8a	4 nitrogen	1 phosphate	3 potash	4	4/15, 5/15, 6/15, 8/15
	Zone 8b	6 nitrogen	2 phosphate	4 potash	6	4/1, 5/1, 6/1, 7/1, 8/1, 9/1
seeded bermudagrass	Zone 7a	3 nitrogen	1 phosphate	2 potash	3	5/15, 6/15, 8/15
	Zone 7b	3 nitrogen	1 phosphate	2 potash	3	5/1, 6/1, 8/1
	Zone 8a	3 nitrogen	1 phosphate	2 potash	3	4/15, 5/15, 6/15
	Zone 8b	4 nitrogen	1 phosphate	3 potash	4	4/1, 5/1, 6/1, 8/1
zoysiagrass	Zone 7a	3 nitrogen	1 phosphate	2 potash	3	5/15, 6/15, 8/15
	Zone 7b	4 nitrogen	1 phosphate	3 potash	4	5/1, 6/1, 7/1, 8/1
	Zone 8a	4 nitrogen	1 phosphate	3 potash	4	4/15, 5/15, 6/15, 8/15
	Zone 8b	6 nitrogen	2 phosphate	4 potash	6	4/1, 5/1, 6/1, 7/1, 8/1, 9/1
St. Augustinegrass	Zone 7a	Not recommended for turf in this zone				
	Zone 7b	2 nitrogen	1 phosphate	2 potash	2	5/1, 6/1
	Zone 8a	2 nitrogen	1 phosphate	2 potash	2	4/15, 8/15
	Zone 8b	3 nitrogen	1 phosphate	2 potash	3	4/1, 6/1, 8/15
centipedegrass	Zone 7a	Not recommended for turf in this zone				
	Zone 7b	1 nitrogen	0 phosphate	1 potash	1	5/1
	Zone 8a	1 nitrogen	0 phosphate	1 potash	1	4/15
	Zone 8b	2 nitrogen	0 phosphate	2 potash	2	4/1, 8/1
carpetgrass	Zone 7a	Not recommended for turf in this zone				
	Zone 7b	Not recommended for turf in this zone				
	Zone 8a	1 nitrogen	0 phosphate	1 potash	1	4/15
	Zone 8b	2 nitrogen	0 phosphate	2 potash	2	4/1, 8/1
Kentucky bluegrass	Zone 7a only	4 nitrogen	1 phosphate	3 potash	4	9/15, 10/15, 3/15, 4/15
tall fescue grass	Zone 7a	3 nitrogen	1 phosphate	2 potash	3	9/15, 3/1, 4/1
	Zone 7b	2 nitrogen	1 phosphate	2 potash	2	9/15, 3/1
creeping red fescue	Zone 7a only	1 nitrogren	0 phosphate	1 potash	1	9/15

*This chart does not include any winterizing fertilizer recommendations that are optional based on soil test analysis, turf use requirements, and grower expectations.

**Given in pounds per 1,000 square feet for entire season (split amount into number of applications).

Mowing

Mowing is necessary for a quality turfgrass. Mow frequently and at the proper height. The frequency and height of cut depend on the type of turfgrass, fertilization program, and the amount of rainfall.

The frequency of mowing depends on the growth rate of the turfgrass. The best rule of thumb is to mow enough that you never remove more than one-third of the leaf area per mowing. A common mistake is to allow the turf to become overgrown before mowing; this stresses the grass by removing too much of the foliage at one time.

When you mow turfgrass properly, it is not necessary to remove clippings for the health of the lawn. The only time you need to remove clippings for the grass's sake is when they are so heavy that the uncut grass is not visible; then remove the clippings to allow the sun to hit the grass. Clippings are an excellent source of slow-release nutrients to the turf. If you remove clippings for aesthetic purposes, consider placing them in a compost pile rather than the trash.

Special Types of Mowing

After many years of high maintenance, some lawn grasses develop a spongy layer of stem and grass residue called "thatch." All lawns have a little thatch, but when thatch layers reach more than 1 inch deep, they should be removed. Excess thatch is a haven for diseases and insects. In addition, heavy thatch layers interfere with proper watering, weed control, and fertilization programs.

Thatch accumulates most often on grasses that are heavy fertilizer users. Bermudagrasses and zoysiagrasses are notorious for developing thatch layers when overfertilized. In addition, St. Augustinegrass and centipedegrass develop thatch over a period of many years. When thatch has accumulated, you should dethatch your lawn. The most practical way to dethatch warm-season grasses is to rent a mower especially designed for dethatching. This mower has vertical blades that thin the grass and throw out the thatch buildup of stems and leaves. The operation usually leaves quite a mess of debris that you should remove from the lawn area.

The best time to dethatch is after the lawn has greened up and you have had to mow the turfgrass at least three times. The grass needs to have at least a month after dethatching to reestablish itself and renew the energy stored in its below-ground portion.

Don't dethatch during the spring transition or green-up period. However, once the grass has come through spring transition and is actively growing, a lawn can be dethatched in the active growing season and up until September 1. Don't dethatch warm-season grasses in late fall or early winter.

If you think your lawn needs dethatching, you need to find a vertical mower. Nurseries, garden centers, and rental stores usually have vertical mowers for rent with advanced notice.

Table 10. Recommended cutting heights.

Turfgrass	Inches
bermudagrass	½–1½
St. Augustinegrass	2½–3
centipedegrass	1½–2
zoysiagrass	1–1½
tall fescue	2–3 winter; 3–4 summer
Kentucky bluegrass	1½–2 winter; 2–3 summer
carpetgrass	1–2
creeping red fescue	2–2½ summer

General Rules for Mowing Turfgrass

1. Be sure the mower blade is sharp. This saves wear and tear on the engine and also prevents damage to the turfgrass.
2. Don't let lawn grasses become overgrown before mowing. Follow recommended mowing heights and frequency of mowing to avoid removing more than one-third of the leaf area.
3. Before mowing, always walk over the lawn area in search of rocks, wire, and other debris that could be a hazard to the operator or bystanders.
4. Wear safety equipment recommended by the manufacturer of your mowing equipment.
5. Always check the oil level before starting the engine.
6. Always adjust the mowing height of the equipment before starting the engine.
7. In general, mow coarse-textured grasses higher than finer-textured grasses.
8. Mow grasses grown in the shade one-half inch higher than the recommended cutting heights.
9. Grass clippings make excellent additions to the compost pile.
10. Avoid using grass clippings as a mulch, since the grass seed and weed seed may contaminate the planting area in flower beds, shrub beds, and vegetable gardens. When added to the compost pile, however, these materials generally decompose and can be used later for soil amendments and mulching.

Control Weeds

To maintain an attractive lawn, you have to learn to manage weeds. Weed control in a lawn begins with a healthy,

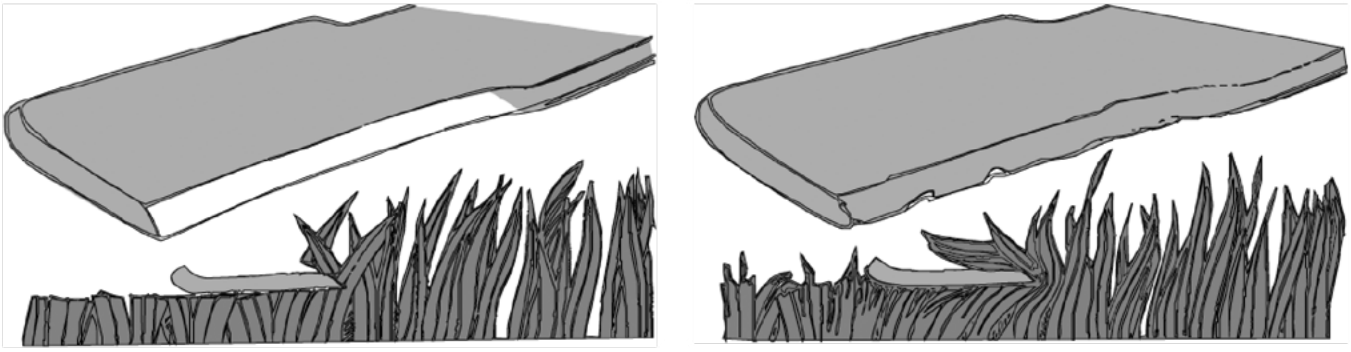


Figure 14. Sharp blades cut the grass evenly; dull blades break and tear it, leaving a ragged lawn.

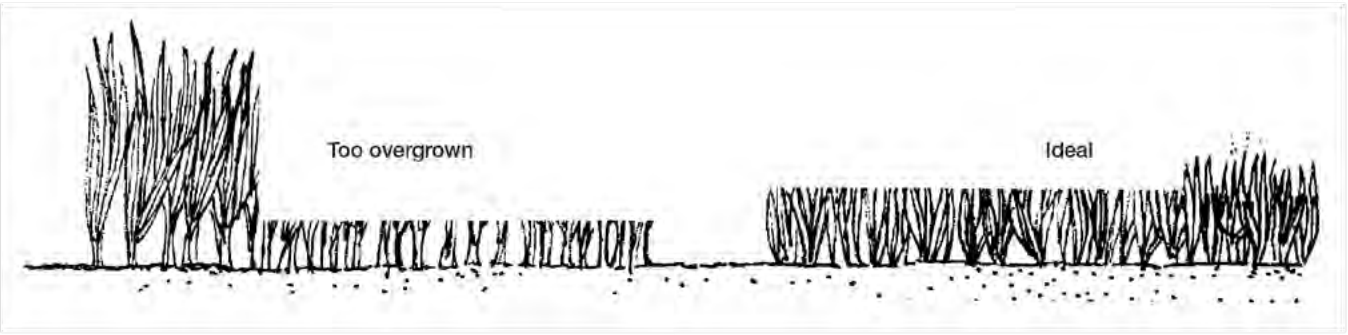


Figure 15. Don't let lawn grasses become overgrown before mowing.

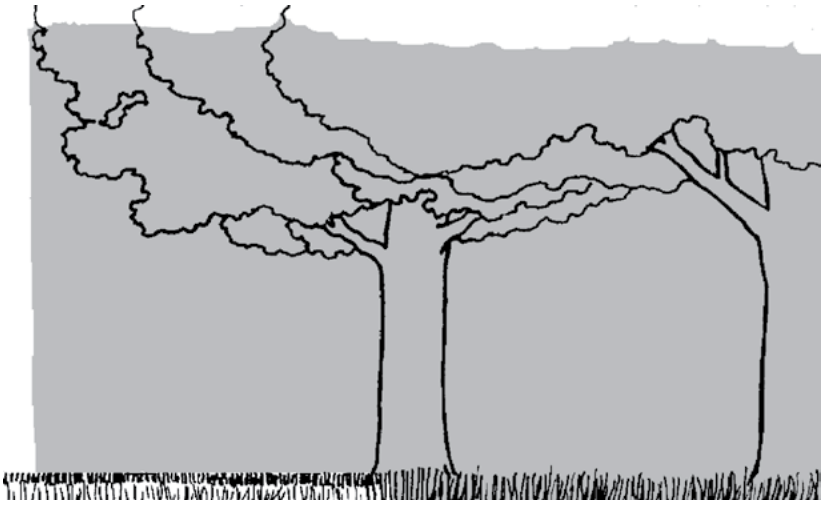


Figure 16. Shaded grass should be ½ inch higher than normal.

vigorous, dense stand of turf. Healthy turf helps control weeds by growing to fill bare areas, shading the soil surface, and shading newly emerged weed seedlings. Without sunlight, many weed seedlings cannot survive. An attractive, weed-free lawn can bring a sense of satisfaction and accomplishment to the homeowner.

Weed Identification

Weed identification is the first step toward chemical control. The pest must be correctly identified before a herbicide to control it can be selected or recommended. County Extension agents can assist you with weed identification. Several inexpensive identification guides are available at most bookstores. Most of these guides contain color photographs as well as written descriptions.

Lawn weeds can be grouped into one of three broad classes: grasses, sedges, or broadleafs. Grasses and sedges are similar with their long, narrow leaves and parallel veins. Grasses, however, have solid nodes (joints) and hollow internodes, and sedges do not. Sedges also have leaves arranged in threes. Hence, a cross-section of a sedge stem appears

triangular. Broadleaf weeds have showy flowers and leaf veins in a net arrangement.

Weeds can be further classified into three broad categories based on their life cycles.

Annuals are those weeds that produce seeds within 1 year after emergence. Those that emerge in the spring, grow through the summer, and produce seeds in the fall are called summer annuals. Examples of summer annuals are crabgrass, goosegrass, spurge, knotweed, and annual lespedeza. Weeds that emerge in the fall, grow in the winter, and produce seeds in the late spring are called winter annuals. Examples of winter annual weeds are henbit, chickweed, and annual bluegrass.

Biennial weeds require 2 years to produce seeds. These weeds emerge and grow the first year, overwinter as a dormant rosette of leaves, resume growth, and produce seeds the second year. Wild carrot and common mullein are examples of biennial weeds.

Perennial weeds emerge, grow, and produce some structure that enables the plant to overwinter and resume growth year after year. These plants typically reproduce by vegetative mechanisms as well as seeds. Common examples are bermudagrass, bahiagrass, dallisgrass, Florida betony, Virginia buttonweed, wild garlic, and nutsedge.

Perennial weeds reproduce by several vegetative structures. Bermudagrass produces rhizomes, or underground stems, capable of rooting and producing new plants at each node. Bermudagrass also produces stolons that are similar to rhizomes but are above the soil surface rather than below. Yellow and purple nutsedges produce tubers (or underground storage organs) capable of producing new plants. A potato is an example of a tuber. Wild onion and garlic produce bulbs or underground vertical stems encased in fleshy leaves. The other mechanism of vegetative reproduction is creeping roots or roots modified for food storage and reproduction. This reproductive mechanism is used by Virginia buttonweed.

Control

Most of the recommended turf-production practices, although not solely intended as weed control methods, do help control weeds. All production practices that promote healthy turf also help reduce weed establishment. This includes use of soil tests to maintain recommended pH, timely addition of recommended rates of fertilizer, controlled irrigation during periods of limited rainfall, insects and disease management, and proper mowing.

Although these practices are considered standard agronomic production tips, they can also help control weeds. As environmentalists, we must manage the turf to use its competitive ability to help control weeds.

Bare soil is a prime area for weed invasion. Bare areas should be reseeded, plugged, or left for adjacent grass to grow into. Areas reseeded or left void should be covered with mulch, such as grain straw, until turf fills the area.

Regardless of how well you manage the turf, weed seeds germinate and seedlings emerge. You should rely on other control methods when this occurs.

Some scattered, individual weeds (wild garlic, for example) can be removed by hand. However, hand removal is a tedious and time-consuming process. Herbicides that will reduce the time required to control weeds are available.

Chemical Weed Control

Herbicides can be divided into two groups: selective and nonselective.

Selective herbicides injure some plants but not others. For example, 2,4-D controls many broadleaf weeds, but does not injure bermudagrass. If, however, you use an excessive rate on a sensitive hybrid bermudagrass, injury will probably occur. Warning: Selective herbicides may become nonselective if you use more than the label recommends. Use caution to apply the rate stated on the product label.

Nonselective herbicides control or injure all plants that are contacted with the spray solution. These herbicides are useful to control all vegetation before lawn renovation or to control emerged weeds in driveways, sidewalks, and patios. Roundup is an example of a nonselective herbicide.

Herbicides can also be classified by their method of application: preemergence and postemergence.

Preemergence herbicides are applied to the soil surface or turf canopy before weed emergence. These herbicides kill weeds before or soon after seedling emergence. Chemical weed control begins with a preemergence herbicide application. If you do not use a preemergence herbicide, weed control becomes a defensive tactic. Apply preemergence herbicides from February to mid-March to control summer annual weeds.

For winter annual weeds, apply after mid-August and before September 1. Individuals in the southern part of the state should apply preemergence herbicides at the beginning of this time and those in the northern part of the state at the end of this period for summer annuals, and reverse these timings for winter annuals.

All preemergence herbicides must move into the upper portion of the soil to control weeds. Herbicides not washed into the soil are decomposed by ultraviolet sunlight or lost as vapors. Some herbicides are more susceptible to decomposition than others. Therefore, the length of time varies that a herbicide can stay on the soil surface before moving into the soil and still provide acceptable weed control. However, the sooner after application the herbicide is washed into the soil, the better the weed control will be. Rainfall will move these materials into the soil, but if rainfall is not forecast within 1 or 2 days after you apply a preemergence herbicide, you should water a half-inch to move the herbicide into the soil.

Postemergence herbicides are applied after weed seedling emergence (no application window is stated). Carefully examine your lawn for the invasion of weed seedlings that were not controlled by the preemergence herbicide.

Postemergence herbicides are most effective if applied to seedlings less than 3 inches tall. Wait until most weeds are 2 to 4 inches tall. Since weed seedling emergence occurs for several weeks, more than one application is needed to control weeds the entire season.

Herbicides are available in several formulations: emulsifiable concentrate (EC or E), water dispersible (WDG, D, DF), flowable (F, AS, LF), soluble concentrate (S), soluble powder (SP), or microencapsulated (M or ME). These formulations are mixed with water and sprayed onto the turf canopy or weeds. All formulations contain inert ingredients in addition to the active herbicide ingredient (active ingredient or ai). They also contain emulsifiers, surfactants, wetting agents, or antifoaming agents that help keep the active ingredient suspended in water and enhance plant uptake. All herbicide labels state the amount of active ingredient and amount of inert ingredients in the container. Knowledge of this information can help you make economical herbicide purchases.

Other herbicides are available in granular formulations (G). The granules are applied directly to the turf or soil surface. Granular materials may be less difficult to apply but are more expensive per unit of active ingredient than the sprayable formulations. Many herbicides are available in sprayable or granular form.

Activity of most postemergence herbicides is enhanced with addition of an adjuvant (or surfactant). Some herbicides require use of surfactant. Adjuvants facilitate herbicide movement into the leaf. Many types of adjuvants are available, and the concentration of active ingredient varies among brands. For most turf herbicide applications, a nonionic surfactant with at least 85 percent active ingredient is sufficient.

The adjuvant rate to add to the tank is stated on the herbicide label. Most, however, recommend 0.25 percent based on the volume of the spray tank (indicated v/v). If, for example, the volume of a spray tank is 1 gallon (or 128 ounces), and the label recommends addition of 0.25 percent (v/v) surfactant, 0.3 ounces surfactant should be added to the spray tank.

Some individuals suggest household detergents can be substituted for surfactant. This is not recommended for several reasons. Household detergents do not contain as much surface-active ingredient per unit volume as do agricultural surfactants. The amount of surface active ingredient per unit volume varies among brands of detergents. Hence, their use is more costly than use of agricultural surfactant. Detergents foam excessively, can form scums that affect sprayer performance, and can interfere with herbicide activity. Remember to purchase a good agricultural surfactant, if the label recommends its use, to save money.

Herbicide Selection

Many preemergence and postemergence herbicides are labeled for use in Mississippi lawns. A visit to the local cooperative dealer or garden center confirms this statement. Don't purchase a herbicide without serious consideration. Determine the type of turf in your lawn and the weeds that are present or anticipated. Then determine which herbicide(s) will provide the best control of the weeds in your turf.

Some weeds are more easily controlled with preemergence herbicides than with postemergence herbicides. For this reason, a combination of preemergence and postemergence herbicides may be necessary for year-round weed management in most lawns.

Turfs vary in their sensitivity to herbicides. Table 11 contains a listing of turfgrass tolerance to herbicides. Consult this table before you make the final herbicide selection. Tables 12 and 13 list weed response to preemergence and postemergence herbicides. These tables are useful to determine which herbicide(s) best controls the weeds present.

Not all herbicides listed in the tables are labeled for home lawns. Many of the products listed will injure desirable, broadleaf plants such as trees, shrubs, flowers, and vegetables. Use caution when applying these materials to turf near these plants. Remember, before using any pesticide, read and follow directions and precautions stated on the label.

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Table 11. Turfgrass tolerance to herbicides.

Herbicide	Common bermuda	Hybrid bermuda	Centipede	St. Augustine	Zoysia
2,4-D	Yes	Yes	Yes	S	Yes
2,4-D + 2,4-DP	Yes	Yes	Yes	S	Yes
2,4-D + dicamba	Yes	Yes	Yes	S	Yes
2,4-D + MCPP	Yes	Yes	Yes	S	Yes
2,4-D + MCPP + dicamba	Yes	Yes	Yes	Y/N[1]	Yes
2,4-D + MCPP + dicamba + carfentrazone	Yes	Yes	Y/N	Y/N	Yes
2,4-D + clopyralid + dicamba	Yes	Yes	No	No	Yes
asulam	–	Yes	–	Yes	–
atrazine	Yes	Y/N	Yes	Yes	Yes
benefin	Yes	Yes	Yes	Yes	Yes
benefin + oryzalin	Yes	Yes	Yes	Yes	Yes
bensulide	Yes	Yes	Yes	Yes	Yes
bentazon	Yes	Yes	Yes	Yes	Yes
bromoxynil	Yes	Yes	–	Yes	Yes
bentazon + atrazine	Yes	Yes	Yes	Yes	Yes
carfentrazone	Yes	–	Yes	Yes	Yes
chlorsulfuron	Yes	Yes	–	–	–
clopyralid	Yes	Yes	Yes	Yes	Yes
clopyralid + triclopyr	Yes	Yes	–	–	–
CMA	Yes	Yes	S	S	Yes
dicamba	Yes	Yes	Yes	Yes	Yes
diclofop	Yes	Yes	–	–	–
dithiopyr	Yes	Yes	Yes	Yes	Yes
DCPA	Yes	Yes	Yes	Yes	Yes

Herbicide	Common bermuda	Hybrid bermuda	Centipede	St. Augustine	Zoysia
DSMA	Yes	Yes	S	S	Yes
fenarimol	Yes	Yes	–	–	–
fenoxaprop	S	S	S	S	Yes
flazasulfuron	Yes	Yes	Y/N	S	Yes
fluazifop	S	S	S	S	Yes
foramsulfuron	Yes	Yes	–	–	–
halosulfuron	Yes	Yes	Yes	Yes	Yes
imazaquin	Yes	Yes	Yes	Yes	Yes
isoxaben	Yes	Yes	Yes	Yes	Yes
MCPP	Yes	Yes	Yes	Yes	Yes
mesotrione	S	S	Yes	Y/N	S
metolachlor	Yes	Yes	Yes	–	Yes
metribuzin	Yes	Yes	–	–	–
metsulfuron	Yes	Yes	Yes	Yes	Yes
MSMA	Yes	Yes	S	S	Yes
MSMA + metribuzin	Yes	Yes	–	–	–
oryzalin	Yes	Yes	No	Yes	Yes
oxadiazon	Yes	Yes	Yes	Yes	Yes
pendimethalin	Yes	Yes	Yes	Yes	Yes
pronamide	Yes	Yes	Yes	Yes	Yes
prodiamine	Yes	Yes	Yes	Yes	Yes
rimsulfuron	Yes	Yes	–	–	–
sethoxydim	S	S	Yes	S	S
simazine	Yes	Yes	Yes	Yes	Yes
sulfentrazone	Yes	Yes	Yes	Y/N	Y/N
sulfosulfuron	Yes	Yes	Yes	Yes	Yes
trifloxysulfuron	Yes	Yes	–	–	Yes

[1]Use products only with a 0.5:1:0.1 ratio of 2,4-D, MCPP, and dicamba on St. Augustinegrass. **S** indicates susceptible; herbicide known to severely damage or kill turfgrass. **Y/N** indicates intermediate, use with caution, or at reduced rates. Consult label for product use instructions and restrictions before considering use. **Yes** indicates tolerant when applied according to label directions. – indicates not labeled or data not available. Consult labels for approved adjuvants. Weed resistance to recommended use rates of certain herbicides has been documented in Mississippi.

Table 12. Estimated preemergence control.

Weeds	atrazine	benefin	bensulide	benefin + oryzalin	benefin + trifluralin	dithiopyr	fenarimol	isoxaben	metolachlor	oryzalin	oxadiazon	oxadiazon + prodiamine	pendimethalin	prodiamine	pronamide	simazine
annual bluegrass	G	G	G	G	G	E	E	N	–	E	G	–	E	E	E	E
bahiagrass	–	G	G	G	–	–	–	–	–	G	G	–	G	–	–	–
buttercup	N	N	N	N	–	–	N	–	–	N	F	–	N	–	–	N
carpetweed	–	G	G	G	–	–	N	F	–	G	E	–	N	–	–	E
chamberbitter	G	–	–	–	–	–	–	G	–	–	G	–	–	G	–	G
chickweed	E	N	F	F	G	–	N	E	–	G	F	–	G	–	F	E
clovers	G	N	N	N	–	–	N	G	–	N	N	–	N	–	–	F
crabgrass	F	G	E	E	G	E	N	N	G	E	G	E	E	E	–	F
dallisgrass	–	G	G	G	–	–	N	N	–	G	–	–	G	–	–	–
dandelion	–	N	N	N	–	–	N	G	–	N	N	–	N	–	–	F
dichondra	E	N	N	N	–	–	N	–	–	N	N	–	N	–	–	N
Florida betony	E	N	N	N	–	–	N	–	–	N	N	–	N	–	–	–
Florida pusley	E	N	F	F	–	–	N	F	–	N	–	–	N	–	–	G
goosegrass	F	F	F	F	G	G	N	–	–	G	E	E	G	E	–	N
ground ivy	N	N	N	N	–	–	N	–	–	N	G	–	N	–	–	G
henbit	–	N	N	N	–	–	N	G	–	N	G	–	N	–	–	E
knotweed	G	N	F	F	G	–	N	G	–	F	–	–	N	–	–	G
lawnburweed	G	N	N	N	–	–	N	–	–	N	F	–	N	–	–	E
lespedeza	G	N	N	N	–	–	N	–	–	N	–	–	N	–	–	F
pennywort	–	N	N	N	–	–	N	G	–	N	–	–	N	–	–	N
plantain	–	N	N	N	–	–	N	G	–	N	N	–	N	–	–	F
prostrate spurge	–	N	N	N	–	–	N	F	–	N	G	–	F	–	–	G
sandbur	F	G	G	G	–	–	N	–	–	G	G	–	G	–	N	–
sherpherdspurse	–	N	N	N	–	–	N	E	–	N	G	–	N	–	–	E
speedwell	E	N	N	N	–	–	N	G	–	N	G	–	N	–	–	F
Virginia buttonweed	–	N	N	N	–	–	N	–	–	N	G	–	N	–	–	G
wood sorrel	G	N	N	N	–	–	N	G	–	F	G	–	F	–	–	G

E = Excellent, **G** = Good, **F** = Fair, **N** = No control, **–** = Data not available.

Table 13. Estimated postemergence control.

Weeds	asulam	atrazine	bentazon	chlorsulfuron	clopyralid	clopyralid + triclopyr	2, 4-D	2, 4-D + mecoprop	2, 4-D + dicamba	2, 4-D + mecoprop + dicamba	2, 4-D + mecoprop dicamba + carfentrazone	diclofop	dicamba	diquat	foram sulfuron	fenoxaprop	flazasulfuron	fluazifop	glyphosate	halosulfuron	imazaquin	mecoprop	mesotrione	metribuzin	metsulfuron	MSMA, DSMA, & CMA	MSMA + metribuzin	pronamide	quinclorac	rimsulfuron	sethoxydim	simazine	sulfentrazone	sulfosulfuron	trifloxysulfuron
annual bluegrass	–	E	N	N	N	N	N	N	N	N	N	–	N	G	E	N	F	–	E	N	N	N	N	G	N	N	N	E	–	E	F	E	N	G	E
bahiagrass	–	N	–	–	N	N	N	N	N	N	N	N	N	–	N	G	–	–	E	N	N	N	–	N	E	F	F	N	–	–	G	N	N	N	F
buttercup	–	N	–	–	–	G	F	G	G	E	E	N	E	F	–	N	–	N	E	–	–	F	–	G	–	N	N	–	–	–	N	N	–	–	–
carpetweed	–	E	–	–	N	–	G	G	G	G	G	N	G	N	–	N	–	N	E	–	–	F	Y	N	N	N	G	–	–	–	N	E	–	–	–
chamberbitter	–	G	–	F	–	–	–	–	–	–	–	–	–	–	–	–	F	N	–	–	N	–	–	–	G	–	–	–	–	–	–	G	–	N	F
chickweed	G	E	–	–	–	E	F	G	G	E	E	N	E	G	–	N	E	N	E	–	G	G	–	G	G	N	N	F	–	G	N	E	–	E	E
clovers	–	G	–	N	E	E	N	G	E	E	E	N	E	P	N	N	G	N	E	–	N	E	–	N	G	N	N	–	–	–	N	G	F	N	G
crabgrass	G	F	N	–	N	N	N	N	N	N	N	–	N	N	–	E	G	G	E	–	–	N	G	N	N	E	E	N	G	N	G	F	–	N	–
dallisgrass	N	N	N	–	N	N	N	N	N	N	N	N	N	N	F	N	P	–	E	N	N	N	N	N	N	E	E	–	–	N	F	N	N	N	–
dandelion	–	F	–	G	–	E	E	E	E	E	E	N	G	N	N	N	F	N	E	N	F	F	–	N	G	N	N	–	–	–	N	F	–	F	E
dichondra	–	N	–	–	–	–	F	G	G	G	–	N	G	N	–	N	P	N	E	–	–	–	–	N	N	N	N	–	–	–	N	N	–	–	–
Florida betony	–	N	N	N	–	G	N	–	G	G	G	N	G	N	–	N	–	N	E	N	N	–	–	N	E	–	N	–	–	–	N	–	–	–	–
Florida pusley	–	N	–	–	–	–	N	N	–	–	–	N	–	N	–	N	–	N	E	–	–	N	–	–	G	N	N	–	–	–	N	N	–	–	–
goosegrass	F	N	N	–	N	N	N	N	N	N	N	E	N	N	G	G	P	–	E	–	–	N	G	N	N	F	E	N	–	N	F	N	G	N	–
ground ivy	–	G	–	–	–	–	G	–	–	–	–	N	–	N	–	N	–	N	E	–	–	–	–	G	G	N	G	–	–	–	N	N	–	–	–
henbit	–	E	–	–	–	E	F	G	G	E	E	N	E	G	E	N	E	N	E	–	F	F	–	G	G	N	N	–	–	E	N	E	–	E	E

Weeds	asulam	atrazine	bentazon	chlorsulfuron	clopyralid	clopyralid + triclopyr	2, 4-D	2, 4-D + mecoprop	2, 4-D + dicamba	2, 4-D + mecoprop + dicamba	2, 4-D + mecoprop dicamba + carfentrazone	diclofop	dicamba	diquat	foram sulfuron	fenoxaprop	flazasulfuron	fluazifop	glyphosate	halosulfuron	imazaquin	mecoprop	mesotrione	metribuzin	metsulfuron	MSMA, DSMA, & CMA	MSMA + metribuzin	pronamide	quinclorac	rimsulfuron	sethoxydim	simazine	sulfentrazone	sulfosulfuron	trifloxysulfuron
knotweed	–	G	–	–	G	–	F	G	G	G	–	N	E	N	–	N	–	N	E	–	–	G	–	N	E	N	N	–	–	–	N	G	–	–	N
kyllinga	–	–	–	N	N	N	N	N	N	N	N	N	N	–	N	N	–	N	E	F	F	N	–	–	N	–	–	–	–	–	N	N	E	E	G
lawnburweed	–	E	–	E	–	–	F	F	G	G	G	N	G	G	N	N	E	N	E	N	E	–	–	G	E	N	N	N	–	G	N	E	–	E	E
lespedeza	–	F	–	–	–	–	F	G	G	G	G	N	E	N	–	N	–	N	E	–	–	G	–	N	G	N	F	–	–	–	N	F	–	–	–
nutsedge, purple	N	N	N	–	N	N	N	N	N	N	N	N	N	N	–	N	F	N	G	E	E	N	–	N	N	F	F	N	–	–	N	N	G	E	E
nutsedge, yellow	N	N	E	–	N	N	N	N	N	–	N	N	N	N	–	N	F	N	G	E	E	N	–	N	N	F	F	N	–	–	N	N	G	E	E
path rush	–	–	–	N	–	–	G	–	–	G	–	–	N	–	–	N	P	N	E	–	N	–	–	–	N	–		–	–	–	–	–	–	N	–
pennywort	–	F	–	–	–	G	F	–	–	F	–	N	–	N	–	N	P	N	E	–	F	–	–	–	G	F	E	–	–	–	N	N	–	–	–
plantain	–	F	–	–	G	F	E	G	G	G	E	N	F	N	–	N	–	N	E	–	–	F	–	N	G	N	N	–	–	–	N	F	–	–	–
prostrate spurge	–	G	–	–	N	E	N	F	G	G	G	N	F	N	–	N	–	N	E	–	–	N	–	N	G	N	N	–	–	–	N	G	–	–	–
ryegrass	–	–	–	E	N	–	N	N	N	N	N	–	N	–	E	N	E	–	E	N	N	N	N	–	E	N	–	E	–	E	–	E	N	N	E
sandbur	–	–	–	–	N	N	N	N	N	N	N	–	N	N	N	–	–	–	E	–	–	N	–	N	N	G	E	N	–	–	F	–	–	–	–
shepherd-spurse	–	E	–	–	–	–	G	G	G	G	G	N	G	G	–	N	–	N	E	–	–	F	–	G	G	N	N	–	–	–	N	E	–	–	–
speedwell	–	–	–	–	G	–	N	F	F	F	F	N	N	G	–	N	P	N	E	–	N	N	–	N	N	N	N	–	–	–	N	–	–	N	–
tall fescue	N	N	N	F	N	N	N	N	N	N	N	N	N	N	–	–	G	N	G	N	N	N	N	N	N	N	N	N	–	–	F	N	N	F	G
torpedograss	N	N	N	–	N	N	N	N	N	N	N	N	N	N	N	–	P	N	N	N	N	N	–	N	N	N	N	N	G	–	N	N	–	N	G

Weeds	asulam	atrazine	bentazon	chlorsulfuron	clopyralid	clopyralid + triclopyr	2, 4-D	2, 4-D + mecoprop	2, 4-D + dicamba	2, 4-D + mecoprop + dicamba	2, 4-D + mecoprop dicamba + carfentrazone	diclofop	dicamba	diquat	foram sulfuron	fenoxaprop	flazasulfuron	fluazifop	glyphosate	halosulfuron	imazaquin	mecoprop	mesotrione	metribuzin	metsulfuron	MSMA, DSMA, & CMA	MSMA + metribuzin	pronamide	quinclorac	rimsulfuron	sethoxydim	simazine	sulfentrazone	sulfosulfuron	trifloxysulfuron
tufted lovegrass	–	N	–	N	N	N	N	N	N	N	N	N	N	–	N	G	P	G	E	N	N	N	E	N	N	N	N	–	N	N	N	N	G	N	N
Virginia buttonweed	–	N	–	G	–	F	N	F	G	G	G	N	F	N	–	N	P	N	E	–	N	N	–	N	F	N	N	–	–	–	N	N	–	N	–
wild garlic	–	N	–	–	N	F	F	F	F	F	F	N	F	N	F	N	P	N	G	–	E	N	–	N	F	N	N	N	–	E	N	N	F	N	E
wood sorrel	–	G	–	–	–	–	N	N	F	F	F	N	G	N	–	N	F	N	E	–	F	F	–	N	G	N	N	–	–	–	N	G	–	–	–

E = Excellent, **G** = Good, **F** = Fair, **N** = No control, **–** = Data not available.

Maintenance Calendar for Home Lawns

Winter *December 22–March 21*

Grassy winter annuals and broadleaf winter annuals in dormant turf become aggressive and rampant by early March. The seed (for next year's crop) matures in late winter and spring. Grassy winter annuals include annual bluegrass and little barley. Broadleaf winter annuals include henbit, wild mustard, common chickweed, saw thistle, pepperweed, Carolina geranium, buttercup, wild garlic, narrow vetch, shepherd's purse, and wild lettuce. Seed from last year's crop of summer weeds are present and will germinate in February and March.

Checklist

- To control existing winter weeds in the dormant lawn in January, February, and very early March: (a) Use a postemergence herbicide to kill existing weeds, and (b) keep your lawn mowed closely at recommended heights for your type of lawn grass. Most winter weeds cannot tolerate close mowing and will be stressed, damaged, or even killed by mowing heights used on warm-season lawns. (c) Plan to use a preemergence herbicide next fall to kill next year's crop. If you have allowed several winter weeds to mature and produce seed, you will certainly have the potential for a big weed crop next winter. Make notes and plans now.
- Do not fertilize lawns with warm-season grasses in January or February. Winter weeds are in "prime time." Warm-season turf is dormant, or nearly so. Fertilizer in these months only encourages rampant weed growth and seed production. Warm-season grasses are not yet actively growing and do not benefit from early spring applications of fertilizer.
- Plan to use a preemergence herbicide in late winter to control summer annuals that will be sprouting then.

Spring *March 22–June 21*

Winter annuals grow vigorously and become rampant. Seed production peaks in spring. See winter weeds mentioned above.

Desirable warm-season turfgrasses begin "spring transition" from dormancy to active growth. They are sensitive to certain herbicides and cultural conditions during "spring transition." Transition begins in March and continues through mid-April.

Summer annual weeds begin seed germination in early spring. Summer perennials begin regeneration from roots, stems, rhizomes, or tubers of established mother plants. Summer perennials also begin seed germination in spring.

Checklist

- Continue to mow the lawn at recommended heights for your particular type of lawn grass. Regular mowing helps control weeds.
- Fertilize the lawn to allow quick coverage. Always be sure the turfgrass, and not weeds, is responding to the nutrients by applying proper herbicides.
- Do not apply postemergence herbicides to warm-season turf during "spring transition." They can damage or hinder turfgrass in the early stage of active growth. Postemergence applications are safe beginning May 1 on the Gulf Coast and May 15 in central and north Mississippi. Lawns with severe thatch problems may need dethatching after the grass has gone through transition. Grasses prone to thatch include bermudagrass, zoysiagrass, and St. Augustinegrass.

Summer *June 22–September 21*

Summer annuals are at their peak. They can produce several generations of weed seedlings from now until frost. Spring seedlings have enough time to produce seed. These seeds immediately germinate into another generation. The cycle is repeated until frost in October and November. Some scattered seed of summer annuals will lie dormant through the winter months and sprout early next spring.

Grassy summer annuals include crabgrass, goosegrass, crowfoot, signalgrass, barnyardgrass, and foxtail. Broadleaf summer annuals include ragweed, spurge, pigweed, chickweed, lamb's quarter, bitterweed, yellow wood-sorrel, spiny amaranth, and beggar's lice.

Warm-season turfgrasses have the best opportunity for rapid growth and development. Encourage quality turf by proper maintenance suggested in this publication.

Winter weeds (grassy and broadleaf) begin their cycles in late summer. Winter annuals begin seed germination in early September. Seeds are present from last year's crop that matured in late winter and early spring of this year. The seed and sprouting seedlings are hard to see because they are below the leaves and stems of your lawn grass. Seeds continue to sprout during the fall, but some wait until late winter to sprout. In both cases, you won't see much growth of winter annuals until cool weather and winter rains arrive in late fall and early winter.

Grassy winter annuals include little barley and annual bluegrass. Broadleaf winter annuals include henbit, wild mustard, common chickweed, sow thistle, pepperweed, Carolina geranium, buttercup, wild garlic, narrow vetch, shepherd's purse, and wild lettuce.

Checklist

- Continue regular mowing at the recommended height for your particular lawn grass. Proper mowing promotes a dense quality turf cover that competes aggressively with weeds.
- Continue a proper fertilization program to encourage a quality turf cover.
- Be prepared to water as needed in hot weather. Summer is the prime time for promoting active growth of your warm-season grass. Take advantage of the ideal temperatures and provide water, fertilizer, and proper mowing at this time.
- Continue a postemergence herbicide program as needed to clean up existing summer weeds.
- Decide on a late-summer application of a preemergence herbicide to control winter weeds. Contact your local nursery and have the herbicide material on hand by late summer. Remember, timely application of preemergence herbicide is necessary for proper control.

Fall *September 22–December 21*

Warm-season lawn grasses grow more slowly with the cooler fall temperatures. However, moderate growth continues in September and early October in most areas of Mississippi. Dormancy begins with the first frost on all warm-season grasses except St. Augustinegrass, which sometimes does not become completely dormant in winter.

Active growth of winter annuals may be seen by December.

Checklist

- Continue regular mowing at recommended heights for bermudagrass, zoysiagrass, and carpetgrass. Raise mowing height to 3 inches on St. Augustinegrass to promote winter hardiness.
- Take a soil test to help you plan your fertilization program for next summer. Fall is the ideal time to apply lime if your soil test recommends it.

Control Diseases

Turfgrass damage should be diagnosed as soon as possible. Damage is often blamed on diseases or insects when climate, environmental conditions, or cultural practices are the real causes. Tree competition, cutting height, cutting frequency, herbicide damage, nutrient chlorosis, and soil compaction sometimes cause diseases to develop.

Diseases are usually more severe in lawns with a heavy thatch. Thatch is a layer of partially decomposed leaves, stems, and

roots at the soil surface. It builds up over several years and restricts the movement of air, water, and fertilizers into the soil. When thatch is heavy, roots are generally shallow, which increases damage from drought.

Following are brief descriptions of the most common diseases of warm-season grasses and some suggested control recommendations. For more complete descriptions of these diseases and updated chemical control recommendations, use rates, timing of applications, and other information, refer to other Extension turf disease publications and suggested chemical labels.

Always read and follow label directions, as many pesticides have restrictive use or application guidelines and can be applied only by professional applicators. Some of the fungicides listed are labeled only for golf courses, sod farms, industrial, or municipal turf areas, or to be applied only by professional applicators to residential lawns; therefore, they may not be used by homeowners.

Large Patch (Brown Patch)

The fungus responsible for large patch, commonly referred to as brown patch, attacks most species of grasses but is more serious on bentgrass, bluegrass, bermudagrass, centipedegrass, and St. Augustinegrass.

Large patch is prevalent in spring or fall. You will see brownish to gray irregular, circular areas a few inches to several feet in diameter. In certain grasses, a narrow, dark, smoke-colored ring may border the diseased area. These water-soaked or scalded spots spread rapidly, becoming large, brown areas.

Generally, large patch fungus attacks the base of leaf sheaths where they are joined to stolons. Leaves turn yellow in St. Augustinegrass and a reddish color in centipedegrass before dying. Uncontrolled, it can attack the roots and kill large areas of the lawn. Large patch is severe on St. Augustinegrass in the spring, especially at temperatures of 60 to 75°F. At temperatures of 80°F and above, and under low moisture conditions, the activity of the fungus decreases. Large patch can be caused by too much nitrogen fertilizer, watering late in the afternoon, and by thatch buildup.

Control: 1) Use recommended varieties and good cultural practices for watering, fertilizing, and mowing. 2) Control thatch. 3) Limit the amount of nitrogen fertilizer. 4) Refer to Tables 14 and 15 for recommended fungicides.

Gray Leaf Spot

Gray leaf spot usually attacks St. Augustinegrass, but it can also attack centipede. It is a summer disease caused by a fungus and is common in long periods of hot, humid weather. Newly sprigged or rapidly growing grass is more susceptible than well-established grass. Too much nitrogen fertilizer can make the disease more severe.

The disease causes irregular gray, dirty-yellow, or ash-colored spots with brown, purple, or water-soaked borders on leaf blades. Spots may be covered with gray mold in warm, humid weather. Lesions may occur on stems, spikes, and leaves. A yellow halo or general chlorosis may occur around some spots.

The disease is usually noticed first in shaded damp areas. In heavy areas, the grass may have a burned appearance. Seldom will this disease kill an entire lawn.

Fungus spores are spread by the wind, rain, irrigation water, and animals.

Control: Avoid excessive nitrogen (water-soluble) fertilization in summer. Water in the day so foliage will not stay wet overnight. Refer to Tables 14 and 15 for recommended fungicides.

Fairy Rings

Most fairy rings are caused by fleshy fungi such as mushrooms, toadstools, or puffballs. They occur wherever grass grows and in soil that is high in organic matter. The rings are usually marked by mushrooms or by a stimulated or depressed growth of vegetation.

There are three types of fairy rings. One produces a ring of dead grass each year and is visible for long periods of time. Another produces a dark-green ring. The third type is visible only when the fruiting bodies are produced and does not affect the grass.

The killing or dark-green reaction sometimes results from hydrogen cyanide (HCN) production, which in high concentrations is lethal to grass. Mushrooms may appear periodically. The soil is permeated by a white fungus growth (mycelium) and is usually very dry.

Fairy rings spread outward a few inches to a few feet per year. Where the grass cover is not uniform, the rings may not be completely circular. As the fungus spreads, it consumes a portion of the organic matter in the soil. The fungus prevents the penetration of water into the soil, and the grass is damaged or killed from drought.

Control: In developing your lawn, do not bury roots, stumps, branches, and other large pieces of organic debris. These provide a food source for these fungi. If the only effect of the fairy ring is a stimulation of growth in rings, fertilization usually takes care of the problem. Removing cores of soil (aerification) aids in water penetration.

Topdress holes with fresh soil free of organic matter. Some experts recommend removing the soil 18 inches on each side of the outer stimulated area 1 foot deep. In removing infested soil, do not spill it on adjacent healthy grass. Fill trench with fresh soil and reseed or resod. Chemical control is generally not very effective because the fungus grows so deeply into the soil, but refer to Tables 14 and 15 for labeled fungicides.

Dollar Spot

This common fungus disease occurs on several grass types but is most severe on bermudagrass. It attacks neglected turf or areas that are under moisture or nutritional stress caused by a lack of nitrogen.

Warm, humid weather and cool nights with heavy dew promote the disease. It kills the grass in small spots 2 to 3 inches in diameter. The spots may grow together into large areas. They appear first as small, circular, straw-colored spots of blighted turfgrass about the size of a silver dollar. Individual leaves develop lesions that have a bleached, straw-colored appearance, bounded by a tan to reddish-brown margin. A white, cotton-like fungal mycelium growth may be seen in early morning when dew is present.

Pieces of diseased plants are spread by mowers, sweepers, and other lawn equipment.

Control: 1) Maintain adequate moisture and nutrients. Maintain a high level of nitrogen when the disease is prevalent. 2) Prevent the buildup of thatch. 3) Do not water in late afternoon or evening. 4) Many strains of this fungus resist certain fungicides, so use several types of fungicides to control this disease. Alternate contact fungicides with systemic fungicides. Refer to Tables 14 and 15 for suggested fungicides.

Slime Molds

Slime molds cover above-ground plants with a dusty-gray, black, or dirty yellow mass. When you look closely, you see small, round balls scattered over the plant. If you rub these balls between your fingers, a minute, soot-like powder covers them. This powder is the spores of the fungus.

Slime molds normally live on the soil, where they feed on decaying organic matter. Slime molds do not feed on living plants. They use them for support during reproduction. They damage grass and other plants only by shading them from sunlight, causing the leaf blades to turn yellow. Slime molds occur in wet weather in spring, summer, and fall. They disappear rapidly as soon as it becomes dry.

Control: Control is usually not necessary. You can break up the masses by sweeping with a broom, spraying with a strong stream of water, or just dragging a hose over the affected area. In prolonged damp weather, you can apply any good contact turf fungicide to affected areas.

Melting Out or Leaf Blotch

Several fungi can cause melting out, or leaf blotch. Fungus spores produce abundantly and travel long distances by wind, water, and mowers. Infection by the wind-borne spores results in leaf spotting.

Symptoms are round or oblong spots parallel to the leaf blade. They are usually brown or purple and are more numerous near the collar area of the leaf blade. The leaf sheath turns brown and dies, resulting in death of the leaf blade. In severe cases, a sheath and crown rot kills the grass in patches. The grass may be badly thinned over the entire turf area.

Control: There are no resistant varieties. 1) Do not let grass stay wet. Irrigate early in the morning. 2) Keep the grass in good vigor. Do not apply high rates of water-soluble nitrogen fertilizers in the spring. 3) Raise mowing height during disease outbreak. 4) Remove and destroy clippings from affected lawns when mowing. 5) Apply recommended fungicides. Follow label instructions.

Nematodes

Nematodes are microscopic worm-like organisms that live in the soil and attack the roots. They are occasionally a problem in home lawns because they feed on turfgrass roots and cause a slow decline of the turf.

If you have a lot nematodes, they can cause a thinning out, stunting, and pale color of the grass, usually in patches. There are no absolute above-ground symptoms to confirm the presence of nematodes. The only way to determine if nematodes are a problem is to have a soil sample assayed by the Mississippi State University Extension Service's Nematode Assay Laboratory. You may get a Nematode Soil Sample Bag (Extension Form 591), Nematode Soil Sample Form (Extension Form 488), and instructions from your county Extension agent.

Control: Controlling nematodes in home lawns is different from nematode control in most other plants. There are no resistant varieties, you cannot use biological control, and there are no chemicals (nematicides) you can use in established home lawns because of the extreme toxicity of nematicides. You should use good cultural practices to keep

damage to a minimum. This includes mowing, watering, controlling insects and diseases, and fertilizing properly.

When bringing soil in to form a new lawn, first have it tested for nematodes. On an established lawn where nematodes are a problem, take a soil sample for fertility testing to the Extension Soil Testing Laboratory. Follow fertilizer and lime recommendations, and water to avoid drought stress.

Rust

People typically notice rust on cool-season turf species, such as fescues and ryegrass. But it also can attack warm-season species such as bermudagrass. Symptoms of rust appear as irregular areas or distinct patches of turf having a yellowing or orange color. Leaves will have tiny pustules or blisters on their surface that when ruptured release a powdery mass of spores.

An easy way to notice these is to wipe a white cloth across the lawn. The tiny spores will easily show up as an orange stain.

Turf stresses such as drought and nitrogen deficiency are associated with this disease, so good turf management will help control rust. Apply fungicides that are effective in managing rust.

Take-All Root Rot

This disease is caused by a fungus. It may be mistaken for chinch bug damage or drought symptoms.

Symptoms are circular to irregular in shape and may resemble symptoms of brown patch. Patches of diseased St. Augustinegrass or centipede at first appear yellowish-green and then die. As diseased stolons die, severe thinning occurs in areas of several feet to even entire lawns.

It is important to remember that this is a root disease and by the time leaf symptoms are noticeable, the root systems have already been severely damaged. Another key symptom is the ease of lifting stolons from the soil, since the roots are essentially gone.

You can lessen the disease by following cultural practices that reduce turf stresses. Eliminate excessive irrigation. Avoid applying high rates of lime, and maintain a soil pH of 5.5 to 6.0. Mow at recommended heights and intervals with a sharp blade. Avoid ammonium nitrate fertilizer, and use acidifying fertilizers such as ammonium sulfate or slow-release urea. Maintain recommended levels of potassium. Do not use root-inhibiting herbicides on infected lawns.

Few fungicides provide acceptable control, but sterol inhibitors such as myclobutanil or triadimefon may help, as well as a strobilurin fungicide such as trifloxystrobin or azoxystrobin.

Spring Dead Spot

Spring dead spot (SDS) is most prevalent in highly maintained bermudagrass lawns. Most other turfgrass diseases attack the foliage, but SDS does its damage below-ground. Therefore, SDS must be managed differently.

Infection occurs in late summer through fall while the grass is still growing, but symptoms go unnoticed until the next spring when the turf begins to break dormancy. As the turf goes dormant, the pathogen continues to attack the roots, causing root decay and increasing susceptibility to cold injury. The result is dead circular patches 6 inches to 3 feet in diameter that appear in the spring.

Preventive applications of trifloxystrobin or sterol fungicides, such as fenarimol, myclobutanil, or propiconazole, applied in early fall and again in the spring may help, but these treatments can become very expensive and may require a professional to apply. To best manage SDS, the goal is to maintain a strong, healthy below-ground turf structure. The first step is to alleviate adverse soil conditions. Reducing soil compaction with core aerification, improving poor drainage issues, and dethatching to keep thatch accumulations below 1 inch will help.

Soil chemical properties and nutrition are also important. Maintaining soil pH between 5.5 and 6.0 tends to help suppress SDS severity. Keeping potassium levels high, especially from a fall application, helps to reduce SDS and increase turf winter hardiness whereas late-season, high-nitrogen applications may enhance the disease.

Throughout the growing season, maintaining an optimum mowing height and avoiding other plant stresses (drought, traffic, pests, etc.) will also develop a stronger, healthier turf.

Anthracnose

This disease has become more prevalent in Mississippi recently, particularly in centipede lawns stressed from heavy thatch or soil compaction, but it can infest many warm- and cool-season turf species. General diagnostic symptoms are yellow to brown irregular patches of turf with leaf lesions that are yellow with black centers. Warm temperatures and extended leaf wetness enhance disease activity.

Control: Avoid late in the day irrigation that creates long overnight leaf wetness. Maintain a balanced fertility program that reduces growth flushes and thatch build-up.

Table 14. Turf fungicides. Locate the disease of interest and look down that column until you find a fungicide active ingredient that has activity against that disease. The disease resistance group is found in column 2. The re-entry period (usually in hours) appears in the final column. Refer to Table 15 to find brand name products.

Active ingredient	Resistance group (FRAC)*	Disease									Re-entry period (usually hrs)
		Anthracnose	Dollar spot	Fairy ring	Gray leafspot	Large (brown) patch	Leaf spot (bermudagrass), melting out, or crown rot	Rusts	Take-all or bermudagrass decline	Spring dead spot	
azoxystrobin	11	G–E**	P	G	F–G	E	G–E	E	F	P–F	4
bacillus licheniformis SB3086		L	GZ								
boscolid	7	NL	E	NL	NL	NL	NL	NL	NL	NL	dry
captan	M4	NL	NL	NL	L	L	L	NL	NL	NL	96
fludioxonil	12	F	NL	NL	L	L	G–E	NL	NL	NL	12
myclobutanil	3	L (C)	L (C)	NL	L (C)	F–G	P–F	G–E	L (C)	P–F **	24
PCNB, quintozene	14	NL	NL	NL	NL	G	F	NL	NL	NL	12
polyoxin D	19	L	NL	F–G	P–F	P–F	F–G	NL	NL	NL	4
propiconazole	3	L (C)	L (C)		L (C)	F–G (C)	P–F	NL	P	NL	24
pyraclostrobin	11	G–E	suppression only	F–G	E	G–E	G–E	L	F	NL	12
thiophanate-methyl	1		G–E		G–E		P	P	L	NL	12
thiram	M3	NL	P	NL	NL	NL	NL	NL	NL	NL	24
triadimefon	3	L	G–E	NL	F–G	G–E	F–G	G	P–F	F	12
trifloxystrobin	11	G–E	NL	NL	G	G	F–G	F–G	NL	NL	12

*E = excellent; F = fair; G = good; L = labeled but efficacy not known; L (C) = labeled, efficacy not known but the chemistry to which this active ingredient belongs may slow growth or cause some phytotoxicity of warm-season turfgrasses during warm weather; NL = not labeled; P = poor.

**Resistance or FRAC group indicates how the fungicide acts against the fungus. Unless the fungicide group begins with an "M," please rotate the use of different fungicide groups to prevent resistance to that fungicide. If possible, it is often a good idea to mix an "M" group fungicide with a numbered fungicide.

Table 15. Fungicide product trade names for residential lawns. *(Some may be applied to home lawns only by professional applicators.)*

Active ingredient	Comments
azoxystrobin	This active ingredient was derived from fungi. For professional use only, but may be used on home lawns. The Heritage label is the most common.
bacillus licheniformis SB 3086	Ecoguard; professional and homeowner use.
captan	Sold by various companies in both homeowner and professional formulations. All have Captan in the trade name.
myclobutanil	Myclobutanil is sold under the homeowner brand names Green Light Fung-Away Systemic Granules, Spectracide Immunox, and Schultz Fungicide Plus. Available in granular form as Fertilome F-Stop. Professionally sold as Eagle. Use to control spring dead spot in the fall often results in the best dormant ratings of all products, but not necessarily the best after spring green-up.
PCNB or quintozene	Homeowner trade names contain PCNB or Terraclor. Professionally available in diverse names.
polyoxin D	This active ingredient was derived from fungi. Sold mostly under the trade name Endorse.
propiconazole	Propiconazole may burn bermudagrass, especially under high summer temperatures. Newer formulations are said to be not as bad. Sold as Bonide Infuse Disease Control, Bonide Fung-onil Lawn and Garden Disease Control, Fertilome Liquid Systemic Fungicide, Honor Guard PPZ Turf and Ornamental Fungicide, and Ortho Lawn Disease Control Ready-Spray. Professionally marketed under the trade name Banner Maxx.
pyraclostrobin	Sold under the trade name Insignia. May be used on home lawns by homeowners, but must purchase the professional material.
thiophanate-methyl	Sold under the trade names Fertilome Halt Systemic Rose, Flower, Lawn Fungicide; Green Light Systemic Fungicide; Green Light Fung-Away ii Systemic Lawn Fungicide; and Southern Ag Thiomyl Turf and Ornamental Systemic Fungicide. Centipede grass is not on thiophanate-methyl labels. The most common commercial trade names are 3336 and Cavalier.
triadimefon	Sold as Bayleton; Bayer Advanced Fungus Control for Lawns (granular formulation); Bonide Fung-onil Lawn Disease Control; Green Light Fung-Away Systemic Lawn Spray Hose-End Concentrate (RTS); Hi-Yield Lawn Fungicide Granules Containing Bayleton; Southern Ag Bayleton - Systemic Fungicide for Turf & Ornamentals; and Southern Ag Bayleton-Turf Fungicide Granules.

Control Insects

The home lawn is an ideal environment for insects and related creatures. Some of these animals may be classified as pests, but many are harmless and some are beneficial. It is important to know the damaging ones from the nonpests. It is also important to be able to tell the difference between insect damage and other types of damage, such as disease, drought, or nutritional problems. The following sections provide brief discussions of the most common insect pests of home lawns and the damage they cause.

Fire Ants

Fire ants are the most common insect pests of home lawns. They occur in practically every lawn in the state, and even when a homeowner manages to eliminate all fire ant mounds in the lawn, they quickly return. This is because new fire ant colonies thrive especially well in areas where they do not compete with other fire ants. Although fire ants are persistent pests, there are steps that homeowners can take to maintain lawns that are relatively free of fire ants.

In terms of both cost and effort, the most effective thing you can do to control fire ants is make a broadcast application of fire ant bait at least once per season. Treatments are most effective if you apply them in the spring, but you can improve control by making additional treatments in midsummer and fall.

Broadcast applications are much more effective than applying bait treatments to individual mounds. This is because broadcast bait treatments also control newly formed colonies you can't see. Broadcast fire ant treatments are most effective when applied before large mounds are present.

When using baits, keep in mind they are meant to be slow acting, to allow time for them to be taken back to the colony and fed to the queen and immature brood. It may take a month or longer to see the full benefit of a bait treatment.

You can eliminate individual mounds that survive the bait treatments with dry mound treatments or liquid mound drenches. Liquid mound drenches provide almost immediate control, when you apply them properly, but they are messy and time-consuming. Dry mound treatments are much more convenient but can take several days to work.

Individual mound treatments are an effective way to eliminate large visible mounds, but they don't work against smaller colonies not yet visible. The best approach is to combine the use of granular baits and spot treatment of individual mounds.

Chinch Bugs

Chinch bugs damage St. Augustine lawns. Although you can occasionally find chinch bugs in other grasses, they rarely cause serious injury to anything other than St. Augustine. As the insects suck the plant juices, they also inject toxins that cause yellowish-brown patches to appear in lawns. These patches tend to enlarge gradually as chinch bugs expand their feeding area. If the feeding does not kill the grass, it recovers slowly and the damage lasts for a long time. Chinch bugs are sunshine-loving insects and seldom attack grass in shaded areas. Areas of St. Augustine lawns that suddenly become exposed to more sun, because of loss of shade trees, are especially susceptible to attack.

Adult chinch bugs are about one-fifth of an inch long and are black with white wings folded over their backs. Newly hatched nymphs are wingless and pink to bright red with a white band across their backs. Older nymphs are black with a white line across their backs.

Check St. Augustine lawns regularly in the warm months of the year by parting the grass in several locations and watching for these insects as they move into the thatch. Another way to check for chinch bugs is to cut the bottom from an opened fruit can, imbed it an inch or so deep in a green area next to damaged turf, and fill it with water. If chinch bugs are present, they float to the top after 5 to 10 minutes. Look closely. These insects are small.

Two-lined Spittlebugs

Two-lined spittlebugs have dark maroon wings with two bright red lines across each wing. Adults use their piercing-sucking mouthparts to suck sap from stems and leaves. The nymphs feed similarly but form their spittle masses deeper in the turf on the stems and stolons. The adults produce toxic saliva, which can cause significant injury to susceptible grasses. Initial symptoms include yellowing of the leaves, but heavy infestations can result in weak, unhealthy areas and even dead brown patches. Damaging infestations most commonly occur on centipede lawns.

Heavy infestations are favored by wet, rainy conditions or by lush, vigorously growing grass, and it is often the "prettiest centipede lawn in the neighborhood" that has the heaviest infestations. Lawns that are well fertilized, frequently watered, mowed fairly high, and suffer from excessive thatch are especially susceptible. Cultural practices play an important role in managing this pest. Taking steps to minimize thatch buildup, keeping grass mowed to the right height, and avoiding excessive water and fertilization can reduce the potential for problems.

This insect has two or three generations per year. Adults of the second generation begin emerging in August and September, and it is normally this second generation that causes the greatest damage to home lawns. Homeowners with susceptible lawns can prevent this problem by checking for spittle masses and treating promptly, if necessary, to prevent large numbers of second generation adults. This means you need to start checking for second generation spittlebug nymphs in July.

Scout lawns by parting turf and looking for the white frothy spittle masses. Heavily infested lawns sometimes have a squishy feel when you walk across them. Treat moderate to heavy infestations with a liquid spray of a recommended insecticide. Sprays are usually more effective than granules because granules tend to fall below the target zone. Hose-end sprayers are a convenient way to apply spittlebug treatments, and many home lawn insecticides are available in "ready to use" hose-end spray containers. Mow and water before treatment to improve control.

Fall Armyworms

Fall armyworms are mainly pests of bermudagrass lawns, and as their name implies, they are most common in late summer and fall. It is the larva, or caterpillar, stage that causes damage by eating the grass blades with their chewing mouthparts.

Fall armyworm larvae have three pairs of true legs just behind the head, as well as five pairs of "prolegs" along their abdomen. These pests can appear as early as late June in the southern portion of the state. During high outbreak years, fall armyworms may feed on centipedegrass or St. Augustinegrass, but this is rare.

Fall armyworm adults (moths) are active at night. Female moths deposit egg masses containing about 150 eggs on grass stems or leaves. Females can lay up to 1,000 eggs.

After hatching, the young larvae first feed as a group on the grass blades. The damage at this stage is slight and often goes unnoticed. But as the larvae grow, they require more food and can strip a lawn quickly. To prevent this, make regular lawn inspections, beginning in early summer.

Select locations at random throughout the lawn, and examine the grass by rubbing it briskly back and forth with your hand; then part the grass and examine the ground. If you see coiled light tan or green to nearly black caterpillars, you probably have fall armyworms. Control is much easier if you find worms early, when they are small. This also helps keep lawn damage to a minimum. Do not water turf after treating for fall armyworms, as this would wash the insecticide out of where the insects are feeding. Liquid sprays are generally more effective than granular treatments.

White Grubs

White grubs are the larvae of May beetles, June beetles, mask chafers, and other related beetles. A full-sized larva is about 1 inch long, has a brownish head, three pairs of legs, and rests in a characteristic "C" shape. White grubs feed below ground, pruning the roots and causing the grass to yellow. You can easily roll or lift severely damaged sod from the ground by hand. Damage is often most obvious when infested turf doesn't green up properly in the spring because of heavy feeding by large numbers of large, nearly mature grubs.

The adults vary in appearance, depending on species. June beetles are green, while May beetles are dark brown, and masked chafers are tan to brown. For most species, flights of adults occur early May through mid-June, and egg laying follows shortly. Because white grubs are easiest to control when small, the best time to apply white grub treatments is in mid- to late summer. Check for grubs by cutting several 1- to 2-foot square samples 2 to 3 inches deep and lifting out, or rolling back, the turf square to look for grubs.

Treatment is probably needed if you find an average of three to five grubs per square foot. When applying insecticides to control white grubs, water insecticides into the turf according to label directions. This leaches the insecticide into the zone where the grubs are feeding.

Mole Crickets

This insect is most common in the sandier coastal soils of south Mississippi. It is rarely a problem in the northern part of the state. Adult mole crickets are light brown, and the front legs are short with shovel-like feet that are well adapted for digging. The young, or nymphs, are similar to the adult except smaller. Damage is the result of nymphs and adults feeding on grass roots and tunneling through the turf, which also destroys roots and causes excessive drying.

These insects overwinter as partly grown nymphs, and damage is often most severe in the spring, because of heavy feeding and tunneling by large nymphs. Depending on species and location in the state, adult mole crickets fly, mate, and lay eggs from mid-March to late May. Newly hatched nymphs are present in June and early July. Even though damage is not obvious at this time, this is when treatment is most effective, because small nymphs are easiest to control.

To check for this insect, mix 1 ounce of liquid dishwashing soap in 2 gallons of water, and pour this solution slowly over about 4 square feet of turf. If mole crickets are present, they will crawl to the soil surface within just a few minutes. Be sure to follow label directions for pre- and post-treatment watering when treating for mole crickets. It is

usually necessary to water following treatment to leach the insecticide into the soil where the mole crickets live.

Snails and Slugs

These creatures do not damage turf, but they can be annoying. These pests, which are not insects, leave a trail of slime that appears as a silver trail when dry. They can damage bedding plants by feeding on young, tender leaves. Snails are about 1 inch long with spiral shells. Slugs vary in length from half an inch to 4 inches. They look like snails except they do not have the shells on their backs.

Snails and slugs are active at night. During the day, they can be found under mulch, in grass along sidewalks or patio edges, or under any object that may be in the lawn. Snails and slugs are best controlled with bait treatments specially formulated for these pests. When using baits, be sure to observe label precautions for use around pets and small children.

Sod Webworms

Sod webworms are the larval, or caterpillar, stage of a small night-flying moth. The moth is about ¾ inches long, cigar-shaped, and gray. It has two noticeable finger-like projections on the front of the head. You may see it during the day while mowing or walking across the lawn. The moth flies short distances in a zig-zag pattern before settling quickly back into the grass.

The webworm larvae generally feed at night and prefer areas that receive plenty of direct sunlight during the day. Problems seldom develop in shaded areas. During the day, the larvae may be found in small silken tunnels in grass thatch. They feed on grass blades next to these tunnels by clipping them off at the thatch line. Injury appears as small hand-sized brown patches. This insect attacks bermudagrass and zoysiagrass.

Ticks and Fleas

Ticks and fleas are carried into the lawn by dogs and cats. They are blood-feeders and will bite people, as well as pets. Ticks have an extremely high reproductive potential. For example, adult females of some species of ticks may lay as many as 3,000 to 5,000 eggs in 2 weeks. Eggs take about 35 to 40 days to hatch. After hatching, the young ticks climb up grass, shrubs, or sides of the house where they wait to climb onto a passing host.

Adult fleas feed on blood, while the larvae feed on bits of organic material or dried blood in and around pet bedding areas. This is why flea populations are normally highest near pet bedding or resting areas. High populations of fleas occasionally occur in and around home lawns.

Successful control of fleas and ticks requires controlling these pests on the pet, in any indoor areas frequented by the pet, and infested lawn areas the pet uses. Control of fleas and ticks on pets and inside homes is addressed in other Extension publications.

Treatments listed in this publication are only for use outdoors in the home lawn. Do not apply them to pets or use indoors unless the label specifically indicates such uses. When treating lawns to control fleas and/or ticks, pay particular attention to areas where pets spend time resting. Often this may not be in the lawn itself but in nearby areas such as under shrubs, porches, or houses.

Control

To control lawn pests, first properly identify the target pest; then select one of the insecticides from Table 16. Insecticides are listed by active ingredient rather than by brand name because many different brand names contain the same active ingredient. Also, brand names can be confusing, and buying insecticides based solely on brand name and what pest is pictured on the label can often lead to disappointing control.

Never purchase an insecticide without first considering the active ingredient and reading the label to determine if the product is labeled and appropriate for the intended use. Time spent reading and studying pesticide labels before making the purchase is time well spent.

Controlling lawn pests depends on getting the insecticide to the target pests. Be sure to consider this when planning an insecticide treatment, and be sure you have the necessary equipment to properly apply the product you are buying.

For pests such as white grubs and mole crickets, it is usually necessary to "water in" the insecticide after application. On the other hand, it is important to avoid watering and rainfall for a day or two when treating pests, like fall armyworms, that feed on grass blades above the soil. Be sure to read the pesticide label and follow the application directions carefully to ensure the desired result—safe, effective pest control.

For a more detailed description of lawn insects, insecticide rates, formulations, application timings, and more information, refer to Extension Publication 2331 *Control of Insect Pests In and Around the Home Lawn*.

Table 16. Lawn insect control guide.

Insect	Insecticide	Use rate[1]	Remarks
fire ants (bait treatments)	hydramethylnon (0.73%) {Amdro}	1–1.5 lb/acre	Apply baits as broadcast treatments in early spring, midsummer, and fall. Use an appropriate spreader that can apply the small amount of bait required. Avoid rainfall or irrigation for at least 24 hrs after application.
	fenoxycarb (1.0%) {Award}	1–1.5 lb/acre	
	pyriproxyfen (0.5%) {Distance}	1–1.5 lb/acre	
	methoprene (0.5%) {Extinguish}	1–1.5 lb/acre	
	abamectin (0.011%) {Ascend}	1 lb/acre	
	indoxacarb (0.045%) {Advion}	1.5 lb/acre	
fire ants (dry mound treatments)	acephate (75% SP)	1–2 tsp/mound	Do not disturb mound. Sprinkle dry product over and around mound as directed.
	cyfluthrin (1% dust)	1 tsp/mound	
	deltamethrin (0.05% dust)	1 tbsp/mound	
fire ants (mound drenches)	acephate (75% SP)	2 tsp/gal water	Use 1–2 gal of drench per mound, depending on size of mound. Do not disturb mound before drenching.
	carbaryl (22.5% conc.)	0.75 fl oz/gal water	
	permethrin (2.5% conc.)	0.67 fl oz/gal water	
fire ants (broadcast treatments)	fipronil (0.0103% granules) {Over'n Out}	2 lb/1000 sq ft	Water in after application. This is not a bait.
chinch bugs (liquid treatments)	carbaryl (22.5% conc.)	16 fl oz/1000 sq ft	Irrigate before application.
	cyfluthrin (0.75% liquid)	6 fl oz/1000 sq ft	Irrigate before and after application.
	lambda-cyhalothrin (0.5% conc.)	4 fl oz/1000 sq ft	Water lightly following application.
	permethrin (2.5% conc.)	6 fl oz/1000 sq ft	
	permethrin (38% conc.)	0.8 fl oz/1000 sq ft	
chinch bugs (granular treatments)	bifenthrin (1% granules)	2.4 lb/1000 sq ft	Irrigate after application.
	carbaryl (6.3% granules)	3 lb/1000 sq ft	
	lambda-cyhalothrin (0.04% granules)	3 lb/1000 sq ft	
	permethrin (0.5% granules)	3 lb/1000 sq ft	
spittlebugs (liquid treatments)	carbaryl (22.5% conc.)	3–6 fl oz/1000 sq ft	Mow and water before treating.
	cyfluthrin (0.75% liquid)	6 fl oz/1000 sq ft	
	lambda-cyhalothrin (0.5% conc.)	2 fl oz/1000 sq ft	
	permethrin (38% conc.)	0.8 fl oz/1000 sq ft	

Insect	Insecticide	Use rate[1]	Remarks
fall armyworms, sod webworms (liquid treatments)	carbaryl (Sevin 22.5%)	3–6 fl oz/1000 sq ft	Delay watering or mowing for 24 hrs.
	cyfluthrin (0.75% liquid)	6 fl oz/1000 sq ft	
	lambda-cyhalothrin (0.5% conc.)	2 fl oz/1000 sq ft	
	permethrin (38% conc.)	0.8 fl oz/1000 sq ft	
white grubs (liquid treatments)	carbaryl (22.5% conc.)	12 fl oz/1000 sq ft	Irrigate after application.
	imidacloprid (1.47% ready-to-spray)	6.4 fl oz/1000 sq ft	Apply according to label.
white grubs (granular treatments)	carbaryl (6.3% granules)	3 lb/1000 sq ft	Irrigate after application.
	halofenozide (1.33% granules)	0.75 lb/1000 sq ft	
	imidacloprid (0.2% granules)	2.87 lb/1000 sq ft	
	trichlorfon (6.2% granules)	3 lb/1000 sq ft	
mole crickets (liquid treatments)	lambda-cyhalothrin (0.5% conc.)	4 fl oz/1000 sq ft	Irrigate after application.
	cyfluthrin (0.75% conc.)	6 fl oz/1000 sq ft	
mole crickets (granular treatments)	bifenthrin (1% granules)	4.8 lb/1000 sq ft	Irrigate after application.
	imidacloprid (0.2% granules)	3.8 lb/1000 sq ft	
	lambda-cyhalothrin (0.04% granules)	3 lb/1000 sq ft	
	carbaryl (5% bait)	0.9 lb/1000 sq ft	
snails and slugs (liquid treatments)	metaldehyde (2% bait granules)	0.5 lb/1000 sq ft	Toxic to pets and wildlife. Follow label.
	iron phosphate (1% bait granules)	1 lb/1000 sq ft	
ticks and fleas (liquid treatments)	carbaryl (Sevin 22.5%)	3 fl oz/1000 sq ft	Apply as a broadcast treatment using a hose-end sprayer or other appropriate sprayer.
	cyfluthrin (0.75% liquid)	6 fl oz/1000 sq ft	
	permethrin (38% conc.)	0.8 fl oz/1000 sq ft	

[1]This information is for preliminary planning purposes only. Always read and follow product labels.
fl oz = fluid ounce; lb = pound; tsp = teaspoon; tbsp = tablespoon; gal = gallon; sq ft = square feet
Apply by mixing the desired amount of insecticide per 1,000 sq ft in at least 15 to 20 gal of water.

The information given here is for educational purposes only. References to commercial products, trade names, or suppliers are made with the understanding that no endorsement is implied and that no discrimination against other products or suppliers is intended.

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MISSISSIPPI STATE UNIVERSITY EXTENSION

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Annual and Perennial Flowers for Mississippi Gardens

Annuals and perennials add interesting elements to the landscape with their beautiful flowers and foliage. Beds of color provide brilliant accents against backgrounds of permanent plantings. They also soften artificial lines and provide graceful transitions from one outdoor area to another.

Flowers can be used to accent a view, frame a door, or just draw attention. Annual plants are practical because they are versatile, sturdy, and inexpensive. They quickly yield color throughout the season.

Perennial plants return year after year. They fit into many landscapes and can be used as borders, accents, or strong focal points. The foliage of many perennials is attractive during nonflowering seasons as well.

Annual Flowering Plants

No other group of flowering plants provides as much color as quickly and economically as annuals. Annual plants sprout from seed. They then flower, set seed, and die, all within one season. Many flowers, vegetables, and herbs are planted every year as annuals.

Some plants may live longer in their native lands but do not survive the temperatures of the Midsouth and are best treated as annuals. Most annuals are planted in spring and killed by frost in the fall. Some of them, such as pansies, ornamental cabbage, and dill, are tolerant of Mississippi winters and are best planted in the fall for color throughout the winter. These plants usually die from the heat of early summer.

Some annuals, such as gomphrena, cosmos, and coreopsis, reseed themselves to yield several years after with minimal care. Annuals come in a variety of colors, heights, and textures, and their uses are almost unlimited. Unbeatable in masses of solid or mixed colors, annuals are also effective in small groups or to soften lines and accent borders.

Many annuals, especially compact varieties, are well suited for containers. Large annuals may be used as specimen plantings, or they can accent plants along the back of a border of flowers or shrubs. Some annuals are vines that may be grown on fences, arbors, porch rails, or trellises.

Annuals are inexpensive, especially when grown from seed; however, they do require soil preparation, fertilization, irrigation, weeding, and pest control. Most are native to semi-arid regions of the world and require full sunshine to survive. Some species of annuals, such as impatiens, are native to dark woodland floors and flourish in covered patios, narrow courtyards, heavily wooded sites, and other shady areas.

Annual gardens are easily established in the smallest and most restrictive of spaces as well as in large areas. Their relatively shallow root systems require only a modest amount of soil. Gardeners with sizable yards quickly learn the trick of planting one or two easy-to-grow beds of massed annuals to decorate patios, walks, or pools. Apartment dwellers can achieve a splash of color with a few well-placed pots, washtubs, or planter boxes of annuals.

Annuals that need full sun, such as periwinkle and marigold, grow and flower best when they receive 4 to 6 hours of direct sunlight each day. Woodland species perform best in areas with partial or heavy shade.

Prevent root diseases and other problems associated with waterlogged soil by avoiding areas where water will stand after a heavy rain. Also avoid areas near large trees and shrubs that may have many competitive, thirsty feeder roots.

Soil Preparation

Soil preparation is the most crucial step in growing annuals. Roots of annuals have to penetrate soils quickly, anchor plants, and absorb water and nutrients in one season, often under adverse conditions. Most Mississippi soils can be improved with cultivation and the addition of plant-enhancing additives.

Cultivating wet soils may cause clumps and shallow "pans," which resist air, water, and root penetration. Soil that is ready for cultivation holds its shape when squeezed but crumbles easily. Power tillers are useful for preparing large areas but may create a compacted zone in the soil directly under the tilled area. Use a digging fork to help avoid soil compaction.

The first step in preparing a bed for annuals is to remove any unwanted plants with a hoe and rake, or with a nonselective contact herbicide. After weeds have been removed or killed,

dig the soil a shovel's depth. Deeper soil preparation is normally not necessary. To prevent re-sprouting, remove grass and weed roots while turning the soil. Break clods and lumps into smaller pieces.

Add 3 to 4 inches of organic material, such as composted leaf-and-yard litter, pine bark, peat moss, or composted manure. Then add an inch or two of sharp sand if the soil is heavy. Also, if the soil test indicates a need for lime or fertilizer, spread these supplements at the recommended rate over the top at this time. Mix amendments together, blending the organic matter, sand, and fertilizer. Rake the prepared bed smooth when finished.

Seed or Transplants

As with vegetables, there are advantages to setting out some annuals as transplants and others from seed. Single-potted annual plants or packs of annuals containing several transplants are more expensive than seed. The instant effect created by setting out plants, however, is irresistible to most gardeners.

Sowing seed directly into the garden soil is a time-honored ritual that rewards work and patience with great returns. The extra time involved is offset by savings in initial cost. Also, you can have more variety with less expense from seed than transplants.

Many species of annual flowers have been improved for better heat tolerance and disease resistance. Instead of relying on the same tried-and-true varieties each year, look for those annuals that have won the All-America Selection award. While retail outlets have dozens of varieties on seed racks each year, mail-order companies also provide gardeners with colorful catalogs full of many exciting annuals, including the newest varieties. Ordering seed through the mail has a peculiar excitement all its own, and the catalogs themselves are a wealth of information on planting and caring for unusual plants.

Whether grown from seed or transplants, annual flowers are handled the same in the garden. Summer annuals are planted in early spring, after soil temperatures have warmed and danger of frost has passed. Winter annuals are planted early enough in the fall to allow time for conditioning before frost.

Set plants shallow, with the top of the roots placed just under the surface of the soil. If transplants are grown in pots made of compressed peat moss, crumble the top edge of the peat pot away from the plant so that it will not wick water away from the roots. Pinching off small flowers on new transplants may be hard to do, but it will promote faster growth and more flowers sooner.

You can have continual bloom with your annuals the entire summer with occasional maintenance. As the flowers begin to fade, remove them before seeds are formed. The plants will generate new flowers to produce more seed. Annual beds maintained for cut flowers will also send up new stems to replace those removed for floral arrangements.

Irrigation, Mulches, Fertilizers, and Weed Control

Mississippi summers are typically dry for weeks. Therefore, be prepared to water annual plants as needed. To promote deep root growth, water thoroughly and deeply, then let soils get nearly dry before soaking again. Gently water annuals, using the fine spray setting of an adjustable nozzle or a breaker especially designed for watering. Soaker or sprinkler hoses are more convenient than hand watering because they provide a gentle flow of water that seeps into the soil. Trickle- or drip-irrigation kits conserve water by placing it only at the base of plants a little at a time, and are best used frequently to keep soil moist. Soakers and drip systems also help keep foliage dry, which can reduce the spread of leaf diseases.

Decorative mulches, such as pine straw, shredded bark, composted leaves, or other porous materials that allow air and water exchange, help to conserve water and keep the soil cooler. Mulches also prevent weed seeds from sprouting but can hinder reseeding annuals for the same reason. Soaker hoses can be hidden beneath the mulch.

Annual plants often require extra applications of fertilizer during the growing season. Whether you use a granular or a water-soluble fertilizer, follow label directions. Water-soluble fertilizers give fast but temporary effects. Slow-release fertilizers are the most expensive, but they provide the appropriate amount to plants throughout the growing season with little effort and waste. The slow-release quality of these products makes them more economical and environmentally safe. Most annuals benefit from an all-purpose fertilizer with an even or nearly even balance between nitrogen, phosphorous, and potash, all of which is indicated by the three numbers on the container. Flowering plants may perform better when you use a fertilizer with a higher middle number, the number that indicates more phosphorous. Green or colorful foliage plants, such as amaranth, caladium, and basil, benefit from a higher first number, or the number that indicates more nitrogen. Remember that fertilizers, like salt, go a long way; "a little" is better than "too much."

The ideal soil pH is between 6.0 and 7.5 for most flower species. A soil test will indicate the need for lime, if any, and the amount needed for your particular soil type. For soil testing information, contact your county Extension office or use an inexpensive test kit available from a garden center or mail-order catalog. Agricultural lime often lasts in Mississippi soils for 3 or more years. For this reason, it is best not to add lime unless a soil test indicates a need and to apply only the recommended amount.

Few things can dampen enthusiasm faster than weeds. To reduce the need for pulling weeds by hand or chopping them, herbicides are available that can prevent weed-seed germination or eliminate existing weeds on contact. Some

of these products may be used to control grasses without harming flowers. There are precautions and guidelines on the uses of herbicides because none are completely foolproof. Consult with your county Extension agent or local garden center on the selection and use of herbicides to control weeds, and carefully follow label directions. Mulches can shade weed seeds and prevent their germination, which will also eliminate or reduce the need for hand or chemical control.

Pest and Disease Control

Choose insect- and disease-resistant varieties when possible. Keep the garden clean, neat, and weed-free, and be alert for early signs of trouble to reduce the need for pesticides. To prevent the spread of leaf diseases, water in the morning or early enough in the evening so foliage has time to dry before dark. Soapy water or insecticidal soap will control many insect pests. Read all label directions before buying or using any pesticide, and follow all precautions.

Table 1. Selected annual flowering plants for Mississippi gardens.

	Light	Height	Spacing	Remarks
Ageratum *Ageratum houstonianum*	Full sun	6–20″	9–12″	Edging; tall cultivars make good cut flowers
Alyssum *Lobularia maritima*	Sun to part shade	3–4″	6–8″	Edging; nice ground cover; heat sensitive
Baby's' Breath *Gypsophila elegans*	Full sun	1–2′	8–12″	Cut flowers; lime lover; excessive growth in rich soil
Globe Amaranth *Gomphrena globosa*	Full sun	1–3′	6–12″	Drought tolerant; popular dry flower; reseeds
Balsam (Touch-me-not) *Impatiens balsamnia*	Sun to part shade	15–24″	8–12″	Reseeds prolifically
Basil *Ocimum basilicum*	Full sun	15–24″	15–18″	Fragrant culinary herb; cut for regrowth
Begonia *Begonia semperflorens*	Sun to part shade	8–10″	8–12″	Group for mass effect; green leaf cultivars are shade tolerant
Black-eyed Susan Vine *Thunbergia alata*	Sun to part shade	Vine	6–18″	Window boxes and hanging baskets
Caladium *Caladium hortulanum*	Sun to part shade	1–2′	12–14″	Tubers planted when day temperatures reach 70°F; dig in fall after foliage drops
Calendula (pot marigold) *Calendula officinalis*	Full sun	1–2′	12–15″	Cut flowers; bright flower bed plantings
Candlestick Plant *Senecio articulatus*	Full sun	4–6′	3–5′	Accent or screen; unusual form
Castor Bean *Ricinus communus*	Full sun	5–7′	2–4′	Coarse-textured bronze leaves; seeds poisonous; screen
Chrysanthemum *Chrysanthemum morifolium*	Full sun	1–3′	12–14″	Many different colors; plants are perennial but often planted as annuals
Cleome *Cleome lutea*	Full sun	4–5′	18–24″	Screen; cut flowers; reseeds prolifically
Cockscomb (celosia) *Celosia argentea or cristata*	Full sun	1–2′	8–12″	Crested or plumed cut flowers; heat tolerant; some reseed
Coleus *Coleus blumei*	Sun to part shade	2–3′	10–12″	Colorful foliage; mass in shade; nice container plant
Coreopsis *Coreopsis lanceolata*	Full sun	1–2′	12–18″	Native wildflower; reseeds; use as filler or in container
Cornflower (bachelor's button) *Centaurea cyanus*	Full sun	2–3′	6–12″	Filler plant; cut flowers; sow in fall
Cosmos *Cosmos bipinnatus*	Sun to part shade	2–4′	6–12″	Heat and drought tolerant; reseeds prolifically
Cypress Vine *Quamoclit pennata*	Sun to part shade	Vine	6–18″	Attracts hummingbirds; reseeds

	Light	Height	Spacing	Remarks
Dill Anethum graveolens	Full sun	3–4′	12–18″	Culinary herb; fine-textured foliage
Dusty Miller *Senecio cineraria*	Full sun	1–2′	8–12″	Silver-gray foliage; yellow flowers
Feverfew *Chrysanthiemum parthenium*	Full sun	2–3′	8–12″	Filler; cut flowers; reseeds
Flowering Cabbage *Brassica oleracea*	Full sun	6–12″	12–18″	Winter annual but not hardy in north Mississippi; colorful foliage
Four-o'clocks *Mirabilis jalapa*	Full sun	1–3′	8–12″	Flowers open in late afternoon; require well-drained soil
Gaillardia (Indian blanket) *Gaillardia pulchella*	Full sun	2–3′	12–18″	Cut flowers or dried; reseeding wildflowers
Geranium (zonal geranium) *Pelargonium x hortorum*	Sun to part shade	12–15″	9–12″	Tolerates cool temperatures; good container plant
Gloriosa Daisy (Black-eyed Susan) *Rudbeckia hirta gloriosa*	Sun to part shade	18–30″	12–18″	Bold texture; cut flowers; reseeds
Hollyhock *Althaea rosea*	Full sun	4–6′	12–18″	Annual cultivars are available; biennial cultivars, plant in fall; use as screen or background plant
Hyacinth Bean *Dolichos lablab*	Full sun	Vine	6–12″	Fast screen; colorful flowers and pods
Impatiens *Imapatiens wallerana*	Part shade	12–24″	8–12″	Best annual for shade; some cultivars may reseed
Johnny Jump-up *Viola tricolor*	Sun to part shade	6–12″ long flowering	6–8″	Winter annual; plant in fall
Joseph's Coat *Amaranthus tricolor*	Full sun	6–12″	8–12″	Colorful foliage; heat and drought tolerant
Lantana *Lantana camara*	Full sun	1–2′	18–24″	Fragrant, attractive flowers; container plant; perennial, but may act as an annual in northern Mississippi
Larkspur *Consolida ambigua*	Part shade	2–3′	8–15″	Spiked flower form; accent or mass plantings; reseeds; sow in fall
Marigold *Tagetes erecta or patula*	Full sun	6–30″	6–12″	Mass plantings; good container plants; spider mites a problem
Morningglory *Ipomoea purpurea*	Full sun	Vine	6–12″	Colorful vine; cultivar selections rarely reseed
Moss Rose *Portulaca grandiflora*	Full sun	6–9″	6–12″	Heat and drought tolerant; summer-long color; reseeds well
New Guinea Impatiens *Impatiens hawkeri*, *I. linearifolia*, or hybrids	Sun to part shade	8–12″	12–14″	Striking foliage; showy blooms; tolerates sun; hanging baskets
Pansy *Viola x wittrockiana*	Sun to part shade	6–12″	6–10″	Winter annual for fall planting and early spring color; container plant
Pepper (ornamental) *Capsicum annuum*	Full sun	9–30″	6–15″	Many cultivars; heat tolerant; may reseed
Periwinkle (vinca) *Catharanthus roseus*	Full sun	1–2′	8–12″	Drought and heat tolerant; container plant; reseeds
Petunia *Petunia x hybrida*	Sun to part shade	6–24″	12–15″	Many cultivars; mass color; heat tolerant; reseeds
Phlox (annual) *Phlox drummondii*	Sun to part shade	8–15″	6–12″	Mass color; native wildflower; reseeds

	Light	Height	Spacing	Remarks
Poppy *Papaver nudicaule* or orientale	Full sun	1–2′	6–12″	Cut flowers; sow in fall; perennial, but mostly annual in Mississippi; easy to grow
Purslane (hybrid) *Portulaca x hybrida*	Full sun	6–9″	6–12″	Heat and drought tolerant; summer-long color; hanging baskets; does not reseed
Queen Anne's Lace *Daucus carota*	Sun to part shade	3–4′	2–3′	Naturalized wildflower; mass color; winter foliage; reseeds
Scarlet Sage *Salvia coccinea*	Sun to part shade	15–30″	8–12″	Attracts hummingbirds; spikes of color; perennial, but may act as an annual in northern Mississippi
Snapdragon *Antirrhinum majus*	Sun	12–36″	10–12″	Spikes of color; cut flowers; blooms best in cool weather
Statice *Limonium sinuatim*	Full sun	1–2′	9–12″	Cut flowers; salt tolerant for coastal plantings; readily dried
Strawflower *Helichrysum bracteatum*	Full sun	12–36″	12–15″	Mass of color; cut flowers or dried
Sunflower *Helianthus annuus*	Full sun	4–10′	20–24″	Thrives in poor soil; temporary screen; attracts goldfinches
Sweetpea *Lathyrus odoratus*	Full sun	1–3′	6–8″	Sow in fall; soak seed in tepid water one hour before planting
Tithonia *Tithonia rotundifolia*	Full sun	4–6′	3–4′	Tall, bright, full plants; drought tolerant
Verbena *Verbena hortensis*	Full sun	6–12″	10–12″	Notably fragrant; planter boxes and baskets
Wishbone Flower *Torenia fournieri*	Part shade	6–12″	6–8″	Garden borders; pots and hanging baskets
Zinnia *Zinnia* sp.	Full sun	1–3′	8–15″	Mass color; many cultivars; variable colors; some reseed



Snaptastic snapdragons.

Quick Reference List of Annuals

Easy-to-Grow
Ageratum
Begonia
Chrysanthemum
Cleome
Cockscomb
Coreopsis
Cornflower
Cosmos
Dusty Miller
Four-o'clocks
Gomphrena
Impatiens
Joseph's Coat
Marigold
Melampodium
Moss Rose
Pansy
Periwinkle
Pepper
Petunia
Poppy
Portulaca
Sunflower
Zinnia

Shade or Semi-Shade
Ageratum
Alyssum
Begonia
Coleus
Impatiens
Pansy
Salvia
Snapdragon
Wishbone Flower
(torenia)

Hot, Dry Locations
Amaranth
(Joseph's Coat)
Copper Plant
Cornflower
Cosmos
Four-o'clocks
Gomphrena
Melampodium
Morninglory
Moss Rose
Periwinkle
Portulaca
Sunflower
Tithonia
Verbena
Zinnia

Poor Soils
Amaranth
(Joseph's Coat)
Cleome
Cockscomb
Coreopsis
Four-o'clocks
Gomphrena
Moss Rose
Periwinkle
Portulaca
Verbena

Annuals to Sow in Fall
Alyssum
Baby's Breath
Calendula
Cornflower
Cosmos
Dill
Johnny Jump-up
Larkspur
Pansy
Poppy
Queen Anne's Lace
Snapdragon
Sweetpea

May Reseed Year after Year
Cleome
Coreopsis
Cornflower
Cosmos
Gomphrena
Impatiens
Johnny Jump-up
Larkspur
Moss Rose
Periwinkle
Petunia
Zinnia

For Cut Flowers
Baby's Breath
Calendula
Cleome
Cockscomb
Cornflower
Cosmos
Gomphrena
Larkspur
Marigold
Poppy
Salvia
Snapdragon
Statice
Zinnia

For Colorful Foliage
Amaranth
Basil
(purple-leafed and ruffle-leafed)
Caladium
Castor Bean
Coleus
Copper Plant
Dusty Miller
Joseph's Coat
Ornamental Kale
(flowering cabbage)

For Edging

Ageratum
Alyssum
Begonia
Dusty Miller
Portulaca
Marigold
(dwarf)
Pansy
Petunia
Verbena
Wishbone Flower
(torenia)
Zinnia
(dwarf, and *Z. angustifolia*)

For Backgrounds and Screens

Amaranth
Castor Bean
Cleome
Cockscomb
Copper Plant
Cosmos
Hollyhock
Marigold
(tall)
Sunflower
Tithonia
Zinnia
(tall)

Attract Butterflies

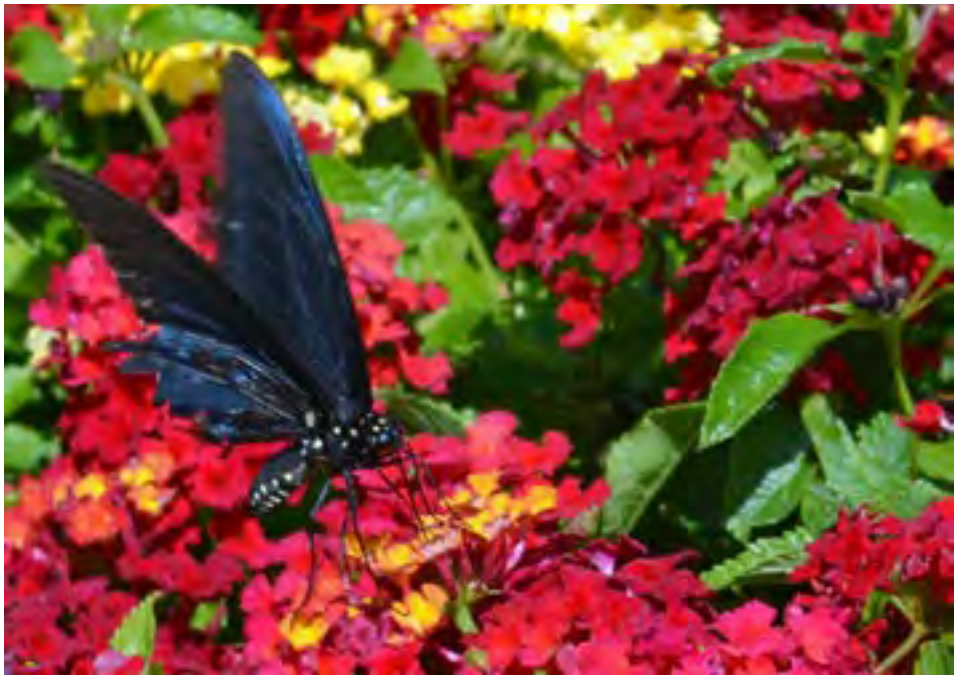
Coreopsis
Cosmos
Gaillardia
Gomphrena
Marigold
(singles best)
Periwinkle
Queen Anne's Lace
Verbena
Zinnia
(the best)

For Containers

Ageratum
Alyssum
Black-eyed Susan Vine
Begonia
Coleus
Geranium
Impatiens
Marigold
Pansy
Pepper
Periwinkle
Petunia
Portulaca
Verbena
Wishbone Flower
(torenia)

For Groundcovers

Alyssum
Begonia
Moss Rose
Periwinkle
Portulaca
Verbena



Luscious royale red zone lantana.

Dependable Annuals for Mississippi

The following is a quick reference list of common and favorite annual flowers grown in Mississippi, along with selected characteristics. It is not intended to be a comprehensive guide, which may be found in any good gardening book. There are many other suitable annuals that are not included here. Try one or two new varieties at a time for the fun of it.

Perennial Flowering Plants

Perennials are plants that live for several years and often require at least two years from seed to flower. There is a renewed interest in herbaceous perennials because they need less maintenance, less water, and fewer pesticides than annuals. Many gardeners include flowering bulbs and ornamental grasses in this category. Once prominent in many landscapes, these enduring plants have been rediscovered for their dependable seasonal effects.

Unlike trees and woody shrubs—also perennials—herbaceous perennials appear to die down part of the year, only to emerge again the following season from underground roots, stems, bulbs, or rhizomes. The simple term "perennial" is commonly used when referring to herbaceous perennials.

Perennials are easily used as ground cover, mixed with annuals, grown in containers, and placed as accents or specimen plants. Many perennials are short bloomers and are best mixed with plants that bloom at different times of the year or included with other landscape plants as part of an overall design. Other perennial plants, such as ferns and monkey grass, are noted more for their foliage rather than flowers. Inclusion of these plants adds interest and creates seasonal color or texture in the landscape.

Favorite perennials, including many herbs and native wildflowers, have long been shared by gardeners and sold through garden centers and mail-order nurseries. Many are treasured as heirloom plants and have proven to be hardy enough to withstand weather and climate extremes, often with little care. Others are exciting new discoveries or hybrids that may take several years to prove themselves in Mississippi gardens; however, there are a good many perennial plants that simply do not survive for more than a year or two in Mississippi's hot, humid climate.

Designing Perennial Plantings

While beds and pots of annuals may be replanted with ease, perennial plantings may live for many years. Their longevity requires planning on the part of the gardener. Perennials work best in highly visible flower beds and can be incorporated into the total landscape design. Otherwise, large areas of the landscape may be left bare for part of the year.

Like annuals, many perennials are effective in mass plantings when they are in bloom. Because of their seasonality, perennials are better viewed as small accents of color and texture among other plants. You can often build a design to support or accent a favorite plant or group of plants. Use small evergreen shrubs, flowering trees, fences, stones, benches, birdbaths, or art objects to enhance a flower garden and "carry" it through all the seasons.

An easy design trick is to interplant groups of flowers that have contrasting shapes. For example, the large flowers of daylilies are set off well by the spikes of blue salvia and the round flowers of yarrow. The large leaves of canna and sword-like form of iris plants have a dramatic effect when used in groups among less bold plants.

A natural way to begin planting perennials is to create islands of flowers in an open lawn, but because such beds are easily viewed from many sides, they often require high maintenance to keep them attractive.

Border plantings along a wall, fence, or hedge can soften the transition of landscape structures into the horizon or create alleys of color. Rectangular beds lend themselves to a border planting where space is restrictive. When planting a perennial border against a hedge, fence, or wall, leave a little space between the object and its backdrop. This allows for better air circulation, more light penetration, and ease of maintenance from the rear of the bed. Perennial borders usually are 6 to 8 feet wide, allowing adequate space for at least a combination of six or more front-to-back species to yield a continual bloom.

To prevent turfgrass from growing into the perennial bed and becoming unsightly, use some form of broad edging or separating strip. Flat-laid bricks, flagstone, bare ground, or a heavy layer of mulch, such as wood chips or bark, will help keep out grass.

Perennials may be grouped according to color, which creates an intermixing that continually blooms at different intervals. Early bulbs may be planted with spring yarrow and iris, which usually fade before daylilies and canna begin their season of color. Use fall sunflowers and ornamental grasses to complete the season. Select plants that have long-lived blooms and foliage to attract attention.

Plant height is a major consideration in landscape design. In border plantings, the tallest plants are usually placed toward the rear to serve as a backdrop. A few of these plants can be moved forward to prevent monotony in the design. In island plantings, tall plants are better placed toward the center. Fall-blooming perennials are usually the tallest, making them the best backdrop or accent plants. Most of the middle-height perennial plants are summer bloomers and may occupy the majority of the middle space. Spring-blooming perennials are primarily short plants; place them toward the front. Emerging foliage and flowers of later blooming plants can help hide the fading foliage of earlier flowers. Narrow beds with excessively tall plants usually do not display effectively. Whether for

borders or island beds, keep the width of a planting about twice the height of the tallest plant.

Site Selection and Soil Preparation

Consider the site before selecting your plants. Although many perennials, such as ferns, tolerate heavy shade, most require abundant sunshine. Air circulation is important for avoiding diseases. Stagnant, warm, or humid air creates ideal conditions for plant disease. Perennial plants also require properly prepared soil, and a few have specific drainage and fertility requirements.

Soil preparation for perennials is similar to that for annuals; however, devote special attention to perennial bed preparation because plants may occupy the site for several years, leaving little opportunity to correct any problems. When possible, add sand and organic matter, such as bark, peat, or compost, to soils well ahead of planting time.

A layer of organic matter from 3 to 4 inches deep, worked into the soil about a shovel's depth, is usually adequate. Since different types of organic matter work and decompose at different rates in the soil, it is best to use a small amount of two to three types of organic matter rather than a large amount of just one.

Soil testing provides specific recommendations for fertilizer and lime needs. Since lime can last for several years (depending on the type), never add it without a soil test. Many fertilizers, such as phosphorus, are best applied and mixed into soils before planting. Perennials need a balance of several nutrients, including nitrogen, phosphorous, and potash; most garden supply stores carry a wide variety of fertilizer mixes. Keep in mind that phosphorus, including that found in bone meal, lasts for several years and does not need to be applied too often.

Propagation

Though most perennials take a couple of years to flower from seed, many are as easy to start as annuals. The quickest way to have blooming plants is by vegetative propagation, such as by dividing old plants or rooting stem cuttings. Plants produced in this manner have all of the traits of the "mother" plant. Propagation by division may seem difficult at first, but most gardeners find that dividing crowns and roots and separating bulbs can be mastered quickly. Try dividing monkey grass for experience; then move on to daylilies, and before long you will have "the hang of it."

Perennial plants with shallow roots are easily pulled apart by hand. Long fibrous roots can be separated with a hand fork. Thickly intertwined roots may need more forceful separation or cutting with digging forks. Replant only those segments with strong roots and a few intact leaves or crowns.

In general, it is best to divide perennials during their dormant or "off" season. For example, divide spring bloomers in fall and fall bloomers in spring. Some perennials may need dividing every 3 to 4 years or they will slowly crowd themselves into clumps of nonflowering leaves and roots.

Many perennial plants may be propagated from stem cuttings, which do not disturb the plant's roots. Take stem cuttings during the spring or early summer, choosing stems that are mature and firm but not yet hardened and woody. Cut off from 4- to 6-inch segments using a sharp knife or shears, and pinch off the succulent tip and flower buds to force the cuttings to concentrate their energy on producing roots. Remove the lower leaves that will be below the surface of the rooting medium, but leave a few leaves to provide a source of energy for root initiation and growth.

Because of disease or weather conditions, cuttings often will not root directly in garden soils. They may be easily started in a pot containing a porous, well-drained rooting medium, such as a 1:1 mixture of perlite and peat moss. Coarse sand and vermiculite are also used as rooting soils. These mixtures will hold moisture but allow drainage for air circulation. Root-stimulating compounds, such as those that contain fungicides, are available at most garden centers. Using a blunt stick, pencil, or finger, open a hole in the rooting medium and insert the treated cutting. Firm the medium around the cutting and water in well.

Many commercial growers use a mist bed to keep cuttings from wilting, but this is usually not feasible on a small scale. You may easily construct a humidity tent from plastic film loosely draped over a frame covering the cuttings. Place the tent in bright light but prevent overheating by making sure the tent is not located in direct sunshine. Keep the plastic loose to allow air circulation. Avoid direct contact between the leaves and the plastic. The tent will serve as a tiny greenhouse and will maintain a good rooting environment with light daily watering. Rooting often occurs within 3 or 4 weeks. By the time new leaves begin to appear on cuttings, roots are usually formed. Remove the plastic tent and water regularly until plants are firmly established.

Transplant newly rooted plants into prepared beds or pots and place in a bright, protected area until you are ready to set them into your garden or share them with others.

Planting

Set perennial plants in their permanent places so roots are completely covered with prepared soil, but avoid burying the stem or crown. Place container-grown plants at the same depth they were grown. Place dormant plants at the depth at which they grew the previous season. To encourage side-root growth, make a planting hole twice as wide as deep. With bare-root perennials, spread the roots outward as well as downward. For container-grown plants, loosen encircled roots and shake some of the potting soil into the planting hole. Remember to crumble away the top edges of a peat pot to prevent water loss through wicking. Do not let roots dry out, especially during transplanting.

Water the plants thoroughly to force out air pockets and to settle the soil. Mark and label the plantings. Mulch the bed surface with pine straw or bark to keep soil from drying, crusting, and overheating in the summer, and to prevent weed seeds from germinating.

Care and Maintenance

If you do not mulch your plants, use shallow cultivation in the spring and early summer to break and aerate compacted soils. Breaking up the soil also aids in water penetration and makes it easier to incorporate fertilizer. Summer cultivation can damage shallow roots and is more difficult because the plants will be larger. Early in the season, stake tall plants with wire stands or bamboo canes. Use care to avoid root damage.

Apply fertilizer sparingly to plants early in the season after new growth begins to show. If plants are growing well, no additional fertilizer may be needed; otherwise, a second, light application will be helpful several weeks into the season.

In the fall, cut the old plant stalks to the ground after the leaves have fallen, and mulch to protect crowns and roots from the extremes of mild weather followed by sudden cold spells. Remove any winter-annual weeds that may have germinated before applying mulch. Fall is also a good time to divide plants that may be encroaching on one another.

Hardy Perennials for Mississippi Gardens

Perennial plants have been long enjoyed for their flowers, foliage, and ability to return for many years with little trouble. Although dozens of perennials have been shared between gardeners, retail garden centers offer many hardy varieties. By planting only three or four new types of perennials each year, you can quickly build up a showy perennial garden and then divide the plants for your own use or to give away.

The following are common and favorite perennial flowers grown in Mississippi, along with selected characteristics. This is by no means a comprehensive list. Use this as a general selection guide for getting started with perennials. Try others as your success and confidence grow.



Mailbox garden with a mixture of perennial plants.

Table 2. Selected herbaceous perennials for Mississippi gardens.*

	Bloom Season	Plant Height	Remarks
Achillea (yarrow) *Achillea filipendulina* or *millefolium*	Spring and summer	1–3′	Fernlike winter foliage; flat, round heads of spring and summer flowers; excellent cut flowers; good companion to daylilies; pink or white cultivars popular; 'Coronation Gold' suffers on Gulf Coast from heat and humidity
Amsonia (blue star) *Amsonia tabernaemontana*	Spring and summer	2–3′	Native; spikes of blue in mid-spring; tolerates wet or dry soils; good cut flower; clump-former to 3 feet tall
Artemisia *Artemisia ludoviciana*	Foliage	2–3′	Silver-gray foliage plant; invasive, but good companion; 'Silver King' and 'Powis Castle'
Asters *Aster* sp.	Fall	2–5′	Wide range of plant heights depending on type
Banana *Musa acuminata*	Foliage	10–15′	Giant foliage; trunk needs mulch protection in winter
Butterfly Lily (ginger lily) *Hedychium coronarium*	Late summer and fall	4–6′	Bamboo-like summer foliage; pure white, fragrant flowers; rhizomes edible as a mild ginger; mulch in winter
Canna *Canna generalis*	Summer	3–7′	Dependable summer flowers; coarse foliage; tolerates both very dry and very wet soils; dwarf forms popular for landscaping; insects are a problem on foliage, but easily controlled; pruning forces new growth
Cardinal Flower (Lobelia) *Lobelia cardinalis*	Late summer and fall	3–4′	Native to moist or lightly shaded areas; spikes of red flowers; cut flower; do not mulch in winter or rot may occur
Chives and Garlic Chives *Allium schoenoprasum*	Spring	1–2′	Edible flowering members of onion family; winter foliage
Coreopsis (Mississippi State Wildflower) *Coreopsis lanceolata*	Spring and summer	2–3′	Several forms include spring bloomers for cut flowers and invasive, low-growing summer bloomers ('Moonbeam', 'Zargreb' with ferny foliage)
Daisies (mums) *Chrysanthemum* sp.	Spring to fall	1–3′	Many forms and colors
Ox-eye Daisy *C. leucanthemum*	Spring	2–3′	Naturalized wildflower 'May Queen' best variety
Shasta Daisy *C. maximum*	Spring	2–3′	Very popular white daisy
Garden Mum *C. x morifolium*	Fall	1–2′	Often planted as an annual; needs dividing in spring to prevent rot
Clara Curtis Aster *C. rubellum* (*C. zawadskii latilobum*)	Fall	2–3′	Old garden favorite; large and pink; often called 'Country Girls'
Daylily *Hemerocallis*	Summer	1–4′	Very popular clump-former with stems of large flowers; tolerates wide range of soils except wet; many improved varieties
Elephant Ear *Alocasia cucullata*	Foliage	3–4′	Favorite large-leaf foliage plant; corms edible; may be invasive; many other species and hybrids available
Ferns	Foliage	1–5′	Many kinds, mostly shade; divide and transplant in winter
Four-o'clocks *Mirabilis jalapa*	Spring to fall	1–3′	Fragrant evening bloomer; easy and fast from seed; tolerant of very poor soils; good for hummingbirds
Hibiscus (rose mallow) *Hibiscus moscheutos*	Summer and fall	3–5′	Several hardy varieties; do not confuse with Chinese hibiscus; tall plants; 'Disco Belle' series have dinner-plate-sized flowers; insects a problem on foliage
Hosta (plantain lily) *Hosta plantaginea*	Summer	10–24″	Shade plant with coarse foliage; cut flower; not heat tolerant near Gulf Coast
Iris *Iris* sp.	Spring	2–5′	Louisiana iris thrives in wet soils; bearded iris is popular, but often rots in heavy soils or if planted deep; Siberian iris more dependable in central and north Mississippi; dwarf crested iris is a shade-loving groundcover.

**Note: Names are those generally used in the nursery trade and garden books. Cultivated varieties are in single quotes.*

	Bloom Season	Plant Height	Remarks
Lamb's Ears *Stachys byzantina*	Foliage	1–2′	Silver-gray foliage, spikes of yellow flowers in spring; drought-tolerant groundcover; container plant
Lantana *Lantana camara*	Spring to fall	2–4′	Long-blooming butterfly plant; drought tolerant; attractive berries poisonous; new cultivars may not be hardy in the north
Liatris (blazing star) *Liatris spicata*	Summer	2–3′	Outstanding native with tall spikes of lavender flowers that bloom from top down; great cut flower
Liriope (monkey grass) *Liriope muscari*	Summer	1–2′	Tough clump-former with evergreen foliage; variegated varieties available; often overlooked as flowering plant for dry or shady sites
Lythrum (loosestrife) *Lythrum salicaria*	Summer and fall	3–5′	Tall spikes of pink flowers; butterflies; named cultivars ('Morden's Gleam', etc.) not invasive; tolerates wet soils or water gardens
Mistflower (wild ageratum) *Eupatorium coelestinum*	Fall	2–3	Native; blooms in fall with masses of blue flowers
Monarda (bee balm) *Monarda didyma*	Summer	2–3′	Native to lightly-shaded moist sites; flowers used for herbal tea; good butterfly plant
Mondograss *Ophiopogon japonicus*	Summer	4–8″	Dwarf lily turf; good ground cover; full sun to part shade
Phlox *Phlox* sp.	Spring	1–3′	Most kinds native; 'Thrift,' *P. subulata*, blooms early spring, good for rock gardens; *P. paniculata*, taller cut flower (suffers from mildew), good for edging; 'Wild Sweet Williams,' *P. divaricata*, good for ground cover; 'Summer Phlox,' *P. paniculata*, taller cut flower (suffers from mildew)
Physostegia (obedience) *Physostegia virginiana*	Summer and fall	2–4′	Invasive native with spikes of cut flowers; 'Vivid' pink cultivar
Purple Coneflower *Echinacea purpurea*	Summer	2–4′	Native summer cut flower; attractive seedheads
Red Hot Poker (Kniphofia) *Kniphofia uvaria*	Late spring to summer	2–3′	Striking stems of late spring flowers above clumps of thin foliage
Rudbeckia (Black-eyed Susan) *Rudbeckia fulgida* or *hirta*	Summer	2–4′	Traditional native wildflower; *R. hirta* is a short-lived spring perennial; reseeds readily; *R. fulgida* 'Goldstrum' is a more dependable, spreading groundcover with many mid-summer flowers on stiff stems; winter foliage
Salvia *Salvia* sp.	Summer	3–4′	Several hardy species and cultivars (*S. greggii*, *S. farinaceae*, *S. guaranitica*), mostly blue cut flowers on spikes
Saponaria (soapwort, bouncing bet) *Saponaria officinalis*	Spring to fall	8–10″	Old-world plant used by pioneers to make soap lather; spreading groundcover with pink and white flowers in clusters; good winter foliage
Sedum *Sedum acre* or *spectabile*	Spring or summer	10–18″	Several hardy species include cascading S. acre with yellow spring flowers, and *S. spectabile* ('Autumn Joy') or house leek; very hardy, easy to root or divide;
Stoke's Aster *Stokesia laevis*	Spring	18–24″	Native, low-growing clump-former with large blue aster-like flowers; tolerates wet soils
Verbena *Verbena x hybrida*	Spring to summer	1–2′	Spreading ground covers for sunny, dry areas; garden verbenas are propagated from cuttings, not seed like the annual species; *V. rigida* and *V. tenuisecta* (moss verbena) are wild along roadsides and are too invasive for most gardens, but do best in very poor soils; prune in summer to control mites
Violets *Viola williamsii*	Late winter and spring	6–10″	Woodland natives that also grow in full sun; may become weedy in lawns; winter flowers edible

Other Hardy Perennials Worth Growing in Mississippi Gardens

Note: These perennials are all easily grown. However, many of them are difficult to locate commercially except through mail order. All can be readily found in good perennial reference books if more information is needed. Latin names followed by sp. *indicate many different species are available.*

Asparagus
Asparagus officinalis
Beard-tongue
Penstemon sp.
Blue-eyed Grass
Sisyrinchium angustifolium
Boltonia
B. asteroides
Bugleweed
Ajuga reptans
Butterfly Weed
Asclepias tuberosa
Candytuft
Iberis sempervirens
Cast-iron Plant
Aspidistra elatior
Comfrey
Symphytum officinale
Coralbells
Heuchera sanguinea
Dianthus 'Telstar' and 'Spring Beauty'
Dianthus sp.
Dwarf Goldenrod
Solidago x *hybrida*
Gerbera Daisy
Gerbera jamesonii
Hardy Begonia
Begonia grandis
Heliopsis ("cut-and-come-again")
Heliopsis scabra
Helleborus (Lenten rose)
Helleborus orientalis
Hidden Ginger (hidden lily)
Curcuma petiolata
Indian Pinks
Spigelia marilandica
Ironweed
Veronia altissima and *V. angustifolia*
Joe-Pye Weed
Eupatorium purpureum
Lily (turk's cap, Madonna, tiger, etc.)
Lilium sp.
Mexican or Mint Marigold
Tagetes lucida
Mints
Mentha sp.
Pachysandra
Pachysandra terminalis
Peony ('Festiva Maxima' and other early bloomers only)
Paeonia lactiflora
Peruvian Lily (parrot lily)
Alstroemeria pulchella
Purple Heart
Tradescantia pallida
Spiderwort
Tradescantia virginiana
Trillium
Trillium cuneatum
Umbrella Sedge
Cyperus alternifolius
Veronica 'Sunny Border Blue', 'Blue Charm', and 'Goodness Grows'
Veronica spicata



Bugleweed groundcover with spikes of purple flowers.

Selected Hardy Bulbs for Mississippi Gardens

Note: These bulbs are commonly grown, though they may not be readily available through local garden supply stores. They are available through mail-order companies. Many may be found in old gardens and, with permission from the owners, can be propagated. Divide bulbs when they are not actively growing. Latin names followed by sp. indicate many different species are available.

Allium (chives, garlic chives)
Allium schoenoprasum
Amaryllis (hardy red)
Amaryllis belladonna
Calla Lily
Zantedeschia aethiopica
Crocosmia ('Lucifer', and the orange montbretia)
Crocosmia x *crocosmiiflora*
Dutch Iris
Iris xiphium
Hyacinth
Hyacinthus orientalis
Hymenocallis (native white spider lily)
Hymenocallis occidentalis
Jacob's Ladder (hardy gladiolus)
Gladiolus byzantinus
Ipheion (starflower)
Ipheion uniflorum
Leucojum (summer snowflake)
Lilies (garden lily; tiger, Madonna, regal, Easter)
Lilium sp.
Lycoris Radiata (red spider lily)
Lycoris radiata
L. squamigera (naked ladies)
Lycoris squamigera
Milk and Wine Lily
Crinum latifolium
Muscari (grape hyacinth)
Narcissus (daffodil)
Narcissus sp.
Oxalis (pink woods sorrel)
Oxalis adenophylla
Painted Arum
Arum italicum
Spanish Squill (woods hyacinth)
Scilla hispanica
Star of Bethlehem
Ornithogalum nutans
Sternbergia (Autumn crocus)
Sternbertia lutea
Society Garlic
Tulbaghia violacea
Rain Lily, Atamasco Lily
Zephyranthes sp.



Red amaryllis.

Quick Reference List for Perennial Uses

Note: Planting a few perennials and annuals around a featured object, such as a bench, urn, or birdbath, gives an interesting all-season scene. Mixing groups of contrasting shapes or textures and planning for a long season of color can create a dramatic effect.

Shade or Part-Shade

Ajuga
Alstroemeria (Peruvian lily)
Aspidistra
Canna (may not bloom, but foliage good for texture)
Ferns
Ginger Lily (Hedychium)
Heuchera (Coral bells)
Hosta
Iris (Dwarf crested, and the old timey "sweet flags")
Liriope

Lobelia (Cardinal flower)
Ophiopogon (mondograss)
Pachysandra (except on Gulf Coast)
Phlox divaricata (wild blue phlox)
Setcreasia (purple heart)
Spigelia (Indian Pink)
Viola (Violets)

Tolerant of Wet Soils

Amsonia (blue star)
Apsidistra
Canna
Cyperus (umbrella sedge)
Ironweed
Joe-Pye Weed
Louisiana Iris
Lobelia (cardinal flower)
Lythrum
Miscanthus (ornamental grass)
Stokesia

Bloom in Late Summer or Fall

Asters
Boltonia
Canna
Daylily
Dwarf Goldenrod
Four-o'clocks
Ironweed
Lantana
Physotegia (obedience)
Purple Coneflower
Mexican Mint Marigold
Ornamental grasses
Rudbeckia 'Goldsturm'
Salvias
Saponaria
Verbena

Attractive to Butterflies

Canna
Coreopsis
Goldenrod
Ironweed
Joe-Pye weed
Lantana (the best)
Liatris
Lythrum
Monarda
Phlox
Purple Coneflower
Rudbeckia
Salvias
Sedums
Stokesia
Verbena
Yarrow

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MISSISSIPPI STATE UNIVERSITY EXTENSION

Crapemyrtle: Flower of the South

Crapemyrtle (*Lagerstroemia* sp.) is a popular ornamental shrub/tree that would be a wonderful addition to any Mississippi landscape. The colorful flower clusters offer a spectacular sight from early summer through late fall. Although commonly called the "Flower of the South," the crapemyrtle is native to China.

Crapemyrtles have aesthetic qualities other than their colorful summer flowers. The trunk color is spectacular on many cultivars and ranges from a light green-gray to a dark cinnamon. The bark on some cultivars peels (exfoliates) in long strands, exposing various colors and creating interesting patterns that enhance the winter landscape.

The foliage is another beautiful feature. While green on most cultivars in spring and summer, it offers an array of fall colors ranging from brilliant yellow to deep maroon. Seed pods develop in early fall and remain on the plants all winter, providing contrast with the exposed linear branches. All of these factors combine to make the crapemyrtle an outstanding landscape plant for all seasons.

Crapemyrtles are hardy from the United States Department of Agriculture (USDA) Plant Hardiness Zone 7 to Zone 10. North Mississippi is in Zone 7b, and the extreme Gulf Coast area is in Zone 9a, making the crapemyrtle hardy throughout the state. It is important to note that even though extremely low winter temperatures can sometimes kill plants to the ground, they normally resprout from the roots in the spring.

Planting

Crapemyrtles are multi-use plants, which means they can be used as shrubs, small trees, specimen plants, patio/container plants, border plants, and even street trees. Select an appropriate cultivar for each use.

Where to Plant

Crapemyrtles have shallow, fibrous root systems. They grow and flower best in sunny locations with good air circulation and well-drained soil. They can grow in partial shade, but flowering is typically reduced and sometimes nonexistent. Crapemyrtles grow in a wide range of soil types but prefer a soil pH range of 5.0 to 6.5.

When to Plant

Install container-grown and balled-and-burlapped plants any time of the year. However, planting in the fall or early spring allows time for roots to establish before summer heat arrives. Install bare-root plants during the winter dormant season.

How to Plant

Prepare a planting hole three times as wide as the root ball. Set the plant in the hole at the same depth it grew in the nursery or container. Then, backfill with the amended soil and water thoroughly. Mulch the planting site with 3 inches of a mulch product or 6 inches of pine straw. Taper the mulch or straw to only 1 inch deep at the base of the tree trunk. After planting, stake large plants to prevent top movement and damage to the root system.

If it is necessary to plant in a heavy clay soil, elevate the planting site because crapemyrtle roots do not tolerate wet soils. Also, do not use finely chopped sphagnum peat (peat moss) or sand to amend heavy clay soils. Subsurface drainage tiles, or "French drains," may be used to remove excess water from the planting area.

If lime is required to raise the pH, mix it thoroughly with the native soil. If a soil amendment is needed, incorporate pine bark or compost into the soil. When planting in sandy soils, adding peat moss helps retain moisture and fertilizer. Thoroughly mix the peat moss with the backfill soil, making sure not to use more than ⅓ by the volume of peat.

Fertilization

Have your soil tested and follow the recommendations provided when fertilizing. If you have not had your soil tested, apply 2 pounds of a slow-release fertilizer with a 2-1-1 ratio per 100 square feet of bed area. Fertilize individual plants with ¼ to ½ cup of fertilizer in a circle no closer than 1 foot from the base of the plant. Sprinkle fertilizer uniformly over the area out from the base of the plant, and water the area thoroughly. Fertilize in early spring and again in early summer before the plants begin to flower.

Late fertilization or overfertilization can result in little or no flowering, excessive vegetative growth, and possible winter damage from not hardening off.

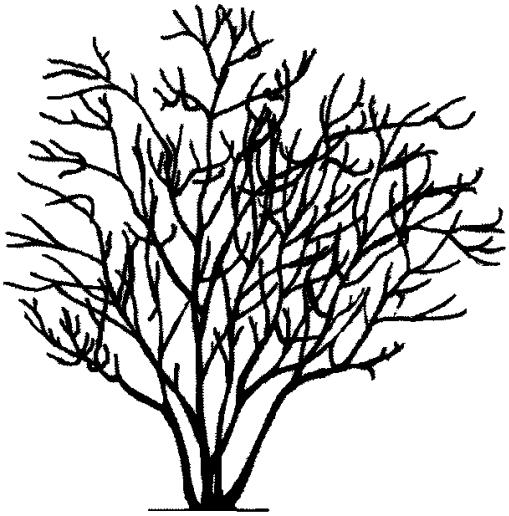
Pruning

The most attractive crapemyrtles are allowed to grow into their natural form, free of being pruned. Improper pruning can ruin this desired appearance of crapemyrtles. Pruning can stimulate new growth and increase the number of bloom clusters on the plant. If you choose to do so, prune in late winter or early spring before growth begins. The crapemyrtles will still flower because they bloom on the current year's wood. Whether the plant will be used as a shrub or a small tree determines the pruning method. The two basic methods used are thinning and cutting back.

Thinning

Thinning is the removal of old and weak branches at their points of origin. It is used to open up plants that are pruned to tree form. This does not stimulate prolific growth and leaves the plant with a more natural appearance.

Select one main stem for a single-trunk tree or three to five stems for a multi-trunk tree. Remove all other stems at ground level. Allow the main trunk(s) to reach a height of 5 to 6 feet before branching.

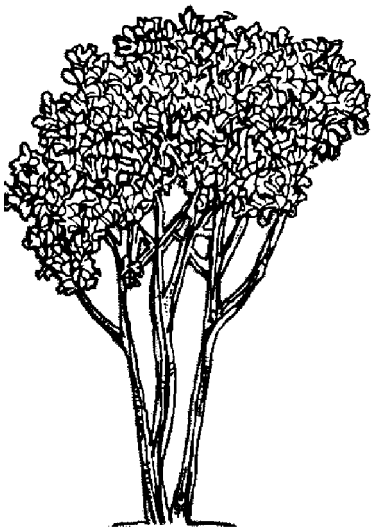


Multi-trunk crapemyrtle before being thinned.

At this height, tip prune to encourage branching. Remove all growth that develops below the desired branch height.

Cutting Back

Cutting back is done to maintain the plant at a certain height. Only use this method with shrub forms because it stimulates heavy branching. It also destroys the natural, balanced form of the plant. If the plant is too big for the landscape, the easiest thing might be to cut it back to the ground and let it regrow, or simply remove it.



Prune to extend the flowering season.

General Pruning Tips

You can prune fading bloom clusters to encourage the development of additional blooms and to extend the flowering season. Occasionally, heavy bloom clusters and branches have to be removed during the growing season to keep limbs from breaking. Limit this type of pruning to only what is necessary.

Do not prune crapemyrtles in the fall following leaf drop. This may stimulate new growth and make the plants susceptible to winter injury. Heavy pruning also destroys the natural appearance and form of the plants, which will be obvious during the winter months until growth resumes in the spring.

More information on pruning crapemyrtles is available on the Extension website.

Cultivar Selection

There are crapemyrtle cultivars suited to most situations in today's landscapes. Some are dwarf and are adapted to growing in containers; others may grow more than 20 feet tall. Some cultivars are upright and narrow in form, while others have a more spreading form. Bark characteristics, flower color, fall color, plant size, plant shape, and disease resistance have been greatly improved in recent years as the result of private, state, and federally funded breeding programs. See Table 1 for cultivars for Mississippi landscapes. It should be noted that the Ebony series of crapemyrtle is also sold under the Black Diamond product line.

Table 1. Recommended crapemyrtle cultivars for Mississippi.

Cultivar	Flower color	Mature height (feet)	Growth habit	Hardy	*L. indica* or *fauriei*	Tree form	Exfoliating bark	Mildew resistant	Fall color	Date of first flower	Days of flowers
Pixie White	white	3	rounded	good	*indica*	no	yes	good	red yellow	June	90
Hope	white	4	open dwarf	good	*indica*	no	no	good	yellow	mid-June	65
Delta Moonlight	white	10	upright	very	×	no	yes	high	burgundy	June	
Ebony & Ivory	pure white	10	upright	very	×	yes	yes	high	burgundy	June	
Acoma	white	14	umbrella	very	× *fauriei*	yes	yes	high	purple red	late June	90
Sarah's Hardy White	white	20	upright	very	*indica*	yes	yes	high	yellow	late June	90
Natchez	white	30	broad tall tree	very	× *fauriei*	yes	best	high	orange red	mid-June	110
Chickasaw	pink	2	miniature	good	× *fauriei*	no	yes	high	orange red	early July	90
Ruby Dazzle	pink	3	dwarf spreading	very	no	no	no	high	red	late June	90
Hopi	medium pink	7	low spreading	very	× *fauriei*	no	yes	high	orange red	late June	100
Pecos	medium pink	7	low spreading	very	× *fauriei*	no	yes	high	maroon	early July	100
Delta Jazz	bright pink	8	upright	very	×	small	yes	high	purple brown	June	90
Ebony Glow	light pink	10	upright spreading	very	×	yes	yes	high	burgundy	June	
Delta Breeze	light pink	10	upright	very	×	no	yes	high	burgundy	June	
Tuscarora	dark pink	16	broadvase	good	× *fauriei*	yes	yes	high	red orange	early July	70
Tuskegee	pink	16	broad spreading	very	× *fauriei*	yes	yes	high	red orange	late June	100
Potomac	clear pink	20	upright	good	*indica*	yes	no	high	orange	late June	90
Miami	dark pink	20	upright	very	× *fauriei*	yes	best	high	orange	mid-June	110
Biloxi	pale pink	25	vase shaped	very	× *fauriei*	yes	yes	high	orange red	July	80
Pocomoke	red	2	dwarf compact	good	*indica*	no	no	good	bronze red	June	90
Victor	dark red	4	dwarf compact	very	*indica*	no	no	good	yellow	late June	85
Raspberry Dazzle	raspberry red	4	dwarf compact	very	no	no	no	high	red	late June	90
Ebony Flame	dark red	6	upright spreading	very	×	no	yes	high	burgundy	June	
Ebony Fire	crimson red	6	spreading	very	×	no	yes	high	burgundy	June	
Delta Flame	red	10	upright	very	×	no	yes	high	burgundy	June	
Ebony Embers	deep red	10	upright	very	×	yes	yes	high	burgundy	June	
Tonto	red	12	compact globose	good	× *fauriei*	small	yes	best	bright maroon	mid-July	80
Centennial Spirit	wine red	16	upright	very	*indica*	small	yes	good	red orange	late June	110
Dynamite	red	20	upright round	very	*indica*	yes	no	good	orange red	mid-June	100
Red Rocket	cherry red	20	upright	good	*indica*	yes	no	high	bronze	early June	100
Arapaho	bright red	20	broad upright	very	× *fauriei*	yes	yes	high	red	late June	85
Carolina Beauty	dark red	20	very upright	fair	*indica*	yes	yes	poor	orange	mid-July	65
Centennial	bright purple	3	compact dwarf	good	*indica*	no	no	good	orange	mid-June	70
Velma's Royal Delight	purple	4	compact	good	*indica*	no	no	good	yellow orange	June	90
Delta Eclipse	lavender	10	upright	very	×	small	yes	high	burgundy	June	
Sioux	light purple	15	dense upright	very	× *fauriei*	yes	yes	high	maroon	late June	110
Catawba	violet purple	15	upright vase	good	*indica*	yes	no	good	red orange	mid-July	70
Lipan	medium lavender	15	upright globose	very	× *fauriei*	no	best	high	orange	mid-July	80
Twilight	purple	18	upright	good	*indica*	yes	yes	fair	yellow orange	early June	75
Muskogee	light lavender	20	broad tall tree	very	× *fauriei*	yes	yes	high	red orange	mid-June	120

Diseases

Powdery Mildew

The major disease affecting crapemyrtles is powdery mildew. This fungal disease reduces flower performance and weakens plants by attacking flower buds, growing tips, and young leaves. It is most common when cool nights are followed by warm days and occurs most often in crowded landscapes with poor air circulation. The fungus overwinters in dormant shoot buds, sheltered places on the plant, and diseased plant debris on the ground.

Powdery mildew infection appears as a grayish-white powdery fungal growth. As leaves expand, they become curled and distorted. On older leaves, large white patches of the fungus appear without much leaf distortion. Flower buds covered with the fungus either fail to open or open improperly. The infection may also spread to mature flowers and cause flower blight.

Crapemyrtle cultivars released in recent years with *Lagerstroemia fauriei* in their parentage are resistant to powdery mildew. Cultivar selection is an effective way to control the disease. These cultivars are noted in Table 1.

Cultural methods for controlling powdery mildew involve sanitation procedures and applying fungicides. In the fall, remove and destroy all diseased twigs. In late winter, proper pruning will improve air circulation and reduce the possibility of disease development.

Begin applying recommended fungicides in the spring when growth begins and immediately after the first sign of disease infection. You may also apply fungicide during the flowering period to prevent blossom blight. It is best to alternate applications of a systemic fungicide with one of the protectant fungicides. Use sulfur only at temperatures below 85°F to avoid leaf burn.

Sooty Mold

Sooty mold is a black, powdery coating that develops on leaves and twigs during cool, moist, cloudy weather. Several causal fungi grow in the sugary honeydew deposited on the plants by small sucking insects, such as aphids and white flies. If you control the feeding insects that produce the honeydew, you can control sooty mold.

The fungi that cause sooty mold do not attack the plants but derive nutrients from the honeydew deposited by the insects. Although sooty mold does not directly attack crapemyrtles, its presence destroys their beauty and can weaken the plants by shading the leaves from sunlight. Heavy infestations of insects that secrete honeydew weaken crapemyrtle plants.

Several insecticides are approved for use on crapemyrtles to control sucking insects. More about sooty mold can be found in Publication 4035 The Plant Doctor: Sooty Mold and Publication 2369 Insect Pests of Ornamental Plants in the Home Landscape.

Anthracnose

This disease causes the leaves to fall off the crapemyrtle and is most common in late summer. Leaves will have black spots and may turn reddish or yellow, then fall off. The black spot is the fungus. Spraying is seldom needed unless the crapemyrtle is in a high visibility area. Leaf removal is the best management tool for this disease.

Crapemyrtle Bark Scale

Crapemyrtle bark scale (CMBS) is a pest that can cause heavy damage to trees. Soil-drench insecticides allow for the most efficient control. See Extension Publication 2938 Crapemyrtle Bark Scale Identification and Control for more information.

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MISSISSIPPI STATE UNIVERSITY EXTENSION

Installing Trees and Shrubs

Buying trees and shrubs for landscaping can be expensive. For a newly built home, the estimated cost for a landscape design is 5 to 15 percent of the home's cost. This type of investment must be well planned and designed for years of pleasure. In many situations, people do not follow instructions for installing individual plants in the landscape.

Establishing landscape trees and shrubs successfully depends on proper soil preparation, planting methods, and follow-up care. Plants require oxygen, nutrients, and water for proper growth. Improper planting and inadequate follow-up care are the main causes of plant death. This is a chance to get new plants off to a good start and to examine planting techniques for greater success in establishing a home landscape.

Preparing planting sites for shrubs in a landscape design involves two methods. When installing several plants, prepare a planting bed by tilling or double-digging the site 10 inches deep, working in organic matter while preparing the planting site. Add fertilizer and amendments by mixing thoroughly into the soil. This soil preparation is ideal when installing several plants in an area.

The second site preparation method involves digging a hole for each plant. The hole planting method is used for replacing or adding plant material. Site preparation involves more than just digging a hole for each plant.

Most nurseries grow ball and burlap and bare-root plants in sandy to loamy soil. When you move these plants to the landscape site, the difference in soil texture can make transplanting more difficult. Getting new plants established in tough, clay soil is a challenge. Clay soils are rich in nutrients but are difficult to manage. A loam soil has fairly balanced amounts of clay, silt, and sand, making it ideal for transplanting shrubs and trees.

Preparing the Planting Site

Dig the planting hole at least twice as wide as the diameter of the root ball. Dig the edges of the hole at a 45-degree angle. If a landscaper uses a mechanical tree spade, they should cut grooves in the sides and bottom of the hole to encourage root growth into the surrounding soil.

Amending the Planting Site

If you are adding amendments to the soil, choose carefully. Remember, young plants eventually send roots beyond the planting hole. Peat moss or other soil-structure improvers often are added to the growing medium. This results in the newly planted tree growing an intensive root system that will soon become mated with the good soil but will not easily penetrate beyond it into the heavier soil.

The recommendation for amending clay soils is to add organic matter such as pine bark or leaf mold. Add the bark at the rate of 2 to 3 inches per 6-inch depth of clay-like soil. Add 1 inch of peat moss to a 6-inch depth of sandy soil. Ideal soil consists of 15 percent air, 50 percent solids, and 35 to 40 percent water.

Ball and Burlap Plants

For ball and burlap plants, dig the planting hole no deeper than the height of the soil ball. Digging the hole deeper lets a plant settle and can suffocate the roots. Planting depth needs to be the same as in the field where the plant was grown. Leave the bottom of the hole undisturbed, with firm soil so the plant will not settle. The discoloration on the bark near ground level indicates the soil level. Lift the plant by the root ball, not the trunk. When filling the hole, be careful not to disturb the root ball. Add backfill up to two-thirds of the root ball's

depth, firm the soil, then settle it with water. Remove the remaining burlap from the top of the root ball. Burlap left on top of the soil line will have a "wick effect," drying the root ball. Cut all strings or metal wire. Finish backfilling the hole with soil.

Make a 3- to 4-inch berm or raised area surrounding the root ball. (A berm is a ring of soil around the base of the plant outside the planting hole. This helps hold water and protects the shrub or tree from possible damage by a lawn mower.) Be sure the berm is well beyond the edge of the root ball so water will be directed to the right place (Figure 1). If drainage is poor, remove the berm after the plant is established to avoid excess water in the hole.

Container-Grown Plants

Handle container-grown plants the same way as ball and burlap plants. Make the planting hole at least twice the diameter of the soil ball but no deeper than its height. Spread the roots by gently teasing to break the circular root pattern. If the plant is pot bound, make three or more vertical cuts through the root system. Also, cut the bottom of the root ball to remove matted roots.

Bare-Root Plants

Some bare-root plants are packed with materials to keep roots moist in the bag. Carefully remove any packing material from the roots. Inspect the roots for any diseased, broken, or dead roots, and clip these roots with pruning shears before planting. Clip exceptionally long roots. Immerse the roots in a bucket of water to soak for at least 1 hour.

Make individual planting holes for bare-root plants wide enough to spread the roots but no deeper than the original soil depth. To prevent settling, build a crown for fibrous-rooted plants, such as roses. Leave the center of the bottom portion of the planting hole higher than the edges to let the plant rest firmly. This mound at the bottom of the hole keeps the plant from settling and helps spread roots in a natural position (Figure 2).

Watering

Thoroughly water newly transplanted trees and shrubs. Water is crucial during the first growing season, as it is the leading cause of transplant failure. Properly watered plants have a greater chance of survival.

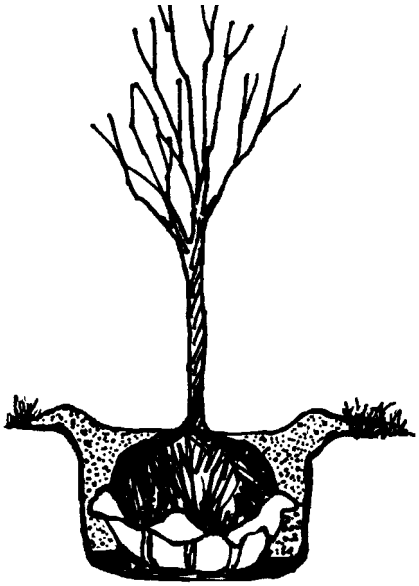


Figure 1. Ball and burlap planting with a berm to hold in water.

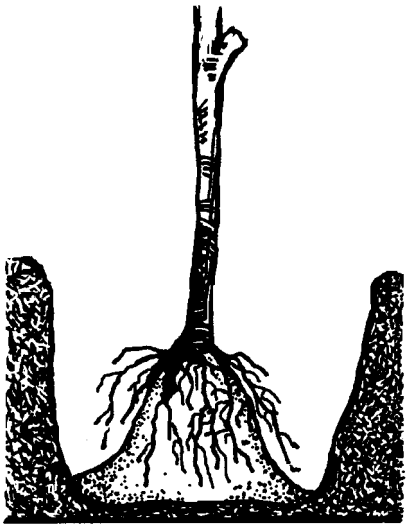


Figure 2. Planting a bare-root plant on a crown of soil.

Mulching

Mulching is essential for young shrubs and trees. It helps save and extend available water, reduces competition by controlling weeds, moderates temperature extremes, and acts as a barrier or visible marker for landscape maintenance equipment.

Too much mulch can be harmful. Mulching with only 2 to 3 inches of bark or 6 inches of pine straw is enough to control weeds and hold moisture in transplanted plants. See Extension Publication 2301 Mulches for the Landscape.

Staking and Guying

It is sometimes necessary to stake or guy a tree that cannot stand up by itself or that is in a windy or heavy-traffic area. Guying anchors young trees to the ground with wires and stakes (Figure 3). Young trees have a small trunk diameter relative to their height; guy wires support slender trees and protect them from wind damage.

When staking trees, remember that the main tree stem grows stronger more quickly if the treetop is free to move with the wind. Set staking posts in line with the tree trunk, far enough away so the trunk cannot rub against the post and damage its bark. Use a broad bandage or run the wire through a piece of rubber hose to secure it to the tree. Tie the tree at a point just high enough to hold it upright in calm weather (Figure 4). After windy conditions, the tree should return to its vertical position.

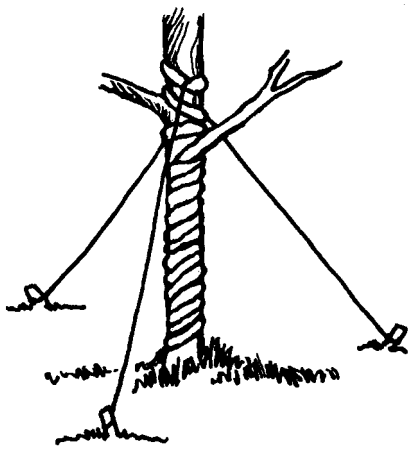


Figure 3. Guying anchors young trees to the ground.



Figure 4. Staking uses posts parallel to the trunk to support trees.

Easy Test to Determine Soil Drainage

To help determine soil drainage, choose a day when the soil is not excessively wet from rain or other factors. Use a large coffee can (approximately 46 ounces) with the top and bottom removed. Dig a 4-inch-deep hole and set the can on the bottom of the hole. Firm the soil around the can so water cannot slip under the bottom edge.

Fill the can with water; wait an hour, and then measure the water level. If the water level drops at least 2 inches in 1 hour, the drainage is considered normal. If the level drops more than 5 inches in 1 hour, it is considered too much. If the level doesn't seem to drop at all, the soil drainage is poor.

Another option is to dig a hole 1 foot by 1 foot wide and fill with water. Follow the same drainage rate as above.

Planting in Poorly Drained Soils

There are alternatives if a planting site does not allow for surface drainage to remove excess water:

- Install a French drain, which removes water through a network of drains. There must be a point lower than the landscape site for the water to drain.
- Plant in a raised bed, which needs to be at least 12 inches deep.
- Prepare a large berm (from 1 to several feet deep). Such structures can complement your landscape.
- If you are planting directly on heavy soil, incorporate a 3-inch layer of new soil to form a transition layer. A sudden change in soil texture disrupts the flow of water through the soil profile, possibly causing a stagnant area beneath the new soil profile.

Transplanting Existing Landscape Plants

The ideal time to transplant is during the dormant season. Temperatures are lower, the soil has more moisture, and plants will be less stressed. Dig/remove the plant with a large enough root ball to sustain the plant. Move to a new location and install by following the previous instructions.

If a plant has to be moved during warmer months, prepare the new location beforehand so the plant can be installed immediately after removing it from the soil. These plants may need frequent irrigation through the remaining summer season.

Publication 3662 (POD-08-24)

Reviewed by **Jeff Wilson**, PhD, Assistant Professor, North Mississippi Research and Extension Center. Written by Gary Bachman, PhD, Extension/ Research Professor Emeritus, Horticulture.

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MISSISSIPPI STATE UNIVERSITY EXTENSION

Easy-to-Grow Herbs for the Landscape

The value of herbs has been known for centuries. They have been used as flavorings in foods and as medicines for ailments. In addition, herbs are used as ornamental plants in the landscape.

Herb gardens add interest to any landscape, with a wide array of characteristics such as form, aroma, and unusual foliage. Herbs are used as borders, accent plants, and hedges. Further selection is based on whether the growing site is sunny or shady, wet or dry.

Starting an Herb Garden

Most garden centers offer a broad selection of herbs for immediate planting in the landscape. Select healthy, vigorously growing plants. The roots should be white to greenish-white. Be sure not to plant the herb any deeper than it was growing in the container. Planting too deep may cause the roots to rot.

Choosing a Planting Site

Most herbs thrive best in well-drained soil, with a soil pH of 6.0 to 6.8. The growing area should be tilled to a depth of 8 to 12 inches. Although herbs are somewhat drought-tolerant, adequate soil moisture is required for vigorous growth. Annual herbs require higher available soil moisture than perennial herbs.

Increase the water-holding capacity of sandy soils by adding a 2-inch layer of organic matter such as compost, sphagnum peat moss, or pine bark. Till the organic matter thoroughly into the soil. Amend heavy clay soils with compost or pine bark; otherwise, beds should be constructed to provide internal drainage.

Fertilizing

A proper nutritional balance is important for proper growth. Get a soil test before fertilizing. Overfertilization causes succulent, or weak, growth. Succulent growth dilutes the concentration of essential oils, thus limiting the flavor and aroma of the herbs. On the other hand, inadequate fertilization will limit growth, resulting in stunted and weak plants.

Base your fertilizer on the soil test recommendations. If you did not do a soil test, apply a complete, slow-release fertilizer with a 1-2-2 or 1-2-1 ratio of N, P, and K in the spring and again in mid- to late summer.

Mulching

Mulch with pine bark, straw, or wood chips, being careful not to pile the mulch around the stem base.

Pruning

Tender herbs should be pruned to remove dead tissue in early spring before growth begins. Herbs valued for their young foliage should be pruned regularly during the growing season to encourage fresh, young growth.

Harvesting

For foliage with the maximum amount of oil, harvest in the early morning, after the dew has dried. If this is not convenient, harvesting may be done anytime. To allow adequate time for regrowth of perennial herbs, do not harvest rigorously after late summer.

Mississippi Medallion Herb Selections

As a tool for promoting Mississippi-grown plants, the Mississippi Nursery and Landscape Association (MNLA) established the Mississippi Medallion Program in 1996. The



Figure 1. 'Purple Ruffles' basil (*Ocimum basilicum*) was the first Mississippi Medallion award-winning herb.

purpose of this program is to identify plants that perform exceptionally well throughout the state and to promote the proper use of these plants in Mississippi landscapes.

Selections are evaluated at research sites before being brought before a selection committee. This promotional program is a joint effort of the MNLA, Mississippi State University Extension Service, Mississippi Agricultural and Forestry Experiment Station, and Mississippi Plant Selections Committee.

In 2004, 'Purple Ruffles' basil (*Ocimum basilicum*) was chosen as the first Mississippi Medallion award-winning herb (Figure 1). Deep purple leaves are intensely fragrant and are highly attractive in both herb gardens and flower beds. This annual will reach 24 inches in both height and width in full sun. Plants should be spaced at least 24 inches apart to ensure ample room in the bed. Basil should be fertilized with light applications of 5-10-5 fertilizer every 4 to 6 weeks or after harvesting leaves. Suggestions for use include color in salads, herbal vinegars, and pesto sauce.

The Mississippi Medallion Selections Committee chose cardoon (*Cynara cardunculus*) in 2008 (Figure 2). A full-sun perennial, cardoon thrives in cool-season landscapes and is used similarly to kale, cabbage, or mustard. Cardoon reaches 2 to 3 feet tall and wide. It can reach 4 to 6 feet if allowed to reach bloom in early summer. Plants should be spaced 18 to 24 inches apart for the cool-season landscape. Cardoon is edible, but blooms are also well-suited for cut-flower use. Plants should be spaced 42 inches apart if grown for blooms.

Rosemary (*Rosmarinus officinalis*) was chosen as the Mississippi Medallion award-winning herb for 2016 (Figure 3). A woody herb suited for full sun, rosemary cultivars may be either upright or prostrate. In general, upright rosemary measures 24 to 36 inches in height. Prostrate, or creeping, rosemary measures 1 to 2 feet in height and 2 to 3 feet in width. Narrow, gray-green leaves bring fragrance and texture to the landscape. Small flowers appear in various shades of white to deep blue. Rosemary requires well-drained soil but is drought-tolerant after establishment.



Figure 2. Cardoon (*Cynara cardunculus*) was the 2008 Mississippi Medallion award-winning herb. Herbs can be used in the landscape as ornamental plants. (Photo by Gary Bachman)



Figure 3. Rosemary (*Rosmarinus officinalis*) was the Mississippi Medallion award-winning herb in 2016.

Table 1. List of easy-to-grow herbs.

Herb	Height (inches)	Description	Culture
Anise (*Pimpinella anisum*)	20–24	Serrated leaves; small, white flowers. Low, spreading, slow-growing annual.	Likes moderately rich soil and full sun. Space 6–8 inches in rows 12–14 inches apart.
Basil (*Ocimum basilicum*)	20–24	Leafy, light-green foliage; white or lavender flowers. Fast-growing annual.	Start seeds indoors in early April or seed in early spring. Space 12 inches. Prefers protected, sunny location.
Borage (*Borago officinalis*)	24–36	Coarse, rough, hairy leaves. Produces light-blue flowers in drooping clusters. Cool-season annual.	Seed directly in early spring. Space 12 inches. May germinate slowly.
Caraway (*Carum carvi*)	10–24	Carrot-like leaf with small, creamy-white flowers. Biennial.	Seed directly in spring; locate in full sun. Space 6 inches.
Chervil (*Anthriscus cerefolium*)	10–28	Similar to parsley; light-green, lacy leaves. Flowers are small white clusters. Annual.	Sow seeds in a moist, partially shaded location. Space 6 inches.
Chives (*Allium schoenoprasum*)	12–18	Dark-green clumps of tubular, grasslike leaves, forming a fluffy, lavender pom-pom flower in mid- to late spring. Tough, easy perennial.	Thrives in rich, well-drained soil. Easily propagated from division. Divide every 3 years.
Cilantro, Coriander (*Coriandrum sativum*)	12–14	Large, coarse plant with white flowers. Cool-season annual.	Sow seeds in full-sun area; thin to 10 inches.
Dill (*Anethum graveolens*)	24–36	Tall plant with feathery green leaves. Open, umbrella-shaped flower heads. Cool-season annual.	Seed directly; thin to 12 inches. If seeds mature and fall, they may come up again next year.
Fennel (*Foeniculum vulgare*)	36	Fine, feathery leaves with licorice flavor. Perennial.	Sow in early spring; thin to 12 inches.
Lavender (*Lavandula* spp.)	12–36	Shrubby plant with silver-gray foliage and lavender flowers during midsummer. Very fragrant aroma from leaves and flowers. Perennial.	Prefers slightly alkaline, well-drained soil.
Lemon Balm (*Melissa officinalis*)	24	Spreading plant with yellowish-green, heart-shaped leaves that give off a lemony aroma when bruised. Spikes of small, white, yellow, or pinkish flowers bloom from summer until fall. Perennial.	Easily propagated from root cuttings in spring or fall; requires sandy, moist soil. Pinch tops to maintain a full, compact plant. Prolific re-seeder.
Mexican Mint Marigold (*Tagotes lucida*)	24–36	Good substitute for French taragon in southern gardens. Tough perennial with light-green leaves and yellow flowers in late summer.	Grow in full sun. Easily propagated by seed or cuttings.
Mint (*Mentha* spp.)	12–24	Spreading, bushy perennial with highly fragrant leaves; oval, light-green leaves. Purple or white flowers are borne in clusters on long spikes.	Easily propagated by division. Can be a nuisance unless spreading roots and stems are confined.
Oregano (*Origanum vulgare*)	24	Very aromatic perennial with mainly pink flowers.	Grow in full sun. Easily propagated by division or cuttings.
Parsley (*Petroselinum crispum*)	10–24	Several varieties, including curled, Italian, or French parsley, are available. Even though parsley is a biennial, treat it as an annual. It produces a rather compact plant, forming long, bright-green leaves. Curled parsley makes an excellent seasonal border.	Sow seeds each spring; slow to germinate. Favors well-drained soil.
Sage (*Salvia officinalis*)	18–24	Coarse, aromatic, grayish-green leaves with purple to white flowers. Perennial.	Grow in well-drained soil in a sunny location. Propagate by cuttings.
Savory, Summer (*Satureja hortensis*)	18	Small, gray-green leaves with purple and white flowers.	Plant this tender annual after danger of frost. Space 6–9 inches.
Sweet Marjoram (*Origanum majorana*)	12	Fine-textured plant with white flowers. Perennial.	Grow in full sun. Space 8–10 inches. Can be propagated by division or cuttings.
Thyme, Lemon (*Thymus* × *citriodorus*)	6	Trailing growth habit; golden-green, highly fragrant leaves. Excellent for rock gardens.	Sow seeds and thin; easily propagated by cuttings.

Publication 3677 (POD-07-24)

Revised by **Christine E. Coker**, PhD, Extension/Research Professor, Coastal Research and Extension Center, from an earlier edition by Lelia Kelly, PhD, David Tatum, PhD, and Norman Winter, former Extension horticulturists.



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MISSISSIPPI STATE UNIVERSITY EXTENSION

Azaleas for the Landscape

Most Mississippi gardens have contained an azalea at some point. Azaleas are in the genus *Rhododendron*, which has more than 900 species. Azaleas are native to many parts of the world, but the most colorful varieties come from China, Japan, and the eastern United States.

There are many characteristics that make the azalea a beloved plant. They flourish with beautiful blooms that can provide an array of colors from mid-spring through early summer. Many varieties also offer colorful fall foliage. With dwarf, intermediate, and large varieties available, gardeners have a wide selection to choose from.

Azaleas are hardy from USDA climate zones 5 to 9. North Mississippi is in zone 7, and the extreme Gulf Coast area is in zone 9, making azaleas hardy throughout the state. All of these attributes make the azalea an excellent plant for Mississippi landscapes.

Planting

Azaleas can be used in many ways in the landscape or garden area. They may be used as border or facer plants along a boundary, as background plantings to frame an area, as foundation plantings to build the design around, or in mass-planted groups to brighten up a landscape room.

Where to Plant

Some azaleas can grow in full sun, but most are best suited for a landscape area with partial shade. This could be on the north side of the house or in a wooded area that receives filtered sunlight through trees. They do best in an acidic soil with a pH between 4.6 and 6.0. A soil test is the best way to ensure proper soil acidity. A higher pH (greater than 6.0) results in poor growth and plants stressed by insects and disease.

Azaleas prefer well-drained soil with an abundant supply of peat moss. If the native soil is poorly drained, you should make raised beds. You can do this with landscape timbers or crossties, or by hilling the soil up 8 to 12 inches above ground level. Azaleas will not tolerate "wet feet" (roots)!

When to Plant

Most azaleas are container-grown and can be planted any time of the year. However, planting in the fall or early spring allows time for roots to establish before summer heat arrives. Plant bare-root plants during the winter dormant season.

How to Plant

Prepare a planting hole two to three times as wide as the root ball. Set plants in the hole at the same depth or slightly higher than where they grew in the nursery or container. Backfill with amended soil and water thoroughly. Adding lots of peat moss, leaf mulch, well-composted sawdust, or other compost can make the soil more acidic, if needed. Finally, mulch the planting site with 3 to 4 inches of a mulch product or 6 to 8 inches of pine straw. Taper the mulch or straw to only 1 inch deep at the base of the plant.

Fertilizing

Have the soil tested and follow the fertilizer recommendations provided. If your soil has not been tested, apply 2 to 4 pounds of an acid-based fertilizer with a 2-1-1 ratio per 100 square feet of bed area. Fertilize individual plants with one-quarter to one-half cup of fertilizer in a uniform circle no closer than 1 foot from the base of the plant. Fertilize in early spring and again in early summer, just after plants have finished flowering. Late or over-fertilization can result in little or no flowering, excessive vegetative growth, and possible winter damage if the plants do not harden off.

Pruning

Azaleas grow and set their bloom buds during the fall months. For this reason, prune them immediately after they have finished their spring bloom period. It is okay to wait until all the azaleas in the landscape have finished blooming to prune them all at once. The best method is to use hand-held pruners and remove only one-third of the overall plant. For more information, see Extension Publication 3589 *Pruning Landscape Plants*.

Variety Selection

There are azalea varieties to fit most any landscape situation. Dwarf varieties only grow to 1 to 2 feet tall, large varieties may reach 12 feet, and there are numerous varieties in between.

Three deciduous species grow natively in woodland areas of the state: *Rhododendron canescens*, the pink bush honeysuckle; *R. austrinum*, the yellow bush honeysuckle; and *R. viscosum*, the white swamp azalea.

Most of today's showy azaleas are hybrids. Some of the major groups of cultivated azaleas are Indicas, Kurumes, Glenn Dale hybrids, Girard's, Robin Hill, and the Satsukis. Varieties from the Indica and Kurume groups are grown more commonly throughout the state (see Table 1).

The Encore series of azaleas has also gained great popularity in Mississippi landscapes, with more than 25 varieties to choose from. This series is known for producing flowers in the fall, as well as in the spring. The Re-Bloom series from Greenleaf Nurseries and the Bloom-A-Thon series from Proven Winners are newer releases that should perform well here as well. However, these are newer cultivars that have not been fully tested for adaptation to all of Mississippi (Table 2).

Color and Flower Forms

Azalea flowers come in a range of colors, including white, yellow, orange, scarlet, crimson, and purple. There are vivid sparkling shades, pastel tints, and pure whites. Some even have striped or flecked flowers.

The single-flower varieties have five petals with five to ten stamens. Other varieties may be double, semi-double, or the hose-in-hose (funnel) type. Azaleas flower abundantly, and, if you choose the right varieties, you may have flowers for up to 3 months (see Table 1).

Watering

Azaleas have an extremely fibrous root system that stays relatively shallow. A good watering schedule is essential during the growing season. Azaleas need the equivalent of 1 inch of rain every 7 to 10 days. It is best to water as deeply and infrequently as possible. The timing and amount will depend upon the soil type and drainage. For more information, see Extension Information Sheet 1670 *The Plant Doctor: Watering and Plant Disease*.

Common Diseases and Pests

Petal blight

Flowers become spotted and water-soaked and cling to the plant after they die. It is more severe in cool, moist springs. Remove old mulch and replace it. Drench or spray with a fungicide. Unless you have a "hot" compost process, do not compost this material. Remove it well away from the property.

Leaf gall

Pale green or whitish, fleshy galls with curled or deformed leaves. Occurs more in cool, moist weather. Hand-pick and destroy affected leaves. Start spraying at the end of the bloom period and continue at 2- to 3-week intervals until mid-June.

Leaf spots

Brown/bronzed leaves, with tiny black fruiting bodies on leaves. Use a fungicide at end of bloom period and continue at 2-week intervals through growing season.

Winter injury

Entire branches turn brown and die during the growing season. Look for bark splitting near base of limbs or at ground level. Use recommended varieties and keep plants in healthy condition. Water regularly during late summer and fall.

Nematodes

Leaves turn yellow and plants are stunted. They do not respond favorably to water and fertilizer. No chemical control is available. Other conditions mimic nematode injury; collect a soil sample from root zone for nematode analysis.

Iron chlorosis

Leaves turn light green to yellow, then creamy white between the veins; but veins remain green. Caused by too-high soil pH, making the iron unavailable. Lower soil pH by adding ferrous sulfate, finely ground sulfur, or aluminum sulfate. Treat foliage with iron chelate for temporary effects.

Azalea caterpillar

Causes sudden defoliation of leaves. Usually occurs in late summer or fall and is more common in the southern part of the state. Control with foliar sprays recommended for caterpillars.

Azalea lacebug

The upper surface of leaves has a gray, coarse-stippled appearance. Underside of leaves becomes discolored by excrement and cast skins. Treat with recommended soil-applied insecticides. For heavy infestations, also apply foliar insecticides when crawlers are hatching.

Scale insects

Usually found on twigs or branches and have various colors and shapes. Some look like bits of white cotton and others are brownish. Treat with recommended soil-applied insecticides. For heavy infestations, also apply foliar insecticides when crawlers are hatching.

For more information on insecticides, see Extension Publication 2369 *Insect Pests of Ornamental Plants in the Home Landscape*.

Table 1. Common azalea varieties.

Indica	**Approximate Bloom Date**	**Flower Color**	**Approximate Height**
Brilliant	early to midseason	rose	3 to 4 feet
George L. Taber	midseason	white to pale pink	6 to 8 feet
Mrs. G. G. Gerbing	early to midseason	white	6 to 8 feet
Judge Solomon	midseason	purplish	6 to 8 feet
Formosa	early to midseason	rose lavender	6 to 10 feet
Pride of Mobile	midseason	watermelon pink	6 to 10 feet
Kurume	**Approximate Bloom Date**	**Flower Color**	**Approximate Height**
Snow	midseason	pure white	1 to 2 feet
Christmas Cheer	early to midseason	brilliant red	2 to 3 feet
Hino Crimson	early	dark red	2 to 4 feet
Hinodegiri	midseason	bright scarlet	3 to 4 feet
Coral Bells	midseason	shell pink	3 to 4 feet
Hershey Red	early	bright red	3 to 4 feet
Pink Pearl	early	soft pink with rose blotch	4 to 6 feet
Satsuki	**Approximate Bloom Date**	**Flower Color**	**Approximate Height**
Gumpo	late	white, pink	1 to 3 feet
Higasa	late	deep pink	1 to 3 feet
Amagasa	late	orange to red	2 to 3 feet
Macrantha	midseason	pink, orange, salmon	2 to 3 feet
Wakebishu	late	light pink	2 to 3 feet
Glenn Dale	**Approximate Bloom Date**	**Flower Color**	**Approximate Height**
Fashion	midseason	soft orange to rose	4 to 6 feet
Glacier	midseason	white	4 to 6 feet
Trouper	early	orange red	4 to 6 feet
Delaware Valley	early to midseason	pure white	4 to 6 feet
Rutherford	**Approximate Bloom Date**	**Flower Color**	**Approximate Height**
Red Ruffle	early	deep red	3 to 4 feet
Pink Ruffle	midseason	pink	4 to 6 feet
Robin Hill	**Approximate Bloom Date**	**Flower Color**	**Approximate Height**
Nancy	late	light purple to pink	2 to 3 feet
Conversation Piece	late	white, pink red	3 feet
Watchet	late	red	3 feet
Congo	late	vivid purple	3 to 4 feet
Girard	**Approximate Bloom Date**	**Flower Color**	**Approximate Height**
Rose	early	rose-red	2 to 3 feet
Renee Michelle	late	clear pink	2 to 3 feet
Pleasant White	mid- to late season	white	2 to 3 feet
Hot Shot	midseason	red	2 to 4 feet
Crimson	midseason	crimson	3 feet
Others	**Approximate Bloom Date**	**Flower Color**	**Approximate Height**
Hardy Gardenia	midseason	white	2 to 4 feet
Herbert	early	purple	3 to 4 feet
Midnight Flare	midseason	dark red	4 feet
Sunglow	midseason	purplish red	4 to 6 feet

Table 2. Repeat-bloom azalea varieties.

Encore Series Pinks	Bloom Form	Flower Color	Approximate Height
Autumn Coral	single	coral pink with fuchsia center	2.5 feet
Autumn Carnival	semi-double	medium pink	3 feet
Autumn Cheer	single	medium pink	3 feet
Autumn Princess	semi-double	salmon-pink	3 to 4 feet
Autumn Sundance	single	deep pink	3 to 4 feet
Autumn Debutante	single	light pink	4 feet
Autumn Empress	semi-double	medium pink	4 feet
Autumn Jewel	single	pink	4 feet
Autumn Rouge	semi-double	light pink	4 feet
Autumn Sweetheart	single to semi-double	soft pink	4 feet
Autumn Carnation	semi-double	medium pink	4 to 5 feet
Autumn Sangria	single	dark pink	4 to 5 feet
Encore Series Reds	**Bloom Form**	**Flower Color**	**Approximate Height**
Autumn Ruby	single	ruby red	2.5 feet
Autumn Bravo	single	red	3 feet
Autumn Embers	semi-double	deep red	3 feet
Autumn Sunset	semi-double	orange-red	4 feet
Autumn Monarch	semi-double	dark peach-orange	5 feet
Encore Series Purples	**Bloom Form**	**Flower Color**	**Approximate Height**
Autumn Lilac	single	lavender-violet	3 to 4 feet
Autumn Amethyst	single	dark lavender	4 feet
Autumn Royalty	single	dark purple	4 to 5 feet
Encore Series Whites	**Bloom Form**	**Flower Color**	**Approximate Height**
Autumn Ivory	single	white	2.5 feet
Autumn Angel	single	pure white	3 feet
Autumn Lily	single	white	4 to -5 feet
Autumn Moonlight	semi-double	white	5 feet
Encore Series Bi-colors	**Bloom Form**	**Flower Color**	**Approximate Height**
Autumn Chiffon	single	light pink with dark pink center	2.5 feet
Autumn Starlight	single	white with pink flecks	3 to 4 feet
Autumn Sunburst	single to semi-double	coral pink with white edges	3 to 4 feet
Autumn Twist	single	white with purple stripes	4 to 5 feet
Autumn Belle	semi-double	pale pink	5 feet
Re-Bloom Series	**Bloom Form**	**Flower Color**	**Approximate Height**
Cherry-Pink Prestige	double	cherry pink	1.5 feet
Blush Elegance	single	light pink	2 feet
Fuchsia Extravagance	single	fuchsia	2 feet
Pink Adoration	single	pink	2 feet
Purple Spectacular	single	purple	2 feet
Coral Amazement	triple	coral	2.5 feet
Firebrick Fame	single	red-orange	2.5 feet
Red Magnificance	double	red	3 feet
White Nobility	single	white	3 feet

Bloom-A-Thon Series	Bloom Form	Flower Color	Approximate Height
White	single	white	3 feet
Pink Double	double	pink	4 feet
Red	single	red	4 feet
Lavender	single	purple	4 feet

Publication 3705 (POD-10-24)

Revised by **Jeff Wilson**, PhD, Assistant Professor, North Mississippi Research and Extension Center, from an earlier edition by David Tatum, PhD, former Extension horticulturist.

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Espalier Shrubs and Trees

Technically speaking, an espalier (ess-PAL-yer) is a plant that has been trained to grow in only one plane. It has only two dimensions, height and width. It does not have the third dimension of depth that gives form to our shrubbery and trees. It is a two dimensional plant—a silhouette of a normal plant. It has been used in parts of Europe for centuries to grow fruit trees where land was scarce. With the development of dwarf fruit trees and their increased productivity for their size, few fruit trees are grown as an espalier today.

The main asset of an espalier plant in the landscape is that it provides large accent plants where space is minimal. The tracery effect of the limbs against a wall lets espalier plants add great accent in the landscape. As such, they should be used where accent is needed—at an entrance or focal area within the landscape. They are ideal choices for situations that require a tall plant but provide little space for diameter development.

Espalier plants should not be overused in the landscape. A small house would seldom use more than one. A large house would normally not require more than two.

Study the lines of your house and make note of any expanse of blank walls or fences. Choose a good location that will provide a good simple background for the espalier. Keep in mind that the larger and taller the espalier, the more pruning and training it will require. A well-managed espalier is a dramatic landscape accent, but a poorly-managed one is a landscape flaw.

Select a Design

The major effect of the espalier plant is in the tracery of the branches contrasted against a wall or fence. For this reason, you must think about the design to enhance the landscape.

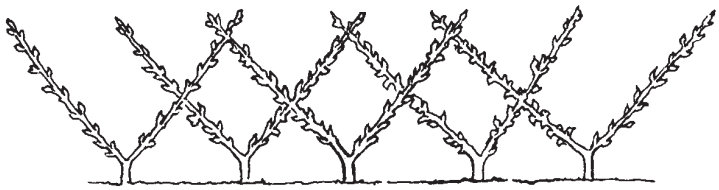
There are many designs. Some of the more common ones are candelabra, chevron, tiered, cordon, basket weave, pinnate, and palmate or fan-shaped (see the illustrations). The candelabra may be well suited for an espalier around a window. The cordon or basket weave may work well for fences.

Many designs may be difficult to create without a guide. You may wish to have a trellis or frame built in the shape of your design to help you place the limbs as you begin to train your plant. A trellis also provides support and gives you the espalier effect where the outside of a building is inappropriate, as with asbestos or aluminum siding.

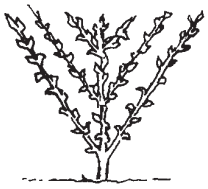
Desirable Characteristics

Age. Plants used for espalier should be young and supple. The limbs of these plants bend easily without breaking. Stiffly-grown young trees, unless they meet the design requirements, may need to be pruned to the ground and started all over again.

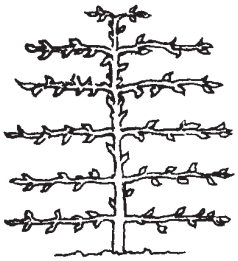
Flexibility. A shrub or tree that produces long, flexible branches is well suited for training as an espalier. Some of these are pyracantha, camellia, magnolia, and many of the fruit trees. Avoid plants with stiff branches such as dwarf yaupon or rotunda holly.



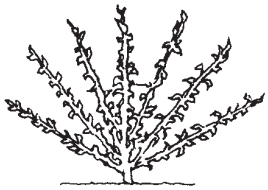
Basket Weave



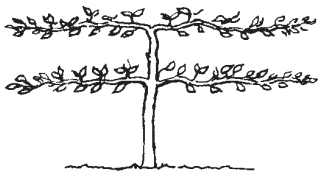
Chevron



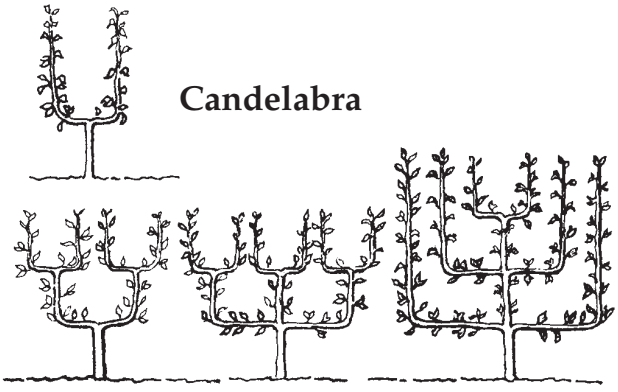
Tiered



Palmate



Cordon



Candelabra

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Height. Consider the mature height of a plant when selecting one for a particular location. Tall-growing plants such as magnolia are not suited for most one- and many two-story homes. Select a plant whose mature height closely matches the height of the area where it is to be espaliered.

Plant Your Espalier Plant

Follow normal planting practices. Make sure the soil reaction (pH) is suitable for the plant you are planting. Plants such as the camellias require acid soils.

Dig a hole at least twice as wide as the root ball of the plant. Make it about 6 inches deeper than the root ball. Make the hole as close to the wall or fence as possible. Back-fill the hole and set the plant into place. It is important that the final height of the root ball be the same as the surrounding soil.

Set the plant so the main trunk or limbs are about 6 inches from the wall. This will let air circulate, which is essential for good growth and sanitation. Fill the hole about two-thirds full with soil and then water thoroughly. Continue filling the hole. Use the remaining soil to form a saucer about the plant to aid in watering for the first year. Remember to mulch your espalier to reduce water stress and weed competition. Mulch also protects roots from heat in summer and cold in winter.

Train Your Espalier Plant

Bending the twigs and branches to meet your espalier design may be difficult, and you should do it when branches are tender. If the branches might break, you may have to wire each branch and gradually move it into place.

Spread the branches on your frame or trellis and attach them securely. Remove unwanted limbs, using a proper pruning cut made with a sharp, clean pruning tool.

Tie and fasten the limbs into place, using soft string, raffia, or bands of grafting rubber. You can also use strips cut from old inner tubes.

Make the tie loosely (if possible) so there is a small loop for the stem to grow. Wire is a poor choice of material to attach limbs during this training process because it may easily bind or girdle a limb. Even string tied tightly can constrict growth. Examine your ties frequently, and adjust the tension if you notice binding.

If you do not use a trellis or frame, position the limbs, and drive a nail at the desired position. Tie the branches to the nail, using materials as for a trellis. If the wall is brick or masonry, use masonry nails instead of conventional ones. Also available for attaching espalier limbs are vine supports. These are small metal disks with a wire loop. You glue the disk to the wall or fence where you want a limb. Once the glue has set, you move the limb into place, and the wire loop holds it there. These wall supports are available from garden centers and plant supply stores.

The distance between the limbs of your espalier varies with your chosen design and plant. Since the tracery of the limbs is the beauty of an espalier, space the limbs far enough apart to enhance this effect. Sixteen inches is considered to be the minimum distance between limbs. This distance permits full foliage on most limbs without losing the tracery effect.

Maintain Your Espalier Plant

Espalier shrubs and trees are not supposed to be trained once and forgotten. In addition to the normal maintenance chores of fertilizing, watering, and controlling insects and diseases, you need to train and prune espalier shrubs several times a year. Every few months as your plant grows, continue to bend and tie limbs to your trellis or wall as they grow. Remove unwanted sprouts. This additional training and pruning make espalier plants high-maintenance in the landscape.

Plants Suitable for Espalier

While it would be impossible to list all plants suitable for use as an espalier plant, here are some suitable ones:

Scientific Name	Common Name	Height in Feet
Abelia grandiflora	Abelia	6
Acer palmatum	Japanese Maple	10-20
Camellia japonica	Common Camellia	10-20
Camellia sasanqua	Sansanqua Camellia	10-20
Cotoneaster spp.	Cotoneaster	6-18
Euonymus alata	Winged Euonymus	9
Ficus carica	Common Fig	12-25
Forsythia spp.	Forsythia	3-9
Ilex cornuta "Burfordii"	Burford's Holly	9-15
Ilex opaca	American Holly	25-30
Ilex opaca hybrids	Hybrid American Holly	25-30
Magnolia soulangiana	Japanese Magnolia	25
Michelia figo	Banana Shrub	15-20
Malus spp.	Flowering and fruiting apples	15-25
Osmanthus fragrans	Sweet Olive	15-25
Photinia spp.	Red Tip Photinia	15
Poncirus trifoliata	Trifoliate Orange	15-30
Prunus persica	Peach	20
Pyracantha spp.	Pyracantha or Fire Thorn	6-18
Pyrus spp.	Flowering and fruiting pears	25-45

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SELECTING LANDSCAPE PLANTS



Choosing landscape plants can be confusing. Maybe this is because there are so many plants to choose from.

This publication will help you choose landscape plants. It is for Mississippi gardeners who are planning new landscapes or improving their existing landscapes. It lists many kinds of plants that grow well in Mississippi.

If you need further help in choosing landscape plants, contact your county Extension Service. Your county agent or home economist will be happy to talk with you.

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Selecting Landscape Plants

Selecting the right plant is a very important step in establishing your landscape. Selecting the improper plant can increase your maintenance chores through excessive pruning, extra watering, and additional spraying to control insects and diseases. Selecting the right plant can reduce these chores and increase the time you have to enjoy your landscape.

This publication includes a list of plants commonly used in the landscape. Just as an architect uses building material lists in designing a building, you should use a plant materials list in planning your landscape. If the architect selects the wrong building materials, his building will be less functional. If you select the wrong plant materials, your landscape will be less functional, too.

When you choose a plant for your landscape, there are many things to consider. First, you should know something about the physical features of the plant, such as its size, shape, and whether or not it will have foliage all year long. Next, you must know if the plant is hardy for your area of the state. You will also need to know if the plant will grow where you want to plant it. Is your soil's acidity level adequate for the plant you are considering? Will the light levels be right? Finally, you must consider how you want to use the plant. For example, do you need a shade tree or do you need a plant to grow beneath low windows? Let's look at these factors more closely.

Physical Features

Size

Plants come in many sizes. We may choose from plants that are as small as 6 to 8 inches tall, shrubs of many sizes, or trees that reach great heights. (See Figure 1.)

When you purchase a plant, it usually has not reached its mature size. A common mistake many homeowners make is placing their plants too close together; another is selecting plants that will grow too tall for their chosen locations.

It is important to know what size plant you need for your landscape planting. Select plants from the selection guide listing your desired plant height. Some parts of this selection guide list plants according to their height. It begins with Ground Covers, Lawn Substitutes, Ferns, and Low Shrubs (plants up to 3 feet tall). It then lists Small (3′-5′), Medium (5′-8′), and Large (8′-12′) Shrubs. It continues with Large Shrubs and Small Trees (12′-20′), Medium (20′-40′), and Large (over 40′) Trees. These height categories are the averages of mature heights for the plants listed. The listing continues with Vines, Palms, Annuals, Tender Perennials, and Bulbs; Plants for Wildlife and Birds; and ends with Plants for the Home Orchard.

Plants grow at various rates. Many people want to use fast-growing plants because they make their greatest contribution to the landscape in a short time. Comments are made about the growth rate of many plants in the "Notes and Comments" section of the guide.

A plant's growth rate is partly controlled by its genetics. Plant growth is also controlled by how you plant it and how well you care for it after planting. Plants grow faster when you give them proper care.

A suggested planting distance is also listed to help you avoid placing your plants too close together. The guide also gives some suggested landscape uses for each plant on the list.

Shape

Plants come in many shapes. Some are tall and thin; others are short and rounded. Still others are very low and spreading. There are many words to describe a plant's shape. The following drawings will help show the various shapes and forms of landscape plants. (See Figure 2.)

Color

When we talk about plant color, we usually think green. That's natural since most plants have leaves that are green. However, there are many shades of green for foliages, from the grayish greens of some junipers to the dark greens of many hollies. Some plants have leaves with splotches of white, cream, or gold. Leaves of some plants will change color as the seasons change, adding bursts of yellows, reds, and oranges.

Many plants have flowers that add color to our landscape. Plants often used for their flower color include azaleas, camellias, forsythia, hydrangeas, spireas, roses, and crape myrtles.

Color may also be a characteristic of the fruit. Hollies have red or black berries. American beautyberry has bright purple fruit.

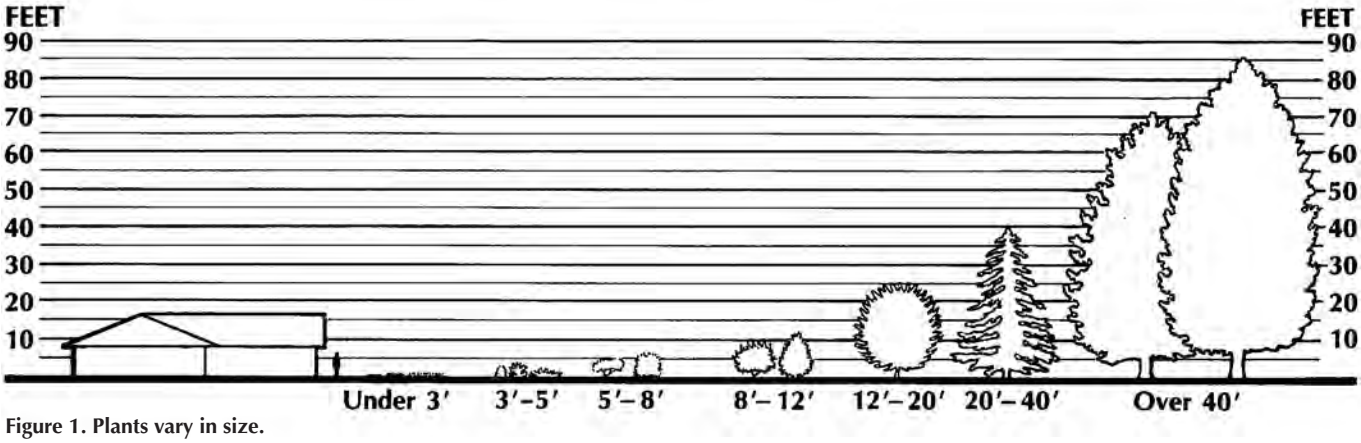


Figure 1. Plants vary in size.

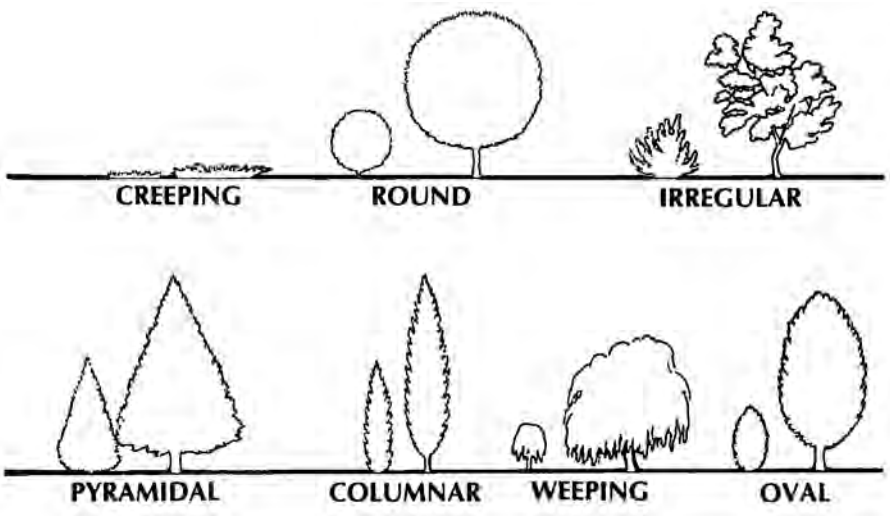


Figure 2. Plants vary in shape.

When you consider color in your landscape, don't limit yourself to the foliage. Consider fruit, flower, and seasonal foliage colors as well.

Plant Usage

When choosing landscape plants, you must know how you want to use these plants in the landscape design. The descriptions and drawings here illustrate the many uses of landscape plants.

Foundation Plants

Foundation plants are usually evergreen. This means they never lose their leaves. Their sizes vary from 6 to 8 inches up to 6 to 8 feet in height. They should be larger for two-story homes so that they blend with the scale. (See Figure 3.)

Use foundation plants in a pleasing design in and around the base or foundation of your home. They should accent the entrance, complement the architectural style of the house, and give a feeling of unity between the house and the property. They should also be hardy and require minimum maintenance.

Accent Plants

Use accent plants to attract the eye and to create an interesting focal point. They usually have strong physical characteristics. They may have attractive foliage, fruit, and flowers, or they may have an interesting shape. (See Figure 4.)

Hedge, Screen, and Background Plants

Hedge, screen, and background plants are usually medium or large shrubs, or trees. Use them to surround an outdoor area and create privacy. You can also use them to hide unsightly views or to separate areas, such as a driveway from a patio. (See Figure 5.) As a result, they sometimes create a background that gives a sense of an outdoor wall.

Evergreen trees and shrubs make excellent wind screens to protect you and your home from harsh winter winds. The leaves of many evergreen trees and shrubs also absorb sound and muffle noise. A screen planting can make your landscape a quieter place.

Shade

One of the many uses of trees is to create shade. Shade trees reduce summer heat, making outdoor living more pleasant. In addition, a shaded roof and walls mean lower cooling costs. (See Figure 6.)

Shade trees can be deciduous. This means they lose their leaves during the winter, letting the sun shine through the branches to warm your home and outdoor areas during cold weather.

Ground Covers and Lawn Substitutes

Use ground covers where grass will not grow, such as in the dense shade of tree canopies or where grass would be difficult or unsafe to mow, such as steep banks. Ground covers can be deciduous or evergreen. Usually they grow to a height of less than 18 inches. When fully established, most ground covers require little maintenance. (See Figure 7.)

Ground cover plants need careful attention during establishment. Proper watering, weeding, and mulching are especially important.

Container Plants for Patio or Planter

If you have a planter designed into your patio or entrance, you may want to select those plants listed for this use. These plants can tolerate a confined root system and limited water conditions. (See Figure 8.)

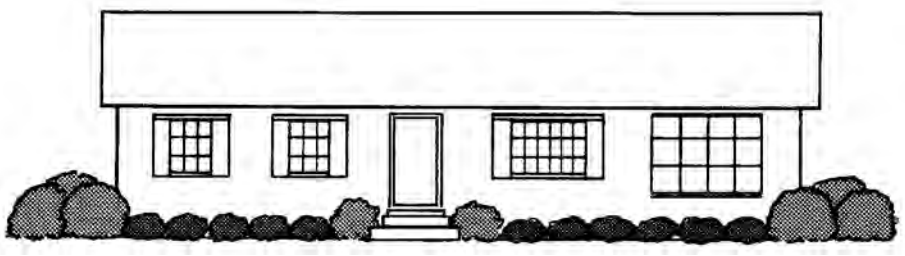


Figure 3. Foundation plants should be very hardy and require little maintenance.



Figure 4. Accent plants are used to attract the eye and create an interesting focal point.

Border and Edging

You may wish to define the limits of your planting area by adding a border or edging plants. Because these plants are low growing and usually evergreen, plant them along the border or edge of the planting bed to give definition and form. When used to hide the legginess of taller plants, they are called facer plants.

Specimen

A specimen plant is usually planted alone for its distinct characteristics. It may be a flowering tree or shrub that you can use for accent or focal purposes.

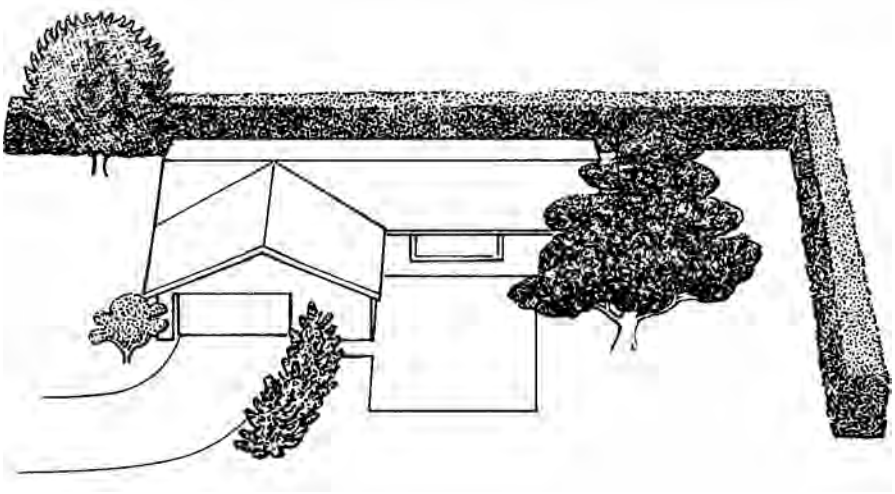


Figure 5. Screen and background plants provide privacy and transform an outdoor space into an outdoor living area.

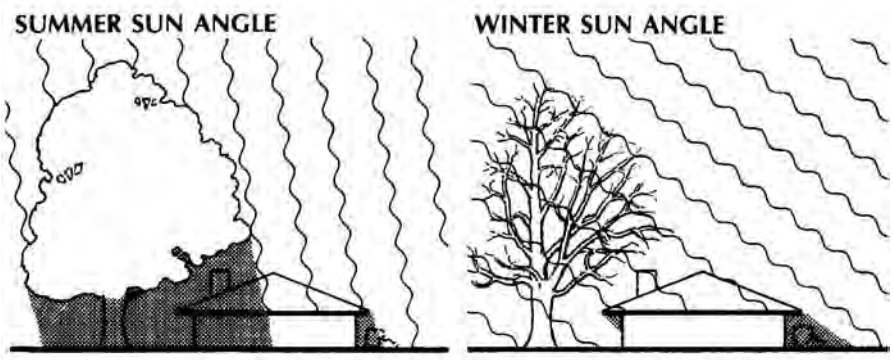


Figure 6. Deciduous shade trees provide shade in summer but lose their leaves in winter to allow winter sun to warm the house.

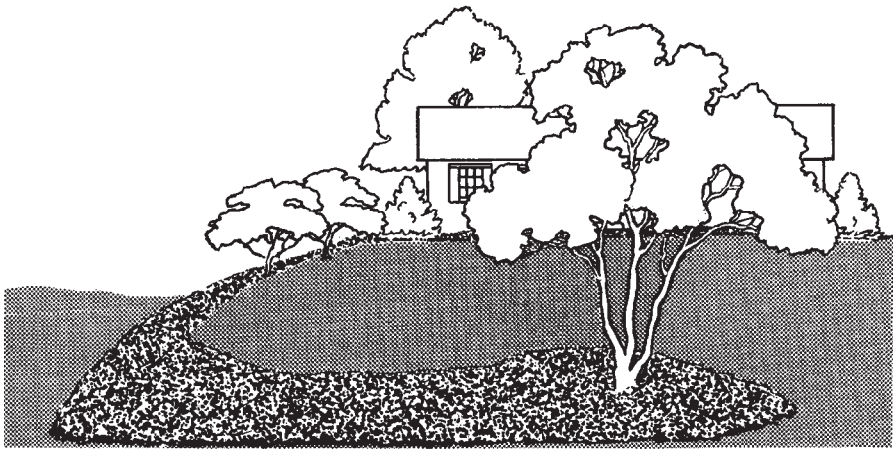


Figure 7. Ground covers are used where grass will not grow or where it will be difficult or unsafe to mow.

Wind and Sound Barrier

Plants of this type are usually evergreen and grow very thickly. Plant wind barriers on the northwest side of your home to slow the chilling winds of winter. When planted along the sides of noisy streets, they reduce traffic sounds.

Walls and Fences

Often plants are placed at the base of walls or fences to grow on them. These plants climb by aerial roots, such as ivy, or are trained to grow against the wall as an espalier. (For more information on espaliered plants, request a copy of Espaliered Trees and Shrubs, Publication 456, from your county Extension office.) Plants used in this way soften the stark appearance of a blank wall or featureless fence.

Trellis

Plants are often trained to grow on trellises to cast shade on patios. They are also grown on trellises to make harvesting their fruit easier, such as muscadine vines in the home orchard. Many times fruiting vines grown on trellises serve a dual purpose, both shade and fruit.

Home Orchard

Many homeowners enjoy growing plants for their edible fruit. When a fruiting plant may also serve another function in the landscape, it is included in these listings. Strawberries make an excellent ground cover; blueberries make a nice hedge or border planting; edible pears and apples have attractive spring flowers. In addition to including these plants with other landscape plants, a special listing entitled "Home Orchard" is included. In this listing, possible landscape uses are given for the various fruiting plants. For more information on the specific care of fruiting plants, ask your county Extension office for information sheets or booklets about the specific fruit you wish to grow.

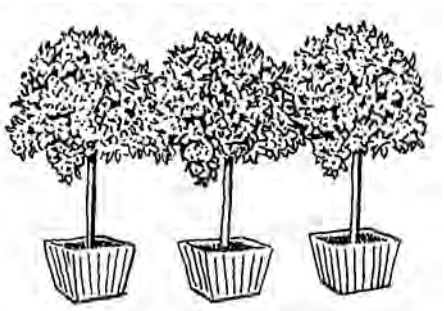


Figure 8. Container plants for patio.

Adaptability

Landscape plants need specific environments for best growth. When choosing a hardy landscape plant, consider three questions: (1) Will the plant withstand winter temperatures in your county? (2) Will it grow in the type of soil you have? and (3) Will the plant withstand the light conditions (sun, part sun, or shade) in the area where you will be planting it?

Climate Zones

The United States Department of Agriculture (USDA) has categorized the climates of the United States, Canada, and Mexico into numbered zones based on average low winter temperatures. The zone numbers range from 1 to 11. The average low winter temperatures for Zone 1 (areas in northern Canada and northward) is -50 °F or below, while the average winter low temperature for Zone 11 (areas in Hawaii and parts of southern Mexico) is 40 °F and above. Each decrease in a zone number means the average low winter temperature is 10 °F colder.

With more refined weather data, each hardiness zone has been subdivided into two additional zones, "a" and "b." Subzone a is 5 degrees colder than subzone b.

The map of Mississippi in Figure 9 shows the USDA plant hardiness zones for Mississippi. All of Mississippi is within Plant Hardiness Zones 7 and 8. Zone 7a represents the areas of the state that have average winter lows of between 0 and 5 °F. Zone 8b represents the areas of the state that have average lows of between 15 and 20 °F.

Find your county and determine which hardiness zone you live in. The plant selection guide lists the plant hardiness zone for each plant. To insure that your landscape plants will withstand your winter temperatures, select only those plants with zone ratings equal to or smaller than your climate zone. The Notes and Com- ments section indicate if a plant is especially well suited for use in a particular zone.

REMEMBER that a plant hardiness rating does not guarantee a plant's ability to grow or flower well in an area. For instance, lilac is hardy to zone 3, extreme northern areas of the U.S. The Notes and Comments section for lilac indicate that it is marginally recommended for zone 7b and not recommended for zone 8 and southward. This is because these areas do not receive enough cold weather to promote flowering for lilac plants.

Plants suited for drier areas of the U.S. may withstand the winter temperatures here but not grow well because of diseases associated with our higher humidity. A plant's hardiness zone rating ONLY indicates its ability to withstand a certain winter low temperature.

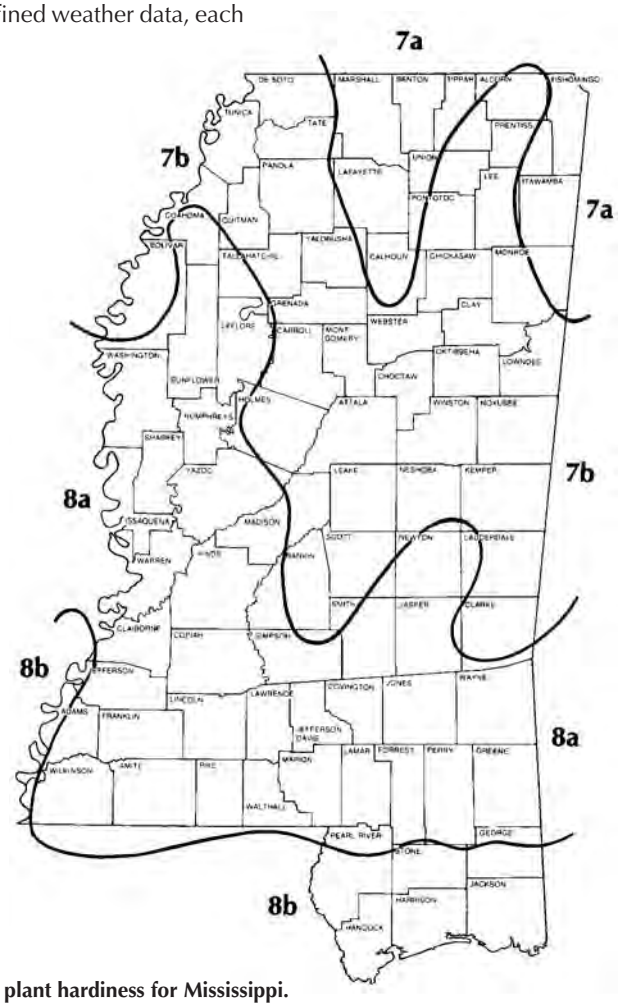


Figure 9. Zones of plant hardiness for Mississippi.

Soils

Many landscape plants have specific soil requirements. Some plants grow best in acid soils; others require slightly acid to neutral soils. A soil test by your Extension Service will tell you the acidity level of your soil and the levels of some plant nutrients. Recommendations are made to correct any nutrient deficiencies that your soil may have.

Some plants may tolerate very wet or very dry soils. However, most plants and trees grow best in well-drained soils. It is important that you know what type of soil you have and how well it drains.

A simple test for drainage is to dig a hole about a foot deep. Fill the hole with water. When the water has all soaked into the soil, refill the hole. Check the hole again about 10 hours later. If any water remains in the hole, you must take steps to improve the drainage. You can improve drainage by raising the planting level or by installing a special drainage system for the planting area.

Poor drainage and soggy soils are not always ideal growing conditions. Comments on soil requirements or tolerances have been made for many of the plants in the selection guide.

Light Requirements — Sun, Part Sun, or Shade

Plants need light to grow. Some plants require full sun all day. Others may need part shade, usually in the hot afternoon. Still others grow better in filtered shade of tree canopies.

It is important that you know the light conditions of the different areas where you will be placing plants. Choose plants that grow well in those light conditions. It is frustrating to purchase a plant, put it into the landscape, and watch it die because it received too much sun. It is also frustrating to have a plant grow weak

and spindly because it did not receive enough sunshine. Light requirements are given for many of the plants listed in the selection guide.

What To Look for When Buying Plants

A trip to the local nursery or garden center can be an exciting experience. You will see many kinds of plants, often displayed so that it is easy for you to imagine them in your own landscape.

Some plants are in containers of various sizes. Others have their roots with attached soil wrapped in burlap. We call these plants "balled and burlapped" or simply "B and B." Still others are packaged with the roots in boxes, paper, or foil wrapping. These are often called "bare-rooted" plants. Many fruit trees and roses are sold this way. (See Figure 10.)

Regardless of how the nursery packages and displays their plants, you should always shop for quality. Good quality plants have strong branches. If the plants are not deciduous, the leaves should be of normal color, size, and shape for the plant you are purchasing.

Avoid "root-bound" plants. (See Figure 11.) Root-bound plants have roots that have become too large or too plentiful for the containers they are growing in. Usually you can see roots growing out of the drainage holes of the container.

Provide Temporary Protection for Plants Until Planting

Have your soil area prepared for planting before buying your plants. If you have to buy the plants before preparing the soil, protect the plants until planting time. (See Figure 12.)

The most important thing is to protect the plants from drying. Place the plants in an area that is partially shaded and protected from drying winds. Most nursery plants dry out rapidly. Look at them each day and water as needed.

If it will be more than three or four days before you can plant these plants, provide additional protection for the roots. Group the plants close together and mulch the root areas with compost, pine straw, or sawdust to keep the roots moist until planting.

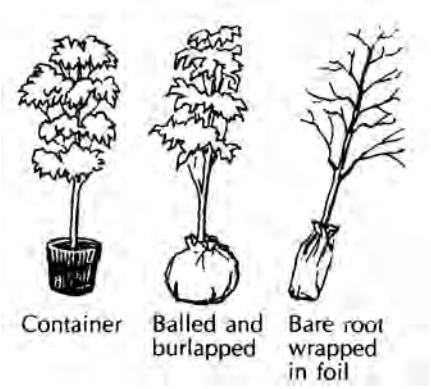


Figure 10. Plants are sold in various packages.



Figure 11. Avoid root-bound plants.

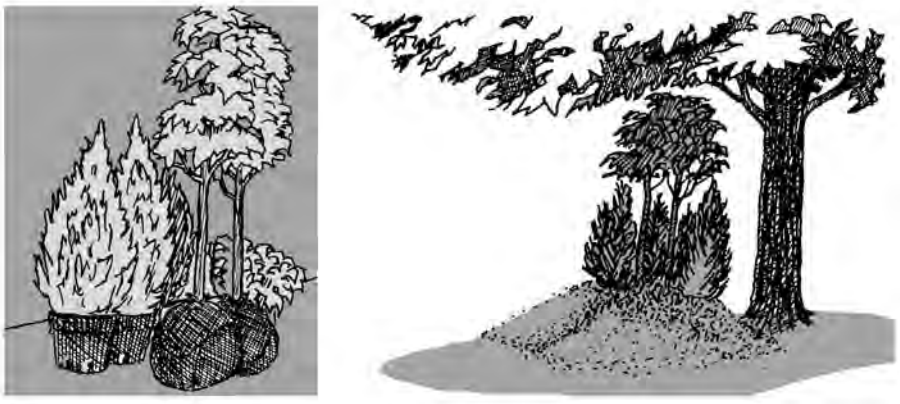


Figure 12. Protect plants before planting by shading them and mulching the roots in sawdust or other suitable material.

How To Use This Guide

In the following guide, some abbreviations are used. Under column heading "Type," these abbreviations are used:

A ..... Annual
b..... Bulb
B ..... Broad-Leaved Evergreen
D.....Deciduous
F.....Fern
G.....Grass
N.....Narrow-Leaved Evergreen
P.....Palm
S.....Semi-Evergreen
T.....Tender Perennial
V ..... Vine

Under column heading "Landscape Uses," these abbreviations are used:

Acent.....Accent or Specimen Plant
Bordr ..... Border/Edging Plant
GCovr ..... Ground Cover
Found..... Foundation Plant
Hedge ..... Hedge Plant
HOrch..... Home Orchard
Patio ..... Patio/Container Plant
Scren ..... Screen Plant
Shade .....Shade Tree
Walls.....Plant used to grow on walls
WindB.....Wind or Sound Barrier
Trels .....Plant used on trellises

When using this guide, do not think in terms of special plants. The following steps will help you make the right choice:

1. Think in terms of what you want the plant to contribute to your landscape.

2. List the characteristics the plant must have to meet your expectations — how will you use the plant, how tall must it be, what features you want the plant to have, such as flowers, berries, etc.

3. List the conditions under which the plant will grow, such as amount of light, soil type, soil drainage, etc.

4. Go to the section of the selection guide for the height you have chosen for your plant. Eliminate all plants in this list that do not meet your light conditions and those recommended for warmer plant zones.

5. With the remaining plants, eliminate those with pH ranges that do not include your soil's pH level.

6. From the remaining plants, mark those that meet your desired landscape use. Then read the Notes and Comments section. This may eliminate another plant or two.

7. Make a list of your possible choices. Take this list to your garden center or nursery and see the actual plants you can select from. Talk with the nurseryman and learn from his experience and knowledge about the plants you are considering. He may know of other plants that will thrive in your landscape that are not in this selection guide.

8. Now you are ready to make an informed decision about which plants you want to place into your landscape.

Ground Covers, Lawn Substitutes, Ferns, and Low Shrubs

Average mature height less than 3 feet

Type Codes:
B = Broad-leaved Evergreen
D = Deciduous
F = Fern
N = Narrow-leaved Evergreen
S = Semi-Evergreen

COMMON NAME SCIENTIFIC NAME	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Bordr	LANDSCAPE USES: GCovr	LANDSCAPE USES: Accent	Spacing	NOTES AND COMMENTS
American Maidenhair Fern *Adiatum pedatum*	F	3			X	5.6 - 6.5	X	X	X		.75′ - 1.5′	Prefers a moist shady location. Growth rate is medium.
Carpet Bugle *Ajuga reptans*	B	4			X	5.0 - 6.5			X		.5′ - 1′	Cannot withstand pedestrian traffic. Not competitive against weeds. Use generous amounts of organic matter and sand in bed to insure drainage. ‘Alba’ has white flowers; ‘Atropur-purea’ has blue flowers and bronzy-purple foliage; ‘Rubra’ has purple foliage; ‘Variegata’ has cream and white variegated foliage. Growth rate is medium.
Coral Ardisia *Ardisia crispa*	B	9		X	X	5.0 - 7.0	X	X		X	1′ - 2′	Tender – needs protection. Reseeds itself freely where adequate mulch is provided. Will not tolerate full sun. Growth rate is medium slow.
Japanese Ardisia *Ardisia japonica*	B	8		X	X	5.5 - 7.0		X	X	X	.5′ - 1′	Susceptible to leaf burn in full sun and leaf spot in hot, humid weather. Needs 3-4 inches of mulch for good growth. Growth rate is medium slow.
Cast-Iron Plant *Aspidistra elatior*	B	8		X	X	5.5 - 7.0	X	X	X		2′ - 2.5′	Leaves burn in full sun. Foliage may become dirty but washed by rain. Established plantings require regular thinning. Tolerates adverse conditions. Growth rate is medium.
Variegated Cast-Iron Plant *Aspidistra elatior variegata*	B	8		X	X	5.5 - 7.0	X	X	X		2′ - 2.5′	See Cast-Iron Plant. Growth rate is medium.
Lady Fern *Athyrium filex feminia*	F	3		X	X	5.5 - 6.5	X	X	X		2′ - 2.5′	Large, vigorous, and very showy. Prefers moist, shady locations. Fronds are bright yellow green. Growth rate is medium fast.
Crimson Pygmy Japanese Barberry *Berberis thunbergii* *‘Crimson Pygmy’*	D	4	X			6.0 - 8.0		X		X	2′ - 3′	Growth rate is medium.
Rattlesnake Fern *Botrychium virginianum*	F	3		X	X	5.5 - 6.5		X	X		.5′ - 1′	Fronds are triangular. Tolerates part sun but needs moist, humus soils. Growth rate is medium fast.
Korean Boxwood *Buxus microphylla koreana*	B	5	X	X		6.0 - 7.5		X			1′- 2′	Very small and compact. Growth rate is medium.
Crown Vetch *Coronilla varia*	B	3	X	X	X	5.0 - 7.0			X		1′ - 2′	Tolerates shade. Best in full sun. May become invasive. Excellent for soil erosion. May not do well in Zones 8a and 8b. Growth rate is fast.
Creeping Cotoneaster *Cotoneaster adpressa*	B	4	X	X		6.0 - 7.0		X	X		2′ - 3′	One of the slower growing dwarf cotoneasters. Growth rate is medium.
Bearberry Cotoneaster *Cotoneaster dammeri*	B	4	X			6.0 - 7.0			X		3′ - 4′	One of the best ground covers for moist soils. Frequently roots along the stems. Growth rate is medium.

Ground Covers, Lawn Substitutes, Ferns, and Low Shrubs

Average mature height less than 3 feet

Type Codes:
B = Broad-leaved Evergreen
D = Deciduous
F = Fern
N = Narrow-leaved Evergreen
S = Semi-Evergreen

COMMON NAME SCIENTIFIC NAME	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Bordr	LANDSCAPE USES: GCovr	LANDSCAPE USES: Accent	Spacing	NOTES AND COMMENTS
Hollyleaf Fern *Cyrtomium falcatum*	F	8		X	X	6.0 - 7.0		X	X	X	1′ - 2′	Not fully hardy with severe winters but rarely killed. Full sun will scorch the fronds. Tolerant of salt spray. Remove brown fronds yearly. Growth rate is medium fast.
Hayscented Fern *Dennstaedita punctilobula*	F	3		X	X	5.5 - 6.5	X	X	X	X	2′ - 2.5′	Very strong; large growing fern. Takes part sun. A handsome plant. Growth rate is medium.
Male Fern *Dryopteris filix-mas*	F	3		X	X	.5 - 6.5		X	X		.5′ - 1′	A fine textured lacy fern. Prefers moist, shady locations. Growth rate is medium.
Goldie Fern *Dryopteris goldiana*	F	3		X	X	5.5 - 5.6	X	X		X	2′ - 2.5′	Large and easy to grow. Prefers shade to part sun and a well drained rich humus soil. Growth rate is medium.
Leather Wood Fern *Dryopteris marginalis*	F	3			X	5.5 - 6.5	X	X	X		2′ - 2.5′	A beautiful, large fern with dark green fronds. Good for floral decorations. Prefers moist and humus soil in a shady location. Growth rate is medium.
New York Fern *Dryopteris novaboracensis*	F	3			X	5.5 - 6.5			X		1′- 2′	A clump-forming woodland fern. Prefers drier soils than other ferns but must be shady. Good to use under trees such as oaks and maples where soil may be drier. Growth rate is medium.
Spinulose Fern *Dryopteris spinulosa*	F	3		X	X	5.5 - 6.5		X			.5′ - 1′	Very lacy, rich green fronds triangular in shape with many tiny leaflets. Growth rate is medium.
Purple Wintercreeper Euonymus *Euonymus fortunei* 'Coloratus'	B	4	X	X		6.0 - 8.0			X		3′ - 5′	A good ground cover with few fruits. Growth rate is medium fast.
Silveredge Wintercreeper Euonymus *Euonymus fortunei* 'Silveredge'	B	5	X	X		6.0 - 8.0		X	X		3′ - 4′	Best variegation in part sun. Growth rate is medium fast.
Dwarf Gardenia *Gardenia radicans*	B	8	X	X	X	5.5 - 6.0	X	X	X		1′ - 2′	Has a larger number of pests. Chlorosis common problem due to lack of iron. Sensitive to poor drainage and heavy soils. Growth rate is medium.
Algerian Ivy *Hedera canariensis*	B	8			X	6.0 - 8.0			X		.75′ - 1.5′	More susceptible to fungus attacks than English Ivy. Will die in severe winters. Mature leaves less lobed. Many selections available. Growth rate is medium.
English Ivy *Hedera helix*	B	5		X	X	6.0-8.0			X		1′ - 2′	Slow to spread for first couple of years. Will tolerate more sun if well watered. Susceptible to root rots. Fruit on old plants only. Growth rate is medium.
Christmas Rose *Helleborus nigra*	B	3	X			6.0 - 7.0		X	X	X	.5′ - 1′	Leaves and roots are poisonous. Plant juice may cause dermatitis. Planted for its winter flowers. Growth rate is medium.

Ground Covers, Lawn Substitutes, Ferns, and Low Shrubs

Average mature height less than 3 feet COMMON NAME SCIENTIFIC NAME	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Bordr	LANDSCAPE USES: GCovr	LANDSCAPE USES: Accent	Spacing	Type Codes: B = Broad-leaved Evergreen D = Deciduous F = Fern N = Narrow-leaved Evergreen S = Semi-Evergreen NOTES AND COMMENTS
Hosta *Hosta species*	B	5			X	5.5 - 7.0		X	X	X	.5′ - 1′	Best in cool shady locations. Many leaf forms and leaf colors available. Growth rate is medium.
Aaronsbeard St. John's Wort *Hypericum calycinum*	B	6		X		6.0 - 8.0		X	X		1′- 2′	Not hardy north of New York. Flowers throughout summer. Can be cut to ground when needed. Growth rate is medium fast.
Evergreen Candytuft *Iberis sempervirens*	B	3	X	X		6.0 - 7.0		X	X	X	.5′ - 1′	Sporadic growth in poorly drained soils. Fertilize in late winter and early spring every three weeks to encourage better growth and flowering. Growth rate is fast.
Heller Japanese Holly *Ilex crenata* 'Helleri'	B	6		X		5.0 - 6.5	X	X	X	X	2′ - 3′	Difficult to transplant. Fruit occurs on new wood. Responds to shearing. Growth rate is medium.
San Jose Juniper *Juniperus chinensis* 'San Jose'	N	5	X			6.0 - 8.0		X	X		4′ - 6′	Branches lie flat on the ground. Exhibits both juvenile and mature needles. Has been a popular prostrate juniper for many years. Growth rate is medium fast.
Shore Juniper *Juniperus conferta*	N	5	X			6.0 - 8.0		X	X		3′ - 4′	Excellent ground cover for large areas. One of the few junipers that can withstand salt spray. Tolerates hot, dry locations. Needles do not darken in winter. Growth rate is medium fast.
Blue Pacific Shore Juniper *Juniperus conferta* 'Blue Pacific'	N	5	X			5.0 - 7.0		X	X	X	3′ - 4′	One of the most popular cultivars of shore juniper. Growth rate is medium fast.
Bar Harbor Juniper *Juniperus horizontalis* 'Bar Harbor'	N	4	X			5.0 - 7.0		X	X		5′ - 8′	Excellent ground cover for large areas. Needles turn purplish after first frost. Growth rate is medium fast.
Blue Rug Juniper *Juniperus horizontalis* 'Blue Rug'	N	4	X			5.0 - 7.0		X	X	X	3′ - 5′	Also known as Juniperus horizontalis 'Wiltoni,' Wilton's Carpet Juniper. One of the better low-trailing junipers. Literally makes a living carpet. Growth rate is medium fast.
Waukegan Juniper *Juniperus horizontalis* 'Douglasi'	N	4	X			5.5 - 7.0		X	X		5′ - 8′	Steel blue foliage turning purplish with first frost. May spread up to 10 feet. Growth rate is medium fast.
Emerald Isle Juniper *Juniperus horizontalis* 'Emerald Isle'	N	4	X			5.5 - 7.0		X	X		3′ - 5′	Growth rate is medium fast.
Compact Andorra Creeping Juniper *Juniperus horizontalis* 'Plumosa Compacta'	N	4	X			5.5 - 7.0		X	X		2′ - 3′	Needles green during summer and purplish after frost. Smaller and more compact than regular Andorra creeping juniper. Growth rate is medium fast.

Ground Covers, Lawn Substitutes, Ferns, and Low Shrubs

Average mature height less than 3 feet COMMON NAME SCIENTIFIC NAME	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Bordr	LANDSCAPE USES: GCovr	LANDSCAPE USES: Accent	Spacing	Type Codes: B = Broad-leaved Evergreen, D = Deciduous, F = Fern, N = Narrow-leaved Evergreen, S = Semi-Evergreen NOTES AND COMMENTS
Andorra Creeping Juniper *Juniperus horizontalis* 'Plumosa'	N	4	X			5.0 - 6.0		X	X		3′ - 4′	Foliage turns purple after first frost. Tips of branches erect, giving plant a more rigid appearance. Growth rate is medium fast.
Variegated Prostrate Garden Juniper *Juniperus horizontalis* 'Variegata'	N	4	X			5.0 - 7.0		X	X	X	3′ - 5′	Needles dark green with yellow and creamy white blotches. Coarse stiff branches. Dense growth habit. Growth rate is medium.
Japanese Garden Juniper *Juniperus procumbens*	N	4	X			5.0 - 7.0		X	X		5′ - 8′	Coarse stiff branches. Dense growth habit. Growth rate is medium fast.
Variegated Japanese Garden Juniper *Juniperus procumbens* 'Variegata'	N	4	X			5.0 - 7.0		X	X		5′ - 8′	See Japanese Garden Juniper. This form has blue green foliage with creamy white blotches. Growth rate is medium.
Broadmoor Juniper *Juniperus sabina* 'Broadmoor'	N	7	X			6.0 - 7.0		X	X		2′ - 3′	Excellent juniper ground cover for large areas. Growth rate is medium.
Tamarix Juniper *Juniperus sabina* 'Tamariscifolia'	N	7	X			6.0 - 7.0		X	X		3′ - 4′	Excellent juniper for ground cover for large areas. Sensitive to poorly drained soils. Growth rate is medium.
Big Blue Liriope *Liriope muscari*	B	7	X	X	X	5.5 - 6.8		X	X		.5′ - 1′	Forms clumps. For uniform ground cover, plant small plants more closely than recommendations. Cut away all foliage in spring before new growth to keep beds neat. Flowers reduced in deep shade. Growth rate is medium.
Variegated Big Blue Liriope *Liriope muscari* 'Variegata'	B	7	X	X	X	5.5 - 6.8		X	X	X	.5′ - 1′	See Big Blue Liriope. Does best and has best leaf color in full sun. Leaves green with creamy white stripes. Growth rate is medium.
Monkey Grass *Liriope spicata*	B	4	X	X	X	5.5 - 6.8		X	X		.5′ - 1′	Foliage more narrow than Big Blue Liriope. Highly competitive. May be difficult to contain in some areas. Flowers are light lilac to almost white. Growth rate is medium.
Moneywort *Lysimachia nummularia*	S	6		X	X	5.5 - 7.0		X	X		.5′ - 1′	Not a well known ground cover but worthy of more use. Frequently used in terrariums. Sometimes called Creeping Charlie. Effective along edges of pools where foliage can cascade into water. Growth rate is fast.
Golden Moneywort *Lysimachia nummularia* 'Aurea'	S	6	X	X		5.5 - 7.0			X	X	.5′ - 1′	See Moneywort. Growth rate is fast.
Zebra, Cemetery, or Ribbon Grass *Miscanthus sinensis* 'Zebrinus'	G	5	X			5.5 - 6.5	X	X		X	.75′ - 1.5′	Herbaceous grass. Not fully hardy but usually returns from roots in spring. Form similar to Pampas Grass but much smaller. Cut foliage to ground after first frost. Tolerant of most soils. Growth rate is fast.

Ground Covers, Lawn Substitutes, Ferns, and Low Shrubs

Average mature height less than 3 feet

Type Codes:
B = Broad-leaved Evergreen
D = Deciduous
F = Fern
N = Narrow-leaved Evergreen
S = Semi-Evergreen

COMMON NAME SCIENTIFIC NAME	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Bordr	LANDSCAPE USES: GCovr	LANDSCAPE USES: Accent	Spacing	NOTES AND COMMENTS
Compact Nandina *Nandina domestica* 'Compacta'	B	7	X	X		5.5 - 7.0		X	X	X	1′ - 2′	Low growing dense form of regular nandina. Fine bright green, lacy foliage on erect stems. Foliage turns very red in fall and winter.
Harbour Dwarf Nandina *Nandina domestica* 'Harbour Dwarf'	B	7	X	X		5.5 - 7.0		X	X	X	1′ - 2′	Low growing dense form of common nandina. Growth rate is medium fast.
Dwarf Nandina *Nandina domestica* 'Nana'	B	7	X	X		5.5 - 7.0		X	X		.75′ - 1.5′	Smaller than compact nandina . Growth rate is medium slow.
Dwarf Nandina *Nandina domestica* 'Purpurea Nana'	B	7	X	X		5.5 - 7.0		X	X		.75′ - 1.5′	Similar to dwarf nandina but foliage has purple green color. Growth rate is medium slow.
Boston Fern *Nephrolepis exaltata bostoniensis*	F	9	X	X	X	5.0 - 6.5	X		X		1′ - 2′	Evergreen with protection in Zone 10. Partial evergreen with protection in Zone 9. Foliage is often burned by hot dry winds in summer and fall. Growth rate is medium fast.
Mondo Grass *Ophiopogon japonicus*	B	7		X	X	5.5 - 7.0		X	X		.5′ - 1′	Not recommended for full sun when grown as a ground cover. Incorporate large amounts of organic matter at planting time. May be mowed yearly to keep foliage neat. Best as groundcover in dense shade. Not recommended to be interplanted with bulbs because of dense growth mat. Growth rate is fast.
Interrupted Fern *Osmunda claytoniana*	F	3		X	X	5.5 - 6.5	X		X	X	1′- 2′	Very bold and upright fern with yellow-green foliage. Fronds may reach 3 feet in height. Prefers moist soils and shade. Growth rate is medium.
Japanese Pachysandra *Pachysandra terminalis*	B	5	X	X		4.5 - 5.5		X	X		.5′ - 1′	Does best in zones 7b and 8a. Not recommended for coastal area except in shade. Turns yellow in full sun. Cannot withstand foot traffic. Growth rate is medium slow.
Variegated Japanese Pachysandra *Pachysandra terminalis* 'Variegata'	B	5	X	X		4.5 - 5.5		X	X		.5′ - 1′	See Japanese Pachysandra. Growth rate is medium slow.
Christmas Fern *Polystichum acrostichoides*	F	3			X	5.5 - 6.5	X	X	X		.75′ - 1.5′	Very good fern for mass plantings in shade. Excellent cut foliage for flower arrangements. Growth rate is medium.
Potentilla or cinquefoil *Potentilla tabernaemontana*	B	4	X	X		5.0 - 7.0		X	X	X	.5′ - 1′	Growth rate is medium.

Ground Covers, Lawn Substitutes, Ferns, and Low Shrubs

Average mature height less than 3 feet COMMON NAME SCIENTIFIC NAME	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Bordr	LANDSCAPE USES: GCovr	LANDSCAPE USES: Accent	Spacing	Type Codes: B = Broad-leaved Evergreen, D = Deciduous, F = Fern, N = Narrow-leaved Evergreen, S = Semi-Evergreen NOTES AND COMMENTS
Rosemary *Rosmarinus officinalis*	B	8	X			5.5 - 6.5		X	X		2′ - 3′	Favorite in old gardens. Foliage has favorable scent. May be killed by severe winter freezes. Has been used as ground cover in drier soils. Some cultivars available: 'Prostrata' low spreading form; 'Alba' with white flowers; 'Tuscan Blue' upright with blue flowers. Growth rate is medium.
Gray Santolina *Santolina chamaecyparissus*	B	7	X			6.0 - 8.0		X	X		1′- 2′	Often becomes unsightly with age. Prune after flowering. Foliage fragrant. Not adapted to high humidity areas like gulf coast. Average benefit to landscape 3-5 years. Cannot tolerate wet soils or shade. Best for zones 7b and 8a. Growth rate is medium.
Green Santolina *Santolina virens*	B	7	X			6.0 - 8.0		X	X		1′ - 2′	Often becomes unsightly with age. Prune after flowering. Grows best in soils with some moisture stress and low fertility. Not recommended for humid gulf coast. Best for zones 7b and 8a. Will not tolerate wet soils or shade. Foliage is fragrant. Growth rate is medium.
Dwarf Bamboo *Sasa pygmaea*	G	7	X	X	X	6.0 - 7.0		X	X	X	1′- 2′	Makes an excellent ground cover. Spreads moderately but rarely becomes a pest like larger bamboos. Growth rate is slow.
Variegated Serissa *Serissa foetida* 'Yellowrim'	B	7	X	X		5.5 - 6.5		X		X	.5′ - 1′	Leaves green with yellow margins. Requires frequent pruning to maintain dense growth. Foliage variegation best in full sun. Has several flowering phases during warm months. Growth rate is medium.
Anthony Waterer Spirea *Spiraea bumalda* 'Anthony Waterer'	D	3	X	X		6.0 - 7.0		X		X	1′ - 2′	Pruned in the spring if needed. Excellent summer color. Growth rate is fast.
Gold Flame Anthony Waterer Spirea *Spiraea bumalda* 'Gold Flame'	D	4	X	X		6.0 - 7.0		X		X	1′ - 2′	Spring foliage is bronzy gold turning to soft yellow in summer. Growth rate is medium fast.
Asiatic Jasmine *Trachelospermum asiaticum*	V	7	X	X	X	5.5 - 6.5		X		X	1′ - 2′	Variegated form available. Shear every 2-3 years to keep beds attractive. Difficult to use with small mounding shrubs. Does not flower. To add fragrance, interplant one Confederate jasmine for every 15-20 Asiatic jasmine planted. Growth rate is fast.

Ground Covers, Lawn Substitutes, Ferns, and Low Shrubs

Average mature height less than 3 feet

Type Codes:
B = Broad-leaved Evergreen
D = Deciduous
F = Fern
N = Narrow-leaved Evergreen
S = Semi-Evergreen

COMMON NAME SCIENTIFIC NAME	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Bordr	LANDSCAPE USES: GCovr	LANDSCAPE USES: Accent	Spacing	NOTES AND COMMENTS
Confederate Jasmine *Trachelospermum jasminoides*	V	8	X	X	X	5.5 - 6.5		X		X	7′ - 10′	Sometimes used as a ground cover in large areas but coverage not as dense as Asiatic jasmine. Not fully hardy in Zone 8a and north. Often interplanted into Asiatic jasmine to add fragrance. Growth not difficult to control. Growth rate is fast.
Bigleaf Periwinkle *Vinca major*	B	6		X	X	5.5 - 6.5	X		X		3′ - 4′	An excellent ground cover for shady locations. Will not tolerate sun or hot, dry locations. Can be grown in hanging baskets. Growth rate is medium fast.
Variegated Bigleaf Periwinkle *Vinca major* 'Variegata'	B	6		X	X	5.5 - 6.5	X		X		3′ - 4′	See Bigleaf Periwinkle. Leaf grayish green with creamy white margin. Growth rate is medium fast.
Littleleaf Periwinkle *Vinca minor*	B	3		X	X	5.5 - 6.5	X		X		2′ - 3′	Excellent ground cover for shady locations. Plant is more vine like than Bigleaf Periwinkle. 'Alba' has white flowers. 'Multiplex' has double purple flowers. 'Variegata' has green and white leaves. Growth rate is medium.
Sweet Violet *Viola odorata*	D	6	X	X	X	5.5 - 7.0	X	X	X	X	.5′ - 1′	Excellent for containers. Double flowering selections available. Growth rate is medium fast.
Virginia Chain Fern *Woodwardia virginica*	F	4		X		5.5 - 6.5		X	X		2′ - 2.5′	A strong and vigorous fern. Prefers moist and partially sunny locations. Growth rate is medium.

Small Shrubs

Average mature height between 3 feet and 5 feet

Type Codes:
B = Broad-leaved Evergreen
D = Deciduous
F = Fern
N = Narrow-leaved Evergreen
P = Palm
S = Semi-Evergreen

COMMON NAME SCIENTIFIC NAME	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Border	LANDSCAPE USES: Found	LANDSCAPE USES: Accent	Spacing	NOTES AND COMMENTS
Compact Abelia *Abelia x grandiflora* 'Prostrata'	S	5	X			6.0 - 8.0		X			2′ - 3′	Flowers on new wood. Tolerates city conditions well. May have several blooming cycles. Attracts bees. Growth rate is medium fast.
Japanese Aucuba *Aucuba japonica*	B	6			X	5.5 - 7.0		X	X	X	3′ - 4′	Needs lots of water. Well drained soil essential. Sunburns in full sun; wind burns in winter. Plant no deeper than grown in nursery. Growth rate is medium slow.
Dwarf Aucuba *Aucuba japonica* 'Nana'	B	6			X	5.5 - 7.0		X	X	X	2′ - 3′	See Japanese Aucuba. Growth rate is medium slow.
Golden Japanese Aucuba *Aucuba japonica* 'Picturata'	B	6		X	X	5.5 - 7.0		X	X	X	3′ - 4′	See Japanese Aucuba. Needs more sun than solid green leaved varieties. Very slow grower. Leaves green with prominent yellow splotches. Growth rate is medium slow.
Gold Dust Japanese Aucuba *Aucuba japonica* 'Variegata'	B	6		X	X	5.5 - 7.0		X	X	X	3′ - 4′	See Japanese Aucuba. Leaves green with yellow specks or tiny spots. Requires more sun than Japanese Aucuba. Growth rate is medium slow.
Wintergreen Barberry *Berberis julianae*	B	5	X	X		6.0 - 8.0		X	X		2′ - 3′	Reported to be hardiest evergreen barberry. Low maintenance. Difficult to transplant. Flowers on old wood. Growth rate is medium.
Rose Glow Japanese Barberry *Berberis thunbergii atropurpurea* 'Rose Glow'	D	4	X			6.0 - 8.0		X		X	2′ - 3′	Best color in full sun. More green as shade increases. Good for city conditions. Dwarf forms available. Growth rate is medium.
Redleaf Japanese Barberry *Berberis thunbergii atropurpurea*	D	4	X			6.0 - 8.0		X		X	3′ - 4′	Will not retain red leaf color in deep shade. Good for city conditions. Growth rate is medium.
Golden Japanese Barberry *Berberis thunbergii* 'Aurea'	D	3	X			6.0 - 8.0		X		X	3′ - 4′	Bright yellow leaves. Similar to Japanese Barberry. Growth rate is medium.
Harland's Boxwood *Buxus harlandii*	B	5	X	X		6.0 - 7.5	X	X	X		1′ - 2′	Shallow roots require mulch. Prefers rich, well drained soils. Growth rate is medium.
Richards Boxwood *Buxus microphylla* 'Richardii'	B	5	X	X		6.0 - 7.5		X	X		1′- 2′	Very fast grower. Growth rate is medium.
Japanese Littleleaf Boxwood *Buxus microphylla japonica*	B	5	X	X		6.0 - 7.5		X	X		2′ - 3′	More upright in form. Very fast grower. Growth rate is medium.
Common Boxwood *Buxus sempervirens*	B	5	X	X		6.0 - 7.5		X	X		3′ - 4′	Grows equally well in alkaline or acid soils. Gets larger than Japanese Littleleaf Boxwood. Very old specimens may reach 20 feet. Growth rate is medium.

Small Shrubs

Average mature height between 3 feet and 5 feet COMMON NAME SCIENTIFIC NAME	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Border	LANDSCAPE USES: Found	LANDSCAPE USES: Accent	Spacing	Type Codes: B = Broad-leaved Evergreen, D = Deciduous, F = Fern, N = Narrow-leaved Evergreen, P = Palm, S = Semi-Evergreen NOTES AND COMMENTS
Purple Beautyberry *Callicarpa dichotoma*	D	7	X	X		6.0 - 8.0		X			2′ - 3′	Plant similar to American Beautyberry but smaller in all respects. Growth rate is fast.
Scarlet Bottlebrush *Callistemon citrinus*	B	8	X			6.0 - 7.5		X	X	X	3′ - 4′	May be killed by severe winters. Flower clusters in form of a bottle brush. Tolerant of salt spray. Can withstand drought. Growth rate is medium slow.
Dwarf Hinoki Falsecypress *Chamaecyparis obtusa* ‘Nana’	N	4	X	X		5.0 - 6.0		X	X	X	2′ - 3′	Branchlets may be slightly orange-brown in summer. Not tolerant of smoky atmosphere. Variegated forms available. Growth rate is slow.
Goldentwig Dogwood *Cornus sericea* ‘Flaviramea’	D	2	X	X		6.0 - 8.0		X		X	3′ - 4′	Yellow twigs all year. Showy in winter. Good for contrast against dark structures. Spreads rapidly. Good for moist areas. Growth rate is medium.
Sago Cycas Palm *Cycas revoluta*	B	9	X			6.0 - 8.0				X	3′ - 4′	Flowers are common but may not occur every year. A favorite plant in many old southern gardens. Foliage injured with severe winters. Growth rate is slow
Dwarf Winged Euonymus *Euonymus alata* ‘Compacta’	D	5				6.0 - 8.0		X		X	2′ - 3′	Wings may be absent on this clone. Good fall color. Growth rate is medium.
Pulchellus Evergreen Euonymus *Euonymus japonica* ‘Microphylla’	B	7	X	X		6.0 - 8.0	X	X	X	X	2′ - 3′	Used as a substitute for boxwood. Variegated leaf form available. Growth rate is medium fast.
Japanese Aralia *Fatsia japonica*	B	7		X	X	6.0 - 8.0	X		X	X	3′ - 4′	Not fully hardy in central and north Mississippi. Burns in full sun. Tolerant of salt spray. Good for tropical effect. Growth rate is medium fast.
Showy Border or Yellow Bells Forsythia *Forsythia x intermedia*	D	5	X	X		6.0 - 7.5		X		X	3′ - 4′	Has profusion of yellow flowers in early spring. Best where winters are cold. Thin out old wood immediately after flowering. Growth rate is medium fast.
Lynwood Gold Border Forsythia *Forsythia x intermedia* ‘Lynwood Gold’	D	5	X	X		6.0 - 7.5		X		X	3′ - 4′	Flowers more fully opened than Showy Border Forsythia. Very heavily distributed along stem. Growth rate is medium fast.
Cape Jasmine or Gardenia *Gardenia jasminoides*	B	8	X	X		5.5 - 6.0	X	X	X	X	3′ - 5′	A popular plant in old gardens in the South. Sensitive to heavy, poorly drained soils. Iron chlorosis in alkaline soils. Growth rate is medium.
Bigleaf Hydrangea *Hydrangea macrophylla*	D	7		X	X	5.0 - 7.5		X	X	X	3′ - 5′	Acid soils produce blue flowers; alkaline soils produce pink flowers. Flowers on 1-year-old wood. Prune only stems that have flowered. Growth rate is medium fast.

Small Shrubs

Average mature height between 3 feet and 5 feet

Type Codes:
B = Broad-leaved Evergreen
D = Deciduous
F = Fern
N = Narrow-leaved Evergreen
P = Palm
S = Semi-Evergreen

COMMON NAME SCIENTIFIC NAME	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Border	LANDSCAPE USES: Found	LANDSCAPE USES: Accent	Spacing	NOTES AND COMMENTS
Nikko Blue Bigleaf Hydrangea *Hydrangea macrophylla* 'Nikko Blue'	D	7		X	X	6.0 - 7.0		X	X	X	3′ - 5′	See Bigleaf Hydrangea. Growth rate is medium fast.
Oakleaf Hydrangea *Hydrangea quercifolia*	D	5		X	X	6.0 - 8.0		X		X	3′ - 4′	Sensitive to heavy, poorly drained soils. Flowers few in dense shade. Relatively short lived. Growth rate is medium.
Carissa Chinese Holly *Ilex cornuta* 'Carissa'	B	7	X	X		5.0 - 6.5		X	X	X	3′ - 4′	A sport of Rotunda Chinese Holly. A recent introduction. Growth rate is medium.
Rotunda Chinese Holly *Ilex cornuta* 'Rotunda'	B	6				6.0 - 7.0	X	X	X		3′ - 4′	Difficult to tell from Spreading Chinese Holly except lower growing, denser foliage. Rarely has fruit. Growth rate is medium.
Compact Japanese Holly *Ilex crenata* 'Compacta'	B	6	X	X		6.0 - 7.0		X	X		3′ - 4′	Both surface and internal drainage must be good for this plant to thrive. Old specimens have interesting irregular forms. Growth rate is medium.
Dwarf Yaupon Holly *Ilex vomitoria* 'Nana'	B	7	X	X	X	6.0 - 8.0	X	X	X	X	3′ - 5′	Berries, when produced, are red. Tolerates city conditions and shearing well. Growth rate is medium.
Showy Jasmine *Jasminum floridum*	B	6	X	X		6.0 - 8.0		X	X	X	3′ - 5′	Branches have tendency to climb like a vine if support is nearby. Little maintenance. Mulch plantings heavily, since plants do not compete well with weeds. Semi-evergreen in north and central Mississippi. Growth rate is medium.
Winter Jasmine *Jasminum nudiflorum*	D	5	X	X		6.0 - 8.0		X		X	3′ - 5′	Drought tolerant. Very little maintenance. Best in sun. Leaves may fall in early spring. Stems are green. Excellent for top of retaining walls where branches can cascade over the wall. Growth rate is medium.
Nick's Compact Pfitzer Juniper *Juniperus chinensis* 'Pfitzeriana Compacta'	N	5	X			6.0 - 8.0		X	X		5′ - 8′	Needles more awl shaped than Pfitzer juniper. Growth rate is medium.
Variegated Chinese Privet *Ligustrum sinense* 'Variegata'	S	7	X	X		6.0 - 7.0		X		X	3′ - 4′	See Chinese Privet. Foliage is variegated; green with a creamy white border. Some buds will regrow green. Prune green shoots to prevent plant reverting to parent form. Tolerates city conditions. Growth rate is fast.

Small Shrubs

Average mature height between 3 feet and 5 feet COMMON NAME SCIENTIFIC NAME	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Border	LANDSCAPE USES: Found	LANDSCAPE USES: Accent	Spacing	Type Codes: B = Broad-leaved Evergreen, D = Deciduous, F = Fern, N = Narrow-leaved Evergreen, P = Palm, S = Semi-Evergreen NOTES AND COMMENTS
Winter Honeysuckle *Lonicera fragrantissima*	B	6	X			6.0 - 7.5			X	X	3′ - 5′	Flourishes under neglect or most unfavorable conditions. Low maintenance. May require occasional pruning. Fertilize annually in late winter or early spring. Red fruit produced but seldom seen because birds eat it as soon as it is ready. Favorite of old southern gardens. Growth rate is medium.
Oregon Grape Mahonia *Mahonia aquifolium*	B	5	X	X	X	6.0 - 8.0			X	X	2′ - 3′	Remove older branches each year to encourage low dense form. Plant increases in size by underground rhizomes. Growth rate is medium fast.
Leatherleaf Mahonia *Mahonia bealei*	B	6		X	X	6.0 - 8.0		X	X	X	2′ - 3′	Plant blends well with rich browns of brick and woodwork. Remove 1/3 of tallest canes each spring. Does well on north sides of buildings. May not flower and fruit well with less than 3 hours of sun per day. Growth rate is medium.
Chinese Mahonia *Mahonia fortunei*	B	8		X	X	6.0 - 8.0		X	X	X	3′ - 4′	Fruit less showy than other mahonias. Will withstand more sun than other mahonias. Slowly spreads by under ground rhizomes. Easily pruned to maintain natural form. Growth rate is slow.
Cinnamon Fern *Osmunda cinnamomea*	F	3		X	X	5.5 - 6.5		X			2′ - 3′	Strong and vigorous. Grows in wet or dry soils. Beautiful waxy green foliage on tall arching fronds. Growth rate is medium.
Royal Fern *Osmunda regalis*	F	3			X	5.5 - 6.5		X			3′ - 4′	A very large handsome fern. Forms clumps. Foliage is deep cut and dark green. Prefers moist soils and shade. Growth rate is medium fast.
Berckman's Golden Arborvitae *Pladycladus orientalis* 'Aurea Nana'	N	5	X	X		6.0 - 7.5		X	X	X	3′ - 4′	Formal shape of plant lends itself to formal gardens. Green branchlets tipped with golden yellow. Once classified in the genus Thuja. Growth rate is slow.
Ostrich Fern *Matteuccia struthiopteris*	F	10		X	X	5.5 - 6.5		X			3′ - 4′	A very tall fern with golden feathery fronds. Very ornamental. Prefers moist, shady locations. Growth rate is medium.
Dwarf Flowering Pomegranate *Punica granatum* 'Nana'	D	8	X	X		5.5 - 7.0		X		X	3′ - 4′	Leaves narrow and small. Single orange red flower during summer. Growth rate is slow.

Small Shrubs

Average mature height between 3 feet and 5 feet COMMON NAME SCIENTIFIC NAME	Type	Zone	LIGHT			pH Range	LANDSCAPE USES				Spacing	Type Codes: B = Broad-leaved Evergreen D = Deciduous F = Fern N = Narrow-leaved Evergreen P = Palm S = Semi-Evergreen NOTES AND COMMENTS
			Sun									
			Full	Part	Shade		Patio	Border	Found	Accent		
Variegated Dwarf Firethorn *Pyracantha* 'Harlequin'	B	8	X			6.0 - 8.0		X		X	3′ - 5′	May be pruned to keep in bounds. Leaves green with a creamy white margin that turns pinkish with cold weather. May reach up to 6-10 feet tall and 6 feet wide. Growth rate is medium slow.
Indian Hawthorn *Raphiolepis indica*	B	7	X	X		5.5 - 7.0		X	X	X	3′ - 4′	Many cultivars to select from. 'Ballerina' is most dwarf with deep pink flowers; 'Pink Cloud' is medium in height with light pink flowers; 'Jack Evans' has compact growth and double pink flowers; 'Springtime' is medium to fast grower and medium to large among Indian hawthorns. Growth rate is medium fast.
Needle Palm *Rhapidophyllum hystrix*	P	8		X	X	5.5 - 6.5			X	X	3′ - 4	A fan-type palm. Dark green leaves silvery beneath. Makes an attractive accent plant. Black, needle-like spines arise along the trunk. Manganese deficiency can occur in alkaline soils. Maintain pH within recommended limits. Growth rate is medium fast.
Glen Dale Azalea *Rhododendron* 'Glen Dale'	B	7		X	X	5.0 - 6.0		X	X	X	3′ - 4′	Developed at U.S. Plant Introduction Station, Glen Dale, MD. Some selections are 'Buccaneer'—orange red with dark blotch; 'Copperman'— brilliant orange; 'Evensong'—rose flowers; 'Fashion'—orange-pink flowers; 'Glacier'—white with char- treuse throat. Growth rate is medium.
Kurume Azalea *Rhododendron obtusum japonicum*	B	7		X	X	5.0 - 6.0		X	X	X	3′ - 4′	Popular hybrid azalea. Some selections include 'Coral Bells' – coral flowers mid-season; 'Christmas Cheer'—red early to mid-season; 'Hinodegiri'—scarlet mid-season; 'Snow'—white mid-season; 'Hexe'—deep red mid-season; 'Bridesmaid'—salmon late season. Growth rate is medium slow.
Hybrid Roses *Rosa hybrida*	D	7	X			6.0 - 7.0		X		X	3′ - 4′	Hybrid teas have large pointed buds and long stems. Floribundas have medium-sized flowers in flat-topped clusters, heavy bloomers. Polyanthas have large flower clusters but each flower smaller than floribundas. Grandifloras have long-stemmed flowers. Growth rate is fast.
Rugose Rose *Rosa rugosa*	D	6	X			6.0 - 7.0				X	3′ - 4′	Good for exposed windy sites. Can spread up to 15 feet in a few years. Suckers freely. Good for city and seaside. Roots easily. Growth rate is fast.

Small Shrubs

Average mature height between 3 feet and 5 feet COMMON NAME SCIENTIFIC NAME	Type	Zone	LIGHT			pH Range	LANDSCAPE USES				Spacing	Type Codes: B = Broad-leaved Evergreen D = Deciduous F = Fern N = Narrow-leaved Evergreen P = Palm S = Semi-Evergreen NOTES AND COMMENTS
			Sun									
			Full	Part	Shade		Patio	Border	Found	Accent		
Memorial Rose *Rosa wichuraiana*	B	4	X			6.0 - 7.0				X	2′ - 3′	Dense growth resists weed encroachment. Excellent for highway slopes. Not prone to leaf diseases. Not well suited for coastal area. Growth rate is fast.
Dwarf Palmetto *Sabal minor*	P	7	X	X		5.5 - 6.5	X	X	X		3′ - 5′	Size varies with habitat. Plants in swampy areas taller than those in drier locations. Difficult to transplant from the wild. May be considered a nuisance in pastures. Deer often eat the fruit. Manganese deficiency can occur in alkaline soils. Maintain pH within recommended limits. Growth rate is slow.
Reeves Spirea *Spiraea cantoniensis*	D	4	X	X		6.0 - 7.0		X	X		4′ - 6′	Double flowered form available. Flowers a little later than other varieties. Prune after flowering, removing old wood at ground level. Growth rate is fast.
Thunberg Spirea *Spiraea thunbergii*	D	3	X	X		6.0 - 7.0		X	X	X	2′ - 3′	Usually first of spiraeas to flower in spring. Late cold spells can kill flower buds. Flowers best in full sun. Prune out old wood in spring after flowering. Growth rate is medium.
Indian Current Coralberry *Symphoricarpos orbiculatus*	D	7	X	X		5.5 - 7.5		X			1′ - 2′	Does well in poor soil. Good for use under trees where shade is not dense. Growth rate is medium.
Sandankwa Viburnum *Viburnum suspensum*	B	7	X	X		6.0 - 8.0		X	X	X	3′ - 4′	Does best in partial shade in summer. Growth rate is medium.
Aloe Yucca *Yucca aloifolia*	B	8	X	X		5.0 - 7.0	X	X	X	X	3′ - 5′	Heat and drought tolerant plant. Old plants form large clumps with irregular stems. Leaves stiff ending in sharp spine. Not recommended for use near walks, etc. or in yards where young children will play. Growth rate is medium.
Adam's Needle Yucca *Yucca filamentosa*	B	7	X	X	X	5.5 - 7.0	X	X	X	X	3′ - 4′	Tolerates most areas except wet soils. Variegated form available. Leaves less rigid than Aloe Yucca. Leaf margins have filaments. Sometimes called bear grass. Growth rate is slow.

Medium Shrubs

Average mature height between 5 feet and 8 feet COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Border	LANDSCAPE USES: Found	LANDSCAPE USES: Accent	Spacing	Type Codes: B = Broad-leaved Evergreen, D = Deciduous, N = Narrow-leaved Evergreen, S = Semi-Evergreen NOTES AND COMMENTS
Glossy Abelia *Abelia x grandiflora*	S	5	X	X	X	6.0 - 8.0		X	X		4′ - 6′	Flowers on new growth. Tolerates city conditions well. May have several blooming cycles per season. Tends to accumulate deadwood. Attracts bees. Growth rate is medium fast.
Edward Goucher Glossy Abelia *Abelia x grandiflora* 'Edward Goucher'	S	5	X	X	X	6.0 - 8.0		X	X		4′ - 6′	Flowers on new growth. Tolerates city conditions well. May have several blooming cycles per season. Has slender arching branches. Attracts bees. Growth rate is medium fast.
Black Barberry *Berberis gagnepaini*	B	5	X	X		6.0 - 8.0		X	X		3′ - 4′	Flowers grown on old wood. Can be used for bonsai. Growth rate is medium.
Mentor Barberry *Berberis x mentorensis*	B	5	X	X		6.0 - 8.0		X	X		3′ - 5′	Tolerates city conditions well. Growth rate is medium.
Hollygreen Barberry Berberis pruinosa	B	7	X	X		6.0 - 8.0		X	X		5′ - 7′	Taller and more vigorous than Wintergreen Barberry. Less hardy than other barberries. Flowers on old wood. Growth rate is medium.
Japanese Barberry *Berberis thunbergii*	D	3	X	X		6.0 - 8.0		X	X		4′ - 6′	Growth rate is medium.
American Beautyberry *Callicarpa americana*	D	7	X	X		6.0 - 8.0		X			3′ - 5′	Fruits more in full sun. Tolerates very poor soil conditions. Fruit persists for relatively short time. Growth rate is fast.
White American Beautyberry *Callicarpa americana* 'Lactea'	D	7				6.0 - 8.0		X			3′ - 5′	See American Beautyberry. Growth rate is fast.
Sweet Shrub *Calycanthus floridus*	D	7	X	X		6.0 - 7.0		X		X	3′ - 5′	Native shrub worthy of more use in landscape. Often associated with old southern landscapes. Also called Carolina Allspice. Growth rate is medium.
Common Flowering Quince *Chaenomeles speciosa*	D	4	X			6.0 - 7.0		X		X	4′ - 6′	Sheds leaves early in fall. Best in cooler areas. Often flowers sparsely in lower south. Growth rate is medium.
Redtwig Dogwood *Cornus sericea coloradensis*	D	2	X	X		6.0 - 8.0		X		X	3′ - 5′	Red twigs throughout winter. Excellent for contrast with light colored structures. Needs room to develop. May require annual pruning. Growth rate is medium.
Fuzzy Deutzia *Deutzia scabra*	D	4	X	X		6.0 - 8.0		X		X	4′ - 6′	Good plant for city conditions. Full sun is best. Easy to transplant. Variegated forms available. Grown for profusion of flowers. Growth rate is fast.
Thorny Elaeagnus *Elaeagnus pungens*	B	7	X			6.0 - 8.0		X	X		5′ - 8′	Requires considerable space for growth. Requires frequent pruning to keep in bounds. Popular large shrub of the South. Growth rate is fast.

Medium Shrubs

Average mature height between 5 feet and 8 feet

Type Codes:
B = Broad-leaved Evergreen
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S = Semi-Evergreen

COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Border	LANDSCAPE USES: Found	LANDSCAPE USES: Accent	Spacing	NOTES AND COMMENTS
Golden Evergreen Euonymus *Euonymus japonicus* 'Aureo-marginata'	B	7	X	X	X	6.0 - 8.0	X		X	X	3′ - 4′	Valuable for its green leaves with gold margins. Some branches may revert to green form. In full sun, leaves may be entirely golden. Growth rate is medium fast.
Goldspot Evergreen Euonymus *Euonymus japonicus* 'Aureo-variegatus'	B	7	X	X	X	6.0 - 8.0	X	X	X	X	3′ - 5′	Valuable for variegated foliage. Dark green with golden spot in center of leaf. Some branches may revert to green form. Growth rate is medium fast.
Silver King Evergreen Euonymus *Euonymus japonicus* 'Silver King'	B	7	X	X	X	6.0 - 8.0	X	X	X	X	3′ - 5′	Valuable for its variegated foliage. Green leaves with white border. Some branches may revert to green form. Growth rate is medium fast.
Silver Queen Evergreen Euonymus *Euonymus japonicus* 'Silver Queen'	B	6	X	X		6.0 - 8.0		X	X	X	3′ - 5′	Scale is a serious problem. Growth rate is medium fast.
Manhattan Spreading Euonymus *Euonymus kiautschovicus* 'Manhattan'	B	5	X	X		6.0 - 8.0		X	X	X	5′ - 8′	Foliage and fruit may be poisonous. More evergreen than other varieties. Tolerant of a wide range of conditions. Growth rate is medium fast.
Common Pearlbush *Exochorda racemosa*	D	4	X	X		5.5 - 6.0		X	X	X	4′ - 6′	Somewhat difficult to transplant. Requires little pruning. Profusion of white flowers in spring. Growth rate is medium.
Tree Ivy or Fatshedera *Fatshedera lizei*	B	8		X		6.0 - 7.0	X				1′ - 2′	A bi-generic cross between Hedera and Fatsia. Not self supporting. Severe winters will burn foliage. Lower stems tend to be bare. Growth rate is medium fast.
Pineapple Guava *Feijoa sellowiana*	B	8	X	X	X	6.0 - 7.5		X		X	5′ - 8′	Tolerant of salt spray. Very intolerant of poorly drained soils. Several cultivars listed but hard to find in the trade. Growth rate is medium.
Rose of Sharon or Shrub Althea *Hibiscus syriacus*	D	4	X			6.0 - 7.5		X		X	3′ - 4′	Remove buds to increase flower size. Flowers when few other plants are flowering. Many varieties available. Growth rate is fast.
Dwarf Burford Chinese Holly *Ilex cornuta* 'Burfordii Nana'	B	7	X	X		6.0 - 7.0	X	X	X	X	4′ - 6′	Can be pruned to restrict growth. Tolerant of most growing conditions except poorly drained soils. Growth rate is slow.
Spreading Chinese Holly *Ilex cornuta* 'Femina Spreading'	B	7		X		6.0 - 7.0		X	X		5′ - 8′	Very heavy berry production. Very wide spreading. No pollination needed for berry production. Fruits on old wood. Growth rate is medium fast.

Medium Shrubs

Average mature height between 5 feet and 8 feet COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Border	LANDSCAPE USES: Found	LANDSCAPE USES: Accent	Spacing	Type Codes: B = Broad-leaved Evergreen, D = Deciduous, N = Narrow-leaved Evergreen, S = Semi-Evergreen NOTES AND COMMENTS
Convexleaf Japanese Holly *Ilex crenata* 'Convexa'	B	5	X	X		5.0 - 6.5		X	X		3′ - 4.5′	May be difficult to transplant, especially in large sizes. Good substitute for boxwood. Fairly tolerant of most conditions. Growth rate is medium fast.
Hetz Japanese Holly *Ilex crenata* 'Hetzi'	B	5	X	X		5.0 - 6.5			X	X	4′ - 6′	Taller growing than Heller Japanese Holly. May do best in part shade in hotter areas. Responds to fertilizer. Fruits on new wood. Growth rate is medium.
Big Leaf Japanese Holly *Ilex crenata* 'Rotundifolia'	B	6	X	X		5.0 - 6.5		X	X		3′ - 4.5′	Best if sheared regularly. Substitute for boxwood. Foliage burn in hot dry soils. May be best in part sun. Fruits on new wood. Growth rate is medium fast.
Inkberry *Ilex glabra*	B	3	X	X		4.0 - 5.0		X		X	3′ - 5′	Clump forming in nature. Black fruit distinguishes this holly from other native species. Growth rate is medium fast.
Japanese Anise Tree *Illicium anisatum*	B	7		X	X	5.5 - 6.5		X		X	4′ - 6′	Leaves aromatic with fragrance of anise when crushed. Growth rate is fast.
Star Bush *Illicium floridanum*	B	7		X	X	5.5 - 6.5		X		X	3′ - 4′	Used like Japanese Camellia. Flowers have unpleasant odor. Cannot tolerate heavy shade. Growth rate is fast.
Blue Vase Juniper *Juniperus chinensis* 'Blue Vase'	N	5	X			6.0 - 8.0		X	X		4′ - 6′	Should not be planted in confined areas because of large size and fast growth. Will withstand most adverse growing conditions except poorly drained soil. Growth rate is medium.
Golden Pfitzer Juniper *Juniperus chinensis* 'Pfitzeriana Aurea'	N	5	X			6.0 - 8.0			X	X	7′ - 10′	Requires plenty of room to develop. Very decorative. Tolerant of city conditions. Will withstand drought though moist well-drained soils preferred. Tolerates alkaline soils. Growth rate is medium fast.
Pfitzer Chinese Juniper *Juniperus chinensis* 'Pfitzeriana'	N	5	X			6.0 - 8.0		X	X		7′ - 10′	Tolerates city conditions well. Prefers moist soils but will withstand dry ones. Soil must be well drained. Tolerant of alkaline soils. Growth rate is medium.
Double Flowering Japanese Kerria *Kerria japonica* 'Flora Plena'	D	4	X	X	X	5.5 - 7.5		X		X	5′ - 8′	Best in partial sun. Sun bleaches flowers. Fibrous roots. Sometimes difficult to transplant. Transplanting requires clump of green stems. Better suited to central and north Mississippi. Growth rate is fast.
Bush Clover *Lespedeza thunbergii*	D	5	X			5.5 - 6.5		X		X	4′ - 6′	Often planted for its late fall flowers. May be killed to the ground with severe winters, but it flowers on current season's growth. Growth rate is medium.

Medium Shrubs

Average mature height between 5 feet and 8 feet

Type Codes:
B = Broad-leaved Evergreen
D = Deciduous
N = Narrow-leaved Evergreen
S = Semi-Evergreen

COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Border	LANDSCAPE USES: Found	LANDSCAPE USES: Accent	Spacing	NOTES AND COMMENTS
Star Magnolia *Magnolia stellata*	D	5	X	X		5.0 - 6.0		X		X	4′ - 6′	Usually flowers before other shrubs in spring. May flower in mid-winter in warm areas. Flowers subject to late freeze damage or freeze after winter warm spell. Growth rate is medium slow.
Weeping White Mulberry *Morus alba* ‘Pendula’	D	4	X	X		5.5 - 7.0				X	4′ - 6′	Grafted onto White Mulberry understock. Height varies depending on the height of graft union. Striking appearance. Growth rate is medium fast.
Heavenly Bamboo or Nandina *Nandina domestica*	B	7	X	X	X	5.5 - 7.0		X	X	X	3′ - 4′	Foliage more red in full sun. Fruiting better in full sun. Remove 1/3 of tallest canes each year to maintain desired height. Stagger each pruning cut to cause more even distribution of foliage. Plant is very leggy in dense shade. Growth rate is fast.
English Dogwood or Mockorange *Philadelphus coronarius*	D	4	X			6.0 - 8.0		X		X	3′ - 5′	Excellent deciduous shrub for south. Dwarf selections available. Prune out old, non-flowering wood after flowering. Some varieties have fragrant flowers. Growth rate is medium fast.
Mugo Pine *Pinus mugo*	N	3	X	X		5.5 - 6.5	X		X	X	5′ - 8′	One of few shrub pines available. Often used in oriental designs. Not well adapted to Zone 8b (coastal area). Growth rate is slow.
Mock Orange, Tobira Pittosporum *Pittosporum tobira*	B	8	X	X		6.0 - 7.5		X	X	X	5′ - 8′	Lemon-scented foliage. Withstands heat and drought. Not recommended for zones 7b, 8a, 8b unless in protected area. Winter damage every 10 years or so. Growth rate is medium.
Variegated Tobira Pittosporum *Pittosporum tobira* ‘Variegata’	B	8	X	X		6.0 - 7.5		X	X	X	5′ - 8′	See Tobira Pittosporum. Variegated foliage gray green with white markings. Growth rate is fast.
Double Flowering Almond *Prunus glandulosa*	D	5	X			5.5 - 6.5		X		X	3′ - 5′	Very attractive in flower. May be used for cut flowers. Growth rate is medium.
Southern Indian Azalea *Rhododendron indicum*	B	7	X	X	X	4.0 - 6.0		X	X	X	4′ - 6′	Well drained soil essential. Some selections are ‘Elegans’ light pink very early; ‘President Clay’ orange red early; ‘Brilliant’ rose pink early- mid season; ‘Formosa’ rose lavender early-mid season; ‘Pride of Mobile’ watermelon pink mid-season; ‘Mrs. G. G. Gerbing’ white. Growth rate is medium fast.
Pinxterbloom Azalea *Rhododendron nudiflorum*	D	8		X	X	4.5 - 5.5		X		X	4′ - 6′	Flowers before foliage appears. Flowers on last year’s wood. Native to South Mississippi. Grows best in partial sun. Growth rate is medium.

Medium Shrubs

Average mature height between 5 feet and 8 feet COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Border	LANDSCAPE USES: Found	LANDSCAPE USES: Accent	Spacing	Type Codes: B = Broad-leaved Evergreen, D = Deciduous, N = Narrow-leaved Evergreen, S = Semi-Evergreen NOTES AND COMMENTS
Double Bridal Wreath Spirea *Spiraea prunifolia plena*	D	5	X	X	X	6.0 - 7.0		X	X	X	3′ - 5′	Flowers before leaves appear. May be used as ground cover along steep banks. Spreads by underground shoots and forms a thicket. Prune out old wood at ground level after flowering. Growth rate is medium.
Vanhoutte Spirea *Spiraea vanhouttei*	D	3	X	X		6.0 - 7.0		X	X	X	5′ - 8′	Widely used and very attractive. Very good plant in conjunction with azaleas. Good for city conditions. Flowers better in full sun. Easily transplanted. Prune old wood to ground after flowering in spring. Growth rate is fast.
Common Lilac *Syringa vulgaris*	B	3	X			6.0 - 7.5		X		X	5′ - 8′	Marginal plant for Zone 7b. Not recommended for Zone 8 and south. Needs adequate cold for good flower production. Several forms available with white, pink, blue, and purple flowers. Growth rate is medium.
Baker Oriental Arborvitae *Thuja orientalis* 'Bakeri'	N	6	X	X		6.0 - 7.5		X	X	X	3′ - 4′	Excellent plant for hot dry locations. Plant shape complements formal landscape designs. Growth rate is fast.
Burkwood Viburnum *Viburnum burkwoodii*	S	5	X	X		5.5 - 6.5		X	X	X	3′ - 5′	Flowers have fragrance of gardenia. Growth rate is medium.
Arrowwood Viburnum *Viburnum dentatum*	D	3	X	X	X	5.0 - 6.0		X	X	X	3′ - 4′	Good for city conditions or seaside. Many shoots originate from the base. Indians used this plant for arrow shafts. May be thicket forming in moist areas. Needs room to develop. Growth rate is fast.
Japanese Viburnum *Viburnum japonicum*	B	7	X	X	X	5.5 - 6.5		X	X	X	3′ - 4′	Does best in part shade. Not widely grown. Growth rate is medium fast.
Doublefile Viburnum *Viburnum tomentosum*	D	4	X	X	X	6.5 - 7.5		X		X	5′ - 8′	Outer flowers in cluster are sterile. Easy to transplant. One of the better viburnums for zones 8a and 7b. Does well in part shade. Growth rate is medium.
Weigela *Weigela florida*	D	5	X			5.5 - 6.5		X		X	5′ - 8′	Does not grow well in coastal areas that are hot and humid. Popular shrub in old southern gardens. Growth rate is medium.
Moundlily Yucca *Yucca gloriosa*	B	7	X	X		5.5 - 7.0	X	X	X	X	3′ - 4′	Flowers staggered over a long period in mass plantings. One of most manageable of yuccas. Old plantings form multiple stems. Drought tolerant. Growth rate is medium slow.

Large Shrubs

Average mature height between 8 feet and 12 feet

Type Codes:
B = Broad-leaved Evergreen
D = Deciduous
G = Grass
N = Narrow-leaved Evergreen
P = Palm
S = Semi-Evergreen

COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Hedge	LANDSCAPE USES: Windb	LANDSCAPE USES: Accent	Spacing	NOTES AND COMMENTS
Eastern Baccharis *Baccharis halimifolia*	B	4	X			7.0 - 8.0		X		X	7′ - 10′	Can thrive in brackish water. Ideal for poorly drained soils. Growth rate is medium fast.
Japanese Camellia *Camellia japonica*	B	7	X	X	X	4.5 - 5.5	X	X		X	4′ - 6′	Provide protection from sun in middle of day. Compact in full sun; more open with more shade. Many selections available. Growth rate is medium slow.
Sasanqua Camellia *Camellia sasanqua*	B	6		X	X	4.5 - 6.5	X	X		X	4′ - 6′	Prefers less acid soil than Japanese Camellia. More cold hardy. Flowers and foliage burn in full sun. Plant shallow where drainage is poor. Growth rate is medium.
Chinese Redbud *Cercis chinensis*	D	6	X	X		5.5 - 7.5				X	5′ - 8′	Flowers more intense in color. Smaller than Eastern Redbud. Shrub-like for several years. Hard to transplant as mature tree. Growth rate is medium.
Blue Cypress *Chamaecyparis pisifera* 'Boulevard'	N	5	X			6.0 - 7.0		X		X	3′ - 5′	May develop to adult foliage and become much taller. Very attractive but not widely grown. Growth rate is slow.
Selloa Pampas Grass *Cortaderia selloana*	G	10	X	X		5.5 - 7.0		X		X	7′ - 10′	Early growth may be slow. Allow ample space for growth. Full sun best for flower production. Prune back dead foliage in late winter. Growth rate is medium.
Japanese Persimmon *Diospyros kaki*	D	7	X			5.5 - 7.0				X	7′ - 10′	Fruit may be nuisance in landscape. When fruit is major consideration, plant two varieties. Growth rate is medium.
Fuyugaki Japanese Persimmon *Diospyros kaki* 'Fuyugaki'	D	7	X			5.5 - 7.0				X	7′ - 10′	See Japanese Persimmon. Sometimes called 'Fuyu.' Self fruitful. Fruit medium in size and nonastringent. Will pollinate other varieties. Growth rate is medium.
Tamopan Japanese Persimmon *Diospyros kaki* 'Tamopan'	D	7	X			5.5 - 7.0				X	7′ - 10′	See Japanese Persimmon. Fruit large and flattened with distinctive ring constriction near middle. Growth rate is medium.
Tani Nashi Japanese Persimmon *Diospyros kaki* 'Tani Nashi'	D	7	X			5.5 - 7.0				X	7′ - 10′	See Japanese Persimmon. Fruit cone shaped. Fruit stores well on tree. May be seedless. Growth rate is medium.
Dahoon Holly *Ilex cassine*	B	7	X	X		5.0 - 6.0		X		X	4′ - 6′	Reported to grow in wet, boggy soils. Leaf color similar to American holly. Slightly tolerant of salt spray. Often multi-stemmed. Growth rate is medium.
Burford Chinese Holly *Ilex cornuta* 'Burfordii'	B	7	X	X		6.0 - 7.0		X		X	7′ - 10′	Much variation in seedlings. With time will make small tree 25-30 feet tall and 25-30 feet wide. Growth rate is medium fast.

Large Shrubs

Average mature height between 8 feet and 12 feet COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Hedge	LANDSCAPE USES: Wind B	LANDSCAPE USES: Accent	Spacing	Type Codes: B = Broad-leaved Evergreen, D = Deciduous, G = Grass, N = Narrow-leaved Evergreen, P = Palm, S = Semi-Evergreen NOTES AND COMMENTS
Blue Haven Juniper *Juniperus scopulorum* 'Blue Haven'	N	4	X			5.5 - 7.0		X			8′ - 12′	Extremely durable plant for dry locations when larger plant is needed. Maintains blue color throughout the year. Growth rate is medium fast.
Gray Gleam Juniper *Juniperus scopulorum* 'Gray Gleam'	N	4	X			6.0 - 8.0		X		X	8′ - 12′	Upright form with good gray-green to blue-gray foliage. Growth rate is medium fast.
Intermediate Lavender Crape Myrtle *Lagerstroemia indica* and hybrids	D	7	X	X		5.0 - 6.0		X		X	6′ - 9′	See Crape Myrtle. Average height is 15 - 25 feet. 'Catawba,' 'Powhatan,' 'Muskogee,' 'Lipan,' and 'Yuma' are various shades of lavender. Growth rate is fast.
Intermediate Pink Crape Myrtle *Lagerstroemia indica*	D	7	X	X		5.0 - 6.0		X		X	6′ - 9′	See Crape Myrtle under Large Shrubs and Small Trees. Average mature height is 12 feet. 'Seminole', 'Near East,' 'Comanche', 'Osage', and 'Sioux' are pink. Growth rate is fast.
Intermediate Red Crape Myrtle *Lagerstroemia indica*	D	7	X	X		5.0 - 6.0		X		X	6′ - 9′	See Crape Myrtle. Average mature height is 12 feet. 'Regal Red' and 'Barton's Red' are various shades of red. Growth rate is fast.
Intermediate White Crape Myrtle *Lagerstroemia indica*	D	7	X	X		5.0 - 6.0		X		X	6′ - 9′	See Crape Myrtle. Average mature height is 12 feet. 'Seminole,' 'Comanche,' 'Osage,' and 'Sioux' are white. Growth rate is fast.
Japanese Ligustrum *Ligustrum japonicum*	B	7	X	X	X	6.0 - 7.0		X		X	5′ - 8′	Birds are attracted to the fruit. Plant takes heavy pruning well. Tolerates city conditions well. Growth rate is medium fast.
Roundleaf Japanese Ligustrum *Ligustrum japonicum* 'Rotundifolium'	B	7	X	X	X	6.0 - 7.0		X		X	5′ - 8′	See Japanese Ligustrum. Foliage more rounded than Japanese Ligustrum. Growth rate is medium fast.
Chinese Privet *Ligustrum sinense*	S	7	X	X	X	6.0 - 7.0		X			5′ - 8′	Takes pruning very well. Often considered a nuisance when growing where not wanted. Will tolerate most soils but grows best in a moist well-drained one. Tolerates city conditions. Growth rate is fast.
Weeping Chinese Privet *Ligustrum sinense* 'Pendulum'	S	7	X	X	X	6.0 - 7.0				X	5′ - 8′	See Chinese Privet. Branches of this plant are pendulous; that is, they hang down. Growth rate is fast.
Vicary Golden Privet *Ligustrum x vicaryi*	D	4	X	X		6.0 - 7.0		X	X	X	4′ - 6′	Grown for its golden yellow foliage that is present throughout the growing season. Growth rate is medium.
Loropetalum *Loropetalum chinense*	B	6	X	X	X	5.5 - 7.0		X			5′ - 8′	Very attractive when in flower. Should not be used in an open, wind-swept area. Grows best in part sun to shade. Growth rate is medium fast.

Large Shrubs

Average mature height between 8 feet and 12 feet COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Hedge	LANDSCAPE USES: Windb	LANDSCAPE USES: Accent	Spacing	Type Codes: B = Broad-leaved Evergreen, D = Deciduous, G = Grass, N = Narrow-leaved Evergreen, P = Palm, S = Semi-Evergreen NOTES AND COMMENTS
Miscanthus or Eulalia *Miscanthus sinensis*	G	6	X	X		5.5 - 7.0		X			7′ - 10′	Plant may be killed back to roots in winter but returns in spring. Does best in open areas where it has room to grow. Can be expected to form a thicket after a few years. Growth rate is fast.
Oleander *Nerium oleander*	B	9	X	X		6.0 - 7.5				X	7′ - 10′	All plant parts poisonous. Smoke from burning plant parts is also poisonous. Withstands temperatures down to 24 °F. Endures heat, glare, poor, dry, alkaline, sandy soils. Many improved selections. Generally, cold tolerance increases as flower color darkens. Growth rate is medium fast.
Sweet Olive *Osmanthus fragrans*	B	7	X	X		5.5 - 7.0		X	X	X	4′ - 6′	Flower initiation induced by sudden changes in temperature and moisture. A long-lived shrub. Old plants may reach 25 feet in height and 12-15 feet in spread. Good drainage essential. Growth rate is slow.
Fraser's Photinia *Photinia* 'Fraseri'	B	7	X	X		6.0 - 7.0		X		X	5′ - 8′	New growth very showy with coppery-red color. Prune frequently to encourage new growth. This plant is a cross between Chinese Photinia and Japanese Photinia. Relatively short lived. Growth rate is medium fast.
Japanese Photinia *Photinia glabra*	B	6	X	X		6.0 - 7.0		X		X	5′ - 8′	Red leaf color best in full sun. Takes pruning well. Sometimes called Red Top or Red Tip. Loose, well drained soil essential for good growth. Magnesium deficiency may be a problem. Growth rate is medium.
Oriental Arborvitae *Platycladus orientalis*	N	6	X	X		6.0 - 7.5				X	4′ - 6′	Branches more vertical than regular arborvitae. Many varieties in the industry. Plant shape complements formal landscape designs. Growth rate is fast.
Chickasaw Plum *Prunus angustifolia*	D	5	X			5.5 - 7.0				X	4′ - 6′	Thicket forming and ideal for road side slopes. Often recommended for naturalistic plantings. Growth rate is medium.
Lady Palm *Rhapis excelsa*	P	8	X	X	X	5.5 - 6.5	X			X	3′ - 4′	Excellent for containers. Dense foliage makes this plant an excellent one for accent. Manganese deficiency can occur in alkaline soils. Maintain pH within recommended limits. Growth rate is medium.

Large Shrubs

Average mature height between 8 feet and 12 feet COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Hedge	LANDSCAPE USES: Windb	LANDSCAPE USES: Accent	Spacing	Type Codes: B = Broad-leaved Evergreen, D = Deciduous, G = Grass, N = Narrow-leaved Evergreen, P = Palm, S = Semi-Evergreen NOTES AND COMMENTS
Elderberry *Sambucus canadensis*	D	4	X	X	X	6.0 - 8.0		X			3′ - 5′	Fruit of this species has been used to make elderberry wine. Fruit attracts birds to the landscape. Spreads by stolons. May become a pest. Growth rate is fast.
Japanese Cleyera *Ternstroemia gymnanthera*	B	7		X	X	5.5 - 7.0		X		X	5′ - 8′	Often listed as Cleyera japonica. Older specimens may get much taller. Takes pruning well. Tolerant of dry soils and competition. Growth rate is medium fast.
Variegated Japanese Cleyera *Ternstroemia gymnanthera* 'Variegata'	B	7		X	X	5.5 - 7.0		X		X	5′ - 8′	Often listed as Cleyera japonica 'Variegata.' Older specimens may get much taller. Takes pruning well. Tolerant of dry soils and competition. Growth rate is medium fast.
Pyramidal Arborvitae *Thuja occidentalis* 'Pyramidalis'	N	6	X	X		6.0 - 7.5				X	4′ - 6′	Well drained soils essential for good growth. Seems to do well in most other soils. Plant shape complements formal landscape designs. Growth rate is fast.
Rabbit-Eye Blueberry *Vaccinum ashei*	D	7	X			4.5 - 5.5		X			4′ - 6′	Do not plant in soils that have been limed. Add 1/2 bushel peat moss to each planting hole. Do not fertilize the first year. Selections to consider are 'Premiere,' 'Tifblue,' 'Woodward,' 'Delite,' 'Southland,' 'Bluegem,' 'Climax,' 'Bluebelle.' Growth rate is medium fast.
Sweet Viburnum *Viburnum odoratissimum*	B	9	X			6.5 - 7.5		X			4′ - 6′	Hardiness questionable in zones 7b and 8a. Growth rate is medium fast.
European Snowball Viburnum *Viburnum opulus* 'Sterile'	D	3	X	X		6.5 - 7.5				X	5′ - 8′	Flowers are sterile. Good for city conditions. Attractive when in flower. Flowers occur on new wood. Growth rate is medium fast.
Leatherleaf Viburnum *Viburnum rhytidophyllum*	B	5	X	X		6.0 - 7.0				X	4′ - 6′	Drooping foliage causes the plant to look wilted. Tolerates shade where other shrubs fail. Should be used sparingly. One of the most cold- hardy viburnums. Growth rate is medium slow.
Laurestinus Viburnum *Viburnum tinus*	B	8	X	X	X	6.0 - 8.0		X		X	4′ - 6′	Flowers may have unpleasant odor. Grows best on poor soils, but they must be well drained. Warm spell during winter may cause flowers to open. Variegated cultivar available. Growth rate is medium.

Large Shrubs or Small Trees

Average mature height between 12 feet and 20 feet COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Border	LANDSCAPE USES: Hedge	LANDSCAPE USES: Accent	LANDSCAPE USES: HOrch	Spacing	Type Codes: B = Broad-leaved Evergreen, D = Deciduous, G = Grass, N = Narrow-leaved Evergreen, P = Palm, S = Semi-Evergreen NOTES AND COMMENTS
Japanese Maple *Acer palmatum*	D	5	X	X		6.0 - 7.5	X		X		13′ - 20′	Has the effect of miniature tree. Poor drainage reduces growth. Shade reduces intensity of leaf color. Several cultivars available. Growth rate is slow.
Bloodgood Japanese Maple *Acer palmatum* 'Bloodgood'	D	5	X	X		6.0 - 7.5	X		X		13′ - 20′	See Japanese Maple. A small tree. New foliage is brilliant red. This deepens to dark red in sun. Most brilliant of red cultivars. Growth rate is slow.
Burgandy Lace Japanese Maple *Acer palmatum* 'Burgandy Lace'	D	5	X	X		6.0 - 7.5	X		X		13′ - 20′	See Japanese Maple. Very slender branches with deeply lobed leaves that appear palmately (like the hand) compound. Red leaves appear lacy. Growth rate is slow.
Disectum Atropurpureum Japanese Maple *Acer palmatum* 'Dissectum Atropurpureum'	D	5	X	X		6.0 - 7.5	X		X		13′ - 20′	See Japanese Maple. Like 'Disectum' but leaves bright red in shade. Branching habit is more weeping. Growth rate is slow.
Disectum Japanese Maple *Acer palmatum* 'Dissectum'	D	5	X	X		6.0 - 7.5	X		X		13′ - 20′	See Japanese Maple. This plant sometimes referred to as Threadleaf. Branching habit is more weeping. Leaves almost fern-like in texture. Growth rate is slow.
Oshio-Beni Japanese Maple *Acer palmatum* 'Oshio-Beni'	D	5	X	X		6.0 - 7.5	X		X		13′ - 20′	See Japanese Maple. Leaves slightly redder than 'Bloodgood.' Growth rate is slow.
Flame Buckeye *Aesculus pavia*	D	6	X	X		6.0 - 7.0	X		X		5′ - 8′	Fruit is poisonous to livestock and humans. New growth is coppery in color. Not easily transplanted. Hard to find in the nursery. Growth rate is fast.
Pindo or Jelly Palm *Butia capitata*	P	9	X	X		5.5 - 6.5			X	X	7′ - 10′	Long arching, plume- or feather-like branches. Winter kills north of Neshoba and Madison counties. Winter kills along the coast with severe winters (temperatures at or below 10 °F). Sometimes labeled in the trade as Cocos australis. Short lived (30-40 years). Manganese deficiency can occur in alkaline soils. Maintain pH within recommended limits. Growth rate is medium.
Eastern Redbud *Cercis canadensis*	D	4	X	X		5.5 - 7.5	X		X		10′ - 15′	Short-lived tree. Not well adapted to coastal areas. Grown as small tree for flowers in spring. Growth rate is medium fast.
White Flowering Eastern Redbud *Cercis canadensis* 'Alba'	D	4	X	X		5.5 - 7.5	X		X		10′ - 15′	See Eastern Redbud. Growth rate is medium fast.

Large Shrubs or Small Trees

Average mature height between 12 feet and 20 feet COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Border	LANDSCAPE USES: Hedge	LANDSCAPE USES: Accent	LANDSCAPE USES: HOrch	Spacing	Type Codes: B = Broad-leaved Evergreen, D = Deciduous, G = Grass, N = Narrow-leaved Evergreen, P = Palm, S = Semi-Evergreen NOTES AND COMMENTS
Forest Pansy Eastern Redbud *Cercis canadensis* 'Forest Pansy'	D	4	X	X		5.5 - 7.5	X		X		10′ - 15′	See Eastern Redbud. Growth rate is medium fast.
Chinese Flowering Quince *Chaenomeles sinensis*	D	4	X			6.0 - 7.0	X		X	X	5′ - 8′	Grown for its fruit. Early spring color. Growth rate is medium.
Gray Dogwood *Cornus racemosa*	D	2	X	X	X	5.5 - 6.5	X		X		7′- 10′	In poor soils may not reach 6 feet. Sprouts and suckers freely. More tolerant of adverse conditions than Flowering Dogwood. Growth rate is medium slow.
Autumn Elaeagnus *Elaeagnus umbellata*	D	7	X			6.0 - 8.0	X	X			8′ - 12′	Good for seashore and city conditions. Very drought tolerant. Fruits on old wood. Easily transplanted. Leaves green above and silver below. Growth rate is fast.
Loquat *Eriobotrya japonica*	B	8	X	X		6.0 - 8.0		X	X		8′ - 12′	Hardiest of tropical fruits. Fruits are tasty. Drought resistant. Excellent for city tree plantings. Growth rate is medium.
Common Fig *Ficus carica*	D	6	X	X		5.5 - 7.5				X	10′ - 15′	'Mission,' 'Celeste,' 'Brown Turkey,' and 'Magnolia' recommended for home fruit production. Selective pruning keeps plant in bounds. Growth rate is medium fast.
Foster's No. 2 Holly *Ilex* 'Foster #2'	B	6	X	X		5.0 - 6.0	X	X	X		5′ - 7.5′	Hybrid between American Holly and Dahoon Holly. Leaves more narrow than American Holly. More tolerant of adverse conditions than American Holly. Growth rate is medium fast.
Nellie R. Stevens Holly *Ilex* 'Nellie R. Stevens'	B	6	X	X		6.0 - 6.0	X	X	X		5′ - 7.5′	Hybrid between English and Chinese holly. Female clone. Large leaves. Growth rate is medium fast.
Possumhaw *Ilex decidua*	D	5	X	X		5.0 - 6.5	X		X		5′ - 8′	Birds reported to prefer red berries over orange ones. May be found in fence rows near open fields. Fruit not showy until after frost. Growth rate is medium.
Yaupon Holly *Ilex vomitoria*	B	7	X	X	X	5.0 - 6.0	X	X	X		5′ - 8′	Highly desirable native shrub. Dioecious. May be "poodled" or espaliered. Yellow fruit form available. Fruits on 2-year-old wood. Growth rate is medium fast.
Weeping Yaupon Holly *Ilex vomitoria* 'Pendula'	B	6	X	X		6.0 - 8.0			X		5′ - 8′	Novelty plant. Fruits on 2-year-old wood. Will tolerate dry conditions. Growth rate is medium.
Blue Column Juniper *Juniperus chinensis* 'Columnaris'	N	5	X			6.0 - 8.0	X		X		2′ - 3′	All leaves are juvenile; that is, they are sharp pointed. Growth rate is medium.
Variegated Hollywood Juniper *Juniperus chinensis* 'Corymbos Variegated'	N	5	X			6.0 - 8.0	X	X	X		5′ - 8′	Does not grow as tall or as fast as regular Hollywood juniper. Growth rate is medium fast.

Large Shrubs or Small Trees

Average mature height between 12 feet and 20 feet COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Border	LANDSCAPE USES: Hedge	LANDSCAPE USES: Accent	LANDSCAPE USES: HOrch	Spacing	Type Codes: B = Broad-leaved Evergreen, D = Deciduous, G = Grass, N = Narrow-leaved Evergreen, P = Palm, S = Semi-Evergreen NOTES AND COMMENTS
Hetz Chinese Juniper *Juniperus chinensis* 'Hetzi'	N	5	X			6.0 - 8.0	X	X	X		10′ - 15′	Similar to Pfitzer juniper except branches at 45-degree angle and not horizontal. Growth rate is medium fast.
Hollywood Juniper *Juniperus chinensis* 'Torulosa'	N	5	X			6.0 - 8.0	X	X	X		5′ - 8′	Growth shape apparently not drastically affected by pruning. Apparently not hardy in northern U.S. A popular, picturesque plant. Growth rate is medium fast.
Weeping Rocky Mountain Juniper *Juniperus scopulorum* 'Pendula'	N	4	X			6.0 - 8.0			X		5′ - 8′	Usually planted as a specimen. A spectacular weeping or drooping form with branching characteristic. May need staking when first planted. Growth rate is medium.
Hillspire Juniper *Juniperus virginiana* 'Cupressifolia'	N	5	X			6.0 - 8.0	X		X		5′ - 8′	Takes pruning well. Often used for nursery spirals and other clipped forms. Growth rate is medium.
Skyrocket Juniper *Juniperus virginiana* 'Skyrocket'	N	4	X			6.0 - 8.0			X		3′ - 4′	Narrow columnar form with silver blue foliage. Looks like rocket in flight. Growth rate is medium fast.
Mountain Laurel *Kalmia latifolia*	B	4		X	X	4.5 - 6.0	X	X	X		5′ - 8′	Difficult to transplant. Not easily found in southern nurseries. Magnificent display of color in spring. Almost impossible to transplant from native stands. Growth rate is medium slow.
Crape Myrtle *Lagerstroemia indica*	D	7	X	X		5.0 - 6.0	X		X		10′ - 15′	Easily propagated. Easily transplanted in very large sizes. Growth rate is fast.
Tall Lavender Crape Myrtle *Lagerstroemia indica*	D	7	X	X		5.0 - 6.0	X		X		10′ - 15′	See Crape Myrtle. Average height is 20 feet. 'Hardy Lavender' and 'Apalachee' are various shades of lavender. Growth rate is fast.
Tall Pink Crape Myrtle *Lagerstroemia indica*	D	7	X	X		5.0 - 6.0	X		X		10′ - 15′	See Crape Myrtle. Average height is 20 feet. 'Potomac,' 'Conestoga,' 'Busham's Party' are various shades of pink. Growth rate is fast.
Tall Red Crape Myrtle *Lagerstroemia indica*	D	7	X	X		5.0 - 6.0	X		X		10′ - 15′	See Crape Myrtle. Average mature height is 20 feet. 'William Toovey,' 'Dixie Brilliant,' 'Fire Bird,' 'Tuscarora,' and 'Carolina Beauty' are various shades of red. Growth rate is fast.
Tall White Crape Myrtle *Lagerstroemia indica*	D	7	X	X		5.0 - 6.0	X		X		10′ - 15′	See Crape Myrtle. Average mature height is 20 feet. 'Natchez' and 'Byer's Wonderful White' are white. Growth rate is fast.

Large Shrubs or Small Trees

Average mature height between 12 feet and 20 feet COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Border	LANDSCAPE USES: Hedge	LANDSCAPE USES: Accent	LANDSCAPE USES: HOrch	Spacing	Type Codes: B = Broad-leaved Evergreen, D = Deciduous, G = Grass, N = Narrow-leaved Evergreen, P = Palm, S = Semi-Evergreen NOTES AND COMMENTS
Glossy Privet *Ligustrum lucidum*	B	7	X	X	X	6.0 - 7.0	X	X			10′ - 15′	Requires lots of fertilizer since this plant is a heavy feeder. Birds attracted to fruit. Has escaped cultivation and may be found in the wild. Seedlings may become a nuisance. Growth rate is fast.
Japanese Magnolia *Magnolia soulangeana*	D	5	X	X		5.0 - 6.0	X		X		10′ - 15′	One of the showiest plants in bloom. Flowers and buds may be injured by cold. Warm spell causes buds to open. Cultivars available: 'Alba' has white flowers; 'Alexandria' has rose purple flowers; 'Burgandy' has deep purple flowers. Growth rate is medium.
Callaway Crabapple *Malus* 'Callaway'	D	3	X			5.0 - 6.5	X		X		13′ - 20′	Slightly susceptible to rust. Fruit reaches 1 inch in diameter. May not flower consistently in Zone 8b (South Mississippi). Growth rate is medium fast.
Carmine Crabapple *Malus atrosanguinea*	D	4	X			5.0 - 6.5	X		X		13′ - 20′	Planted for its carmine red flowers that fade to poor pink just before petal fall. Resistant to rust. Growth rate is medium fast.
Sargent Crabapple *Malus sargentii*	D	4	X	X		5.5 - 6.5	X		X		27′ - 40′	Slightly susceptible to scab and fire blight. Dense branching crab that may grow twice as wide as tall. Growth rate is medium fast.
Banana Shrub *Michelia figo*	B	7	X	X		5.0 - 6.5	X		X		7′ - 10′	Chlorosis of foliage a problem where soil pH is not at proper levels. Flowers very fragrant. Petals have maroon border. Fragrance that of very ripe bananas. Very sensitive to poorly drained soils. Often referred to as Michelia fuscata or Magnolia fuscata. Growth rate is slow.
Southern Waxmyrtle *Myrica cerifera*	B	6	X	X		4.0 - 6.0		X	X		10′ - 15′	Early settlers boiled leaves and fruit to get wax that they used to make bayberry candles. Not particularly long lived. Very tolerant of most growing conditions. Greatest success comes in transplanting smaller plants. Easily transplanted in the 3-4 foot height range. Growth rate is fast.
Hollyleaf Osmanthus *Osmanthus fortunei*	B	6	X	X		5.5 - 7.0	X	X	X		10′ - 15′	Popular plant in old Southern gardens. Fragrance not as strong nor flower period as long as Sweet Olive. Growth rate is slow.

Large Shrubs or Small Trees

Average mature height between 12 feet and 20 feet COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Border	LANDSCAPE USES: Hedge	LANDSCAPE USES: Accent	LANDSCAPE USES: HOrch	Spacing	Type Codes: B = Broad-leaved Evergreen, D = Deciduous, G = Grass, N = Narrow-leaved Evergreen, P = Palm, S = Semi-Evergreen NOTES AND COMMENTS
Pygmy Date Palm *Phoenix humilis*	P	9		X	X	5.5 - 6.5		X			5′ - 8′	May reach 20 feet in height. Hardy to 20 degrees. Protect palm if temperatures are expected to drop that low. Foliage plume-like. Manganese deficiency can occur in alkaline soils. Maintain pH within recommended limits. Growth rate is medium slow.
Chinese Photinia *Photinia serrulata*	B	7	X	X		6.0 - 7.0	X	X	X		7′ - 10′	Becomes leggy with old age. New growth coppery colored. Very intolerant of poorly drained soils. Growth rate is medium.
Black Bamboo *Phyllostachys nigra*	B	6	X	X		5.5 - 7.0		X	X		4′ - 6′	Stems green, becoming black the second year. May become invasive and be hard to contain. Growth rate is fast.
Southern Yew *Podocarpus macrophyllus maki*	B	7	X	X		5.5 - 7.0		X	X		4′ - 6′	Can be sheared and shaped easily. Dioecious. Widely used on the coast. Questionable if it should be planted in Zone 7b. Growth rate is medium fast.
Purpleleaf Plum *Prunus cerasifera*	D	4	X	X		5.5 - 6.5	X		X		10′ - 15	Best leaf color in full sun. Prune to reduce crossing branching. Tree is short lived. Growth rate is medium.
Flowering Peach *Prunus persica*	D	5	X			6.0 - 7.5	X		X	X	7′ - 10′	Many varieties available for the home fruit grower. Avoid low-chilling varieties. Select from 1,100 hours for North Mississippi to 600 hours for Gulf Coast area. Well-drained soils are essential to reduce root rot problems. Growth rate is fast.
Double Flowering Oriental Cherry *Prunus serrulata* 'Kwansan'	D	5	X			6.0 - 7.0	X		X		7′ - 10′	Very attractive when in flower. New growth bronzy green. Will not tolerate dry locations. One of the hardiest and most popular flowering cherries. Growth rate is medium.
Flowering Pomegranate *Punica granatum*	D	8	X	X		5.5 - 7.0			X	X	7′ - 10′	Popular shrub of the old South. There are many double-flowered and non-fruiting forms. Growth rate is medium fast.
Scarlet Firethorn *Pyracantha coccinea*	B	6	X	X		6.0 - 8.0	X	X			7′ - 10′	Vigorous growth difficult to control in confined areas. Needs lots of room to grow. Difficult to transplant in large sizes. If large size is planted, use a container-grown plant. Excellent plant for espalier. Growth rate is medium fast.

Large Shrubs or Small Trees

Average mature height between 12 feet and 20 feet COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Border	LANDSCAPE USES: Hedge	LANDSCAPE USES: Accent	LANDSCAPE USES: HOrch	Spacing	Type Codes: B = Broad-leaved Evergreen, D = Deciduous, G = Grass, N = Narrow-leaved Evergreen, P = Palm, S = Semi-Evergreen NOTES AND COMMENTS
Formosa Firethorn *Pyracantha koidzumi*	B	8	X	X		6.0 - 8.0	X	X			7′- 10′	Difficult to transplant as a large specimen. Excellent for espalier. Berries produced on 2nd year's wood, so prune in spring after berries have shed and before new growth begins. Growth rate is medium fast.
Flameleaf Sumac *Rhus copallina*	D	4	X	X		5.5 - 7.0	X		X		7′ - 10′	Suckers freely forming a large colony. One of the earliest woody plants to appear on cleared land. Growth rate is medium.
Smooth Sumac *Rhus glabra*	D	4	X	X		5.0 - 6.0	X		X		4′ - 6′	Suckers freely forming large clumps. Withstands wide range of growing conditions. Tolerant of city conditions. Growth rate is medium fast.
Pussy Willow *Salix discolor*	D	3	X	X		6.5 - 8.0	X		X		5′ - 8′	Female catkins are the familiar pussy willows. Can be used as a cut flower. Can become a pest. May have problems with high humidity of the deep south. Growth rate is fast.
Small Flowering Tamarix *Tamarix parvifolia*	B	4	X	X		6.0 - 8.0	X	X	X		5′ - 7′	Flowers on year-old wood. Prune after flowering, if needed. Does well on dry soils and seashore plantings. Small leaves give branches a feathery appearance. Growth rate is medium.
Windmill Palm *Trachycarpus fortunei*	P	8		X	X	5.5 - 6.5			X		5′ - 7′	Easily transplanted. Hardy in most areas where other palms may be killed. Trunk covered with fibers, giving the appearance of being covered with dark burlap. Will not grow well in poorly drained areas. Tolerant of salt spray. Highly resistant to wind. Manganese deficiency can occur in alkaline soils. Maintain pH within recommend limits. Growth rate is slow.
Lilac Chaste Tree *Vitex agnus-castus*	D	6	X	X		6.0 - 7.0	X		X		10′ - 15′	Often pruned into a single or multitrunked tree. Popular plant in old gardens. Foliage has pungent odor when crushed. Growth rate is medium fast.

Medium Trees

Average mature height between 20 feet and 40 feet COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Accent	LANDSCAPE USES: Wind Break	LANDSCAPE USES: Shade	LANDSCAPE USES: Hedge or Screen	Spacing	Type Codes: B = Broad-leaved Evergreen, D = Deciduous, N = Narrow-leaved Evergreen, P = Palm, S = Semi-Evergreen NOTES AND COMMENTS
Boxelder *Acer negundo*	D	5	X	X		6.0 - 8.0			X		17′ - 25′	Wood weak and subject to wind damage. Tolerates dry soils. Fast grower. Short-lived tree. Only maple with compound leaves. Growth rate is fast.
Autumn Flame Red Maple *Acer rubrum* 'Autumn Flame'	D	5	X	X		6.0 - 7.5	X		X		27′ - 40′	See Red Maple. Large globular tree with slightly smaller leaves. Colors early in fall. (Patented) Growth rate is fast.
Columnar Red Maple *Acer rubrum* 'Columnar'	D	5	X	X		6.0 - 7.5	X		X		27′ - 40′	See Red Maple. Tree densely upright in form, giving it a columnar appearance. Growth rate is fast.
October Glory Red Maple *Acer rubrum* 'October Glory'	D	5	X	X		6.0 - 7.5	X		X		27′ - 40′	See Red Maple. Large globular tree with glossy green leaves. Turns scarlet to crimson in the fall. (Patented) Growth rate is fast.
Red Sunset Red Maple *Acer rubrum* 'Red Sunset'	D	5	X	X		6.0 - 7.5	X		X		27′ - 40′	See Red Maple. Large upright tree with glossy green leaves. Good fall color. Growth rate is fast.
Trident Red Maple *Acer rubrum* 'Trident'	D	5	X	X		6.0 - 7.5	X		X		27′ - 40′	See Red Maple. Leaves with 3 lobes, wooly white beneath. Relatively short-lived tree. Growth rate is fast.
Drummond Red Maple *Acer rubrum drummondii*	D	5	X	X		6.0 - 7.5	X		X		27′ - 40′	See Red Maple. Leaves with 3-5 lobes, wooly white beneath. Fruit generally larger than Red Maple. Relatively short-lived tree. Growth rate is fast.
Silver Maple *Acer saccharinum*	D	4	X			6.0 - 7.5			X		20′ - 30′	Short-lived tree. Not well adapted for lower South. Wood is brittle. Good fall color. Shallow root system may cause heaving of walks, etc. Growth rate is medium fast.
Mimosa *Albizia julibrissin*	D	7	X	X		5.0 - 7.0	X				23′ - 35′	Soft wood is easily damaged by wind and ice storms. Late to leaf out in spring. Suckers may be a nuisance. Short-lived tree. Growth rate is medium fast.
Charlotte Mimosa *Albizia julibrissin* 'Charlotte'	D	7	X	X		5.0 - 7.0	X				23′ - 35′	See Mimosa. Reported to be resistant to mimosa wilt. Not easily found in the nursery. Growth rate is medium fast.
Rubra Mimosa *Albizzia julibrissin* 'Rubra'	D	7	X	X		5.0 - 7.0	X				23′ - 35′	See Mimosa. Deep flowers. Growth rate is medium fast.
River Birch *Betula nigra*	D	4	X	X		5.0 - 6.5	X		X		13′- 20′	Aphids may be severe on young leaves, causing distortion. Exfoliating bark. May be multitrunked. Chlorosis above pH of 6.5. Growth rate is medium.

Medium Trees

Average mature height between 20 feet and 40 feet COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Accent	LANDSCAPE USES: Wind B	LANDSCAPE USES: Shade	LANDSCAPE USES: HO rch	Spacing	Type Codes: B = Broad-leaved Evergreen, D = Deciduous, N = Narrow-leaved Evergreen, P = Palm, S = Semi-Evergreen NOTES AND COMMENTS
Common Paper Mulberry *Broussonetia papyrifera*	D	6	X	X		5.5 - 7.0				X	20′ - 30	Difficult to grow other plants beneath because of dense shade and roots. Suckers may be a problem. Bird droppings will stain. Growth rate is fast.
Southern Catalpa *Catalpa bignonioides*	D	6	X	X		7.0 - 8.0				X	20′ - 30′	Often raised for worms that feed on leaf. Worms used for fish bait. Growth rate is medium fast.
Flowering Dogwood *Cornus florida*	D	4	X	X	X	5.0 - 6.5	X				17′ - 25′	Showy part of flower are bracts and not petals. Color white, pink, red. Wood is hard, heavy. Very sensitive to heavy, poorly drained soils. Growth rate is medium slow.
Washington Hawthorn *Crataegus phaenopyrum*	D		X	X	X	6.0 - 7.0	X				13′ - 20′	One of the best of all the hawthorns. Tolerates city conditions well. One of later flowering varieties. Native from Virginia to Alabama. Growth rate is medium fast.
Arizona Cypress *Cupressus arizonica*	N	7	X	X		6.0 - 8.0	X	X			13′ - 20′	Has very attractive blue-gray needles. Responds well to fertilizer. May get too big for many locations. Growth rate is medium.
Lusterleaf Holly *Ilex latifolia*	B	7		X		5.0 - 6.0	X	X	X		20′ - 30′	Dioecious. Fruits on 2-year old wood. Vigorous shoots may be injured by cold. May resemble magnolia at a distance. Growth rate is medium slow.
Mexican Blue Palm *Brahea armata*	P	9	X	X		5.5 - 6.5	X				7′ - 10′	May be killed with temperatures of 15 degrees. Recommended for zone 9 and south unless in a well protected area. Very tolerant of heat and wind. A rugged palm. Highly alkaline water may cause tip burn. Manganese deficiency can occur in alkaline soils. Maintain pH within recommended limits. Growth rate is slow.
Chinese Parasol Tree *Firmiana simplex*	D	7	X	X		5.0 - 7.0	X		X		10′ - 15′	Often becomes straggly after 10-15 years. Extremely upright in growth. Seedlings may become pest. Good fall color. Fast growing for first 5-7 years. Growth rate is fast.
Chinese Ash *Fraxinus chinensis*	D	5	X			5.5 - 6.5		X	X		20′ - 30′	Growth rate is medium fast.
Arizona Velvet Ash *Fraxinus velutina*	D	7	X			6.0 - 8.0	X		X		20′ - 30′	Short-lived tree. Tolerates alkaline soils and dry conditions. Growth rate is medium fast.
Thornless Honey Locust *Gleditsia triacanthos inermis*	D	4	X			6.0 - 8.0	X		X		17′ - 25′	This selection has no thorns as other locusts.Not recommended for hardiness zones 9 and 10. Growth rate is fast.

Medium Trees

Average mature height between 20 feet and 40 feet

Type Codes:
B = Broad-leaved Evergreen
D = Deciduous
N = Narrow-leaved Evergreen
P = Palm
S = Semi-Evergreen

COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Accent	LANDSCAPE USES: Wind Break	LANDSCAPE USES: Shade	LANDSCAPE USES: Hor ch	Spacing	NOTES AND COMMENTS
Moraine Thornless Honey Locust *Gleditsia triacanthos inermis* 'Moraine'	D	4	X			6.0 - 8.0	X		X		17′ - 25′	See Thornless Honey Locust. Growth rate is fast.
Sunburst Thornless Honey Locust *Gleditsia triacanthos inermis* 'Sunburst'	D	4	X			6.0 - 8.0	X		X		17′ - 25′	See Thornless Honey Locust. Growth rate is fast.
Common Witch Hazel *Hamamelis virginiana*	D	4		X	X	6.0 - 7.0	X				7′ - 10′	Difficult to move as a large plant. Trunk and bark are landscape features. Does not flower well in deep shade. Growth rate is medium fast.
American Holly *Ilex opaca*	B	5	X	X		5.0 - 6.0	X	X	X		13′ - 20′	Numerous varieties. Some with yellow fruit. Dioecious. Difficult to transplant in larger sizes. Fruits on new wood. Growth rate is medium.
East Palatka American Holly *Ilex x attenuata* 'East Palatka'	B	6	X	X		5.0 - 6.0	X	X	X		13′ - 20′	Very heavy berry producer. Supposed to be a female clone of American Holly. Growth rate is medium.
Howard American Holly *Ilex opaca* 'Howard'	B	6	X	X		5.0 - 6.5	X	X			13′ - 20′	See American Holly. Heavy berry producer. Female clone. Not as hardy as American Holly. Growth rate is medium.
Savannah American Holly *Ilex opaca* 'Savannah'	B	6	X	X		5.5 - 7.0	X	X			13′ - 20′	See American Holly. Leaves have wavy margin, 2-3 inches long, with several spines. Growth rate is medium.
Chilean Palm *Jubaea chilensis*	P	9	X	X	X	5.5 - 6.5	X				7′ - 10′	Hardy to 15 degrees. Recommended for Zone 9 only. Slow growing palm with long arching feathery fronds. Not commonly grown but a good plant. Will need protection with severe cold spells. Manganese deficiency can occur in alkaline soils. Maintain pH within recommended limits. Growth rate is slow.
Keteleer Chinese Juniper *Juniperus chinensis* 'Keteleeri'	N	4	X			6.0 - 8.0	X	X			7′ - 10′	Free fruiting. Dioecious. Larger fruit than most junipers. Growth rate is medium.
Eastern Red Cedar *Juniperus virginiana*	N	2	X			5.5 - 8.0	X	X			13′ - 20′	Probably monoecious. Fruit matures in 1 year. May be difficult to transplant when large. Formal shape. Lends itself to formal landscapes. Becomes open when old. Growth rate is medium.
Canaert Eastern Red Cedar *Juniperus virginiana* 'Canaerti'	N	3	X			6.0 - 8.0	X	X			10′ - 15′	Heavy fruit producer. Very popular form of red cedar. Easily sheared to various shapes. Growth rate is medium.

Medium Trees

Average mature height between 20 feet and 40 feet COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Accent	LANDSCAPE USES: Wind Break	LANDSCAPE USES: Shade	LANDSCAPE USES: Hedge or Screen	Spacing	Type Codes: B = Broad-leaved Evergreen, D = Deciduous, N = Narrow-leaved Evergreen, P = Palm, S = Semi-Evergreen NOTES AND COMMENTS
Golden Rain Tree *Koelreuteria bipinnata*	D	9	X	X		5.0 - 7.0	X		X		30′ - 45′	Subject to winter kill or severe injury every 10-15 years. Best suited for coastal Mississippi. Tree's form is unpredictable. Short lived. Growth rate is fast.
Panicled Golden Rain Tree *Koelreuteria paniculata*	D	5	X	X		5.0 - 7.0	X		X		17′ - 25′	May not do well in northern Mississippi. Growth rate is medium fast.
Yulan Magnolia *Magnolia denudata*	D	5	X	X		5.0 - 6.0	X				13′ - 20′	Difficult to transplant. Needs plenty of room to develop. Rose colored flowering form available. Growth rate is medium.
Bigleaf Magnolia *Magnolia macrophylla*	D	5	X	X	X	5.0 - 6.0	X				17′ - 25′	Difficult to transplant. Native plant. Open exposure may result in large leaves (1-3 ft) being beaten by the wind. Growth rate is fast.
Japanese Flowering Crabapple *Malus floribunda*	D	4	X			6.0 - 7.0	X				17′ - 25′	One of the oldest and most dependable crabapples. Flowers fairly early in its life. Bears every year. May not receive enough cold in Zone 8b for good flowering. Growth rate is medium fast.
Chinaberry *Melia azederach*	D	7	X	X		5.0 - 7.0	X		X		13′ - 20′	Twigs and fruit are a maintenance problem. Seed sprout easily around base of tree. Short-lived tree with weak, brittle wood. Tolerates a wide range of conditions. Growth rate is fast.
Fruitless White Mulberry *Morus alba* 'Fruitless'	D	3	X	X		6.0 - 7.5	X		X		17′ - 25′	Tolerates most soils. Growth rate is fast.
Jerusalem Thorn *Parkinsonia aculeata*	D	9	X	X		6.0 - 7.5	X				13′ - 20′	In warm areas will flower from spring to fall. Stems remain green throughout the year. Thorns. Short-lived tree. Young trees grow rapidly and require staking for first two or three years. Tolerant of salt spray. Growth rate is fast.
Royal Paulownia *Paulownia tomentosa*	D	5	X			6.0 - 8.0	X		X		10′ - 15′	Very similar in habit to Catalpa. Flower buds often injured by cold winters. With heavy pruning, new shoots may grow 12 feet in a single season. Leaf litter a problem. Flowers on last year's wood. Flower buds picturesque through the winter. Weak wood. Growth rate is fast.

Medium Trees

Average mature height between 20 feet and 40 feet COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Accent	LANDSCAPE USES: Wind B	LANDSCAPE USES: Shade	LANDSCAPE USES: Hdg Orch	Spacing	Type Codes: B = Broad-leaved Evergreen, D = Deciduous, N = Narrow-leaved Evergreen, P = Palm, S = Semi-Evergreen NOTES AND COMMENTS
Date Palm *Phoenix dactylifera*	P	9		X	X	5.5 - 6.5	X				13′ - 20′	Usually a very large palm. Needs lots of room. Leaves will burn at 20 °F. Palm may be killed at 10 °F. Once it reaches larger sizes, this palm seems to be more hardy. Protect when small. May not flower and fruit on sandy, droughty soils. Manganese deficiency can occur in alkaline soils. Maintain pH within recommended limits. Growth rate is medium slow.
Spruce Pine *Pinus glabra*	N	8	X	X		5.5 - 7.0	X	X	X		13′ - 20′	Will tolerate heavier soil conditions than other pines. Bark smooth similar to oaks. Branches smooth. Cones remain on tree for 2-3 years. Cones 1-2 1/2 inches. Growth rate is medium fast.
Virginia Pine *Pinus virginiana*	N	5	X			5.5 - 6.5	X	X	X		13′ - 20′	Often grown commercially in Christmas tree farms. Takes regular pruning at proper time well. Growth rate is fast.
Pistachio or Chinese Pistache *Pistacia chinensis*	D	8	X			5.5 - 6.5	X		X		26′ - 40′	Drought tolerant. Planted for fall color of scarlet to golden yellow. Used as understock for edible nut tree. Durable tree, wind resistant. Growth rate is medium.
Bolleana Poplar *Populus alba* ‘Pyramidalis’	D	3	X	X		5.5 - 7.0	X		X		17′ - 25′	Leaf silvery white beneath. May show dust and soot. Suckers readily from roots. Tolerates poor to fertile soils. Growth rate is medium fast.
Carolina Cherry Laurel *Prunus caroliniana*	B	7	X	X		5.5 - 6.5	X	X	X		10′ - 15′	Leaves and fruit poisonous when eaten. Best in full sun. Prefers well drained soils. Subject to wind and ice storm damage. Growth rate is medium fast.
Black Cherry *Prunus serotina*	D	3	X	X		6.0 - 7.5	X		X		13′ - 20′	Fruit favored by many forms of wildlife. Short-lived tree with brittle wood. Volunteer seedling common along fence rows. Fast growth with fertile, moist, well-drained soils. Growth rate is fast.
Yoshino Cherry *Prunus yedoensis*	D	5	X			6.0 - 7.0	X		X		23′ - 35′	Makes excellent show in spring. Will come true from seed. Effective when grown in front of narrow-leaved evergreens. Growth rate is medium.
Aristocrat Flowering Pear *Pyrus calleryana* ‘Aristocrat’	D	5	X			5.5 - 6.5	X				17′ - 25′	Large glossy green leaves with wavy margins. Heavy flower producer in spring. Fruit may be a nuisance in the landscape. Growth rate is medium fast.

Medium Trees

Average mature height between 20 feet and 40 feet

Type Codes:
B = Broad-leaved Evergreen
D = Deciduous
N = Narrow-leaved Evergreen
P = Palm
S = Semi-Evergreen

COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Accent	LANDSCAPE USES: Wind Break	LANDSCAPE USES: Shade	LANDSCAPE USES: Hedge or Screen	Spacing	NOTES AND COMMENTS
Bradford Flowering Pear *Pyrus calleryana* 'Bradford'	D	5	X			5.5 - 6.5	X				17′ - 25′	Not as susceptible to fire blight as common pear. Fruit small (1/2 inch in diameter) and may be considered a nuisance in the landscape. Subject to trunk splitting with heavy ice storms. Growth rate is medium fast.
Capital Flowering Pear *Pyrus calleryana* 'Capital'	D	5	X			5.5 - 6.5	X				10′ - 15′	Named in 1977 from selection of 'Bradford' seedlings growing at the U.S. Plant Introduction Station, Glen Dale, MD. Not as susceptible to fire blight as common pear. Growth rate is medium fast.
Whitehouse Flowering Pear *Pyrus calleryana* 'Whitehouse'	D	5	X			5.5 - 6.5	X				7′ - 10′	Named in 1977 from selection of 'Bradford' seedlings growing at the U.S. Plant Introduction Station, Glen Dale, MD. Not as susceptible to fire blight as common pear. Growth rate is medium fast.
Common Pear *Pyrus communis*	D	4	X			6.0 - 7.5	X		X		13′ - 20′	Recommended cultivars for the home orchard include 'Baldwin,' 'Cox,' 'Kieffer,' 'Orient,' 'LeCont,' and 'Pineapple.' Growth rate is medium.
Blue Japanese Oak *Quercus glauca*	B		6	X	X	5.0 - 6.5	X				13′ - 20′	Difficult to find in the trade. Severe winters may kill the foliage. Excellent tree for coastal areas. Growth rate is medium fast.
Darlington Oak or Laurel Oak *Quercus laurifolia*	B	7	X	X		5.0 - 6.5	X		X		20′ - 30′	Difficult to transplant. Not widely grown. Leaves fall in spring. Excellent tree for coastal areas. Acorns 1/4 to 1/2 inch long. Growth rate is medium slow.
Live Oak *Quercus virginiana*	B	8	X			5.0 - 6.0	X		X		50′ - 75′	Largest on record has a 38-foot trunk circumference, 168-foot spread, and 75-foot height. Easily transplanted when young. Needs plenty of room to develop. Acorns 3/4 inch long, narrow, black. Thought to be slow growing, but proper care indicates otherwise. Growth rate is medium.
Staghorn Sumac *Rhus typhina*	D	3	X	X		5.0 - 6.0	X				13′ - 20′	Easily damaged by ice storms. Tolerates poor dry soils. Branching habit often resembles a stag's horns. Growth rate is medium.
Black Locust *Robinia pseudoacacia*	D	4	X	X		6.0 - 8.0	X		X		13′ - 20′	Tends to sucker readily, forming large clumps. Wood highly resistant to decay. Growth rate is medium fast.

Medium Trees

Average mature height between 20 feet and 40 feet COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Accent	LANDSCAPE USES: Wind B	LANDSCAPE USES: Shade	LANDSCAPE USES: HOrch	Spacing	Type Codes: B = Broad-leaved Evergreen, D = Deciduous, N = Narrow-leaved Evergreen, P = Palm, S = Semi-Evergreen NOTES AND COMMENTS
Cabbage or Palmetto Palm *Sabal palmetto*	P	9	X	X		5.5 - 6.5	X				4′ - 6′	Very easy to transplant in large sizes. Base of old leaf petioles decays, leaving a relatively smooth trunk. Palm much like a lollypop in profile. Tolerant of salt spray. Only one growing bud. When transporting or transplanting, tie leaves together to protect the bud. Manganese deficiency can occur in alkaline soils. Maintain pH within recommended limits. Growth rate is medium.
Babylon Weeping Willow *Salix babylonica*	D	4	X	X		5.0 - 6.0	X		X		20′ - 30′	Very fast grower near water sources. Brittle wood subject to storm damage. Short lived. Shallow, competitive root system. Growth rate is fast.
Corkscrew Willow *Salix matsudana* ‘Tortuosa’	D	4	X	X		6.0 - 8.0	X				10′ - 15′	Short-lived tree. Wood is weak and subject to storm damage. Roots may clog sewer lines. Landscape asset is the twisted branches resembling a cork screw. Nice effect when foliage is not present. Growth rate is medium fast.
Black Willow *Salix nigra*	D	4	X	X	X	5.5 - 7.0			X		20′ - 30′	Sprouts readily and may become a pest along drainage ditches or ponds. Short lived. Often multiple trunked. A plant of little ornamental value. Growth rate is fast.
Western Soapberry *Sapindus drummondii*	D	5	X			6.0 - 8.0	X		X		20′ - 30′	Fruit reported to be mildly poisonous. Fruit, when crushed in water, will form lather like soap. Not readily available in trade but should be used more. Growth rate is medium.
Sassafras *Sassafras albidum*	D	4	X	X		6.0 - 8.0	X		X		13′ - 20′	Sassafras tea is made from roots. Difficult to transplant, especially if large. Stems remain green. Often found growing in colonies. Three different leaf shapes on same tree: right mitten, left mitten and three lobed. Growth rate is medium fast.
Lacebark Elm *Ulmus parvifolia*	D	6	X			5.0 - 7.5	X		X		13′ - 20′	Partially evergreen in more southern climates. Confused with *Ulmu spumilis*, the Siberian Elm, but is a superior plant. Some cultivars available. Growth rate is fast.
Norway Maple *Acer platanoides*	D	3	X	X	X	6.0 - 8.0			X		27′ - 40′	Not recommended below Zone 8. Tolerates city conditions and restricted roots. Does not tolerate dry soils. Growth rate is medium fast.

Large Trees

Average mature height between 40 feet and greater COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Accent	LANDSCAPE USES: Screen	LANDSCAPE USES: Shade	LANDSCAPE USES: HOrch	Spacing	Type Codes: B = Broad-leaved Evergreen, D = Deciduous, N = Narrow-leaved Evergreen, P = Palm, S = Semi-Evergreen NOTES AND COMMENTS
Crimson King Norway Maple *Acer platanoides* 'Crimson King'	D	3	X	X	X	6.0 - 8.0	X		X		27′ - 40′	See Norway Maple. Holds red to reddish purple leaf color during growing season. Fall color may not be compatible in some situations. Growth rate is medium fast.
Emerald Queen Norway Maple *Acer platanoides* 'Emerald Queen'	D	3	X	X	X	6.0 - 8.0	X		X		27′ - 40′	See Norway Maple. Leaves green during growing season. Growth rate is medium fast.
Jade Green Norway Maple *Acer platanoides* 'Jade Green'	D	3	X	X	X	6.0 - 8.0	X		X		27′- 40′	See Norway Maple. Rapid grower with straight limbs. Growth rate is medium fast.
Schwedleri Norway Maple *Acer platanoides* 'Schwedleri'	D	3	X	X	X	6.0 - 8.0	X		X		23′- 35′	See Norway Maple. Slightly smaller than parent plant. Leaves red in spring, turning green in summer. Growth rate is medium fast.
Superform Norway Maple *Acer platanoides* 'Superform'	D	3	X	X	X	6.0 - 8.0	X		X		27′- 40′	See Norway Maple. Rapid grower with dark green leaves. Growth rate is medium fast.
Red Maple *Acer rubrum*	D	3	X	X		6.0 - 8.0	X		X		33′ - 50′	Tolerates poorly drained soils. Good fall color. Growth rate is fast.
Sugar Maple *Acer saccharum*	D	3	X	X		6.0 - 7.5	X		X		27′ - 40′	Better suited for cooler and more humid regions of the United States. Not recommended below Zone 7. Growth rate is medium slow.
Pecan *Carya illinoensis*	D	5	X			6.4 - 8.0			X	X	27′ - 40′	Leaves fall early and appear late. Wood brittle and subject to storm damage. Nut is edible. Nut may be food for wildlife such as squirrels and birds. Growth rate is medium.
Deodar Cedar *Cedrus deodara*	N	7	X			6.0 - 7.0	X	X			20′ - 30′	Tops may die because of borers and destroy symmetry. Branches pendulous when young. Reported to be drought tolerant. Growth rate is medium.
Sugar Hackberry *Celtis laevigata*	D	5	X	X		6.0 - 8.0	X		X		33′ - 50′	Long-lived tree. Bark interesting with warty outgrowths. Zigzag stems. Good for chalky or alkaline soils. Root shallow and dense. Growth rate is medium.
Common Chinafir *Cunninghamia lanceolata*	N	6	X			6.0 - 8.0	X	X			13′ - 20′	Overall appearance of plant is coarse though foliage is small. Sensitive to poorly drained soils. Best growth in north Mississippi. Growth rate is medium slow.

Large Trees

Average mature height between 40 feet and greater COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Accent	LANDSCAPE USES: Screen	LANDSCAPE USES: Shade	LANDSCAPE USES: HOrch	Spacing	Type Codes: B = Broad-leaved Evergreen D = Deciduous N = Narrow-leaved Evergreen P = Palm S = Semi-Evergreen NOTES AND COMMENTS
Leyland Cypress *Cupressocyparis x leylandii*	N	5	X	X		5.0 - 7.0	X	X			17′ - 25′	This plant is an intergeneric hybrid. Transplants easily from containers. Tolerant of salt spray. Varieties include 'Castlewellan'—yellow foliage; 'Greenspire'—narrow, columnar form; 'Leighton Green'—heat resistant; 'Naylor's Blue'—grayish-green foliage; 'Silverdust'— bluish-green with white variegations. Growth rate is very fast.
American Beech *Fagus grandiflora*	D	3	X			5.0 - 6.7	X		X		33′ - 50′	Sensitive to overly wet areas. Tolerates very little soil disturbance around plant once established. Not tolerant of city conditions. Growth rate is medium.
European Beech *Fagus sylvatica*	D	3	X			5.0 - 6.7	X		X		33′ - 50′	Sensitive to very wet areas. Does not tolerate soil disturbance around roots once established. Growth rate is medium.
White Ash *Fraxinus americana*	D	2	X			6.0 - 7.5	X		X		43′ - 65′	Not tolerant of poorly drained soils. Should not be used in suburban areas where there is no top soil or soil is a heavy clay. Growth rate is medium.
Green Ash *Fraxinus pennsylvanica lanceolata*	D	2	X			6.0 - 7.5	X		X		30′ - 45′	Leaves persist throughout most of the winter. Leaves more lance shaped than regular green ash. Avoid poorly drained soils. Growth rate is medium.
Marshall's Seedless Green Ash *Fraxinus pennsylvanica lanceolata* 'Marshall's Seedless'	D	2	X			6.0 - 7.5	X		X		30′ - 45′	Seedless variety. Does not have litter problem as with Green Ash. Old cultivar selected in Nebraska. Drought resistant. Growth rate is medium fast.
Ginkgo *Ginkgo biloba*	D	4	X	X		6.0 - 7.0	X		X		20′ - 30′	Male and female varieties. Fruit is produced on female trees and may have unpleasant odor. Select a male variety. Long lived. Fossils found of leaves over 150 million years old. Growth rate is medium.
Common Persimmon *Diospyros virginiana*	D	4	X			5.0 - 6.5	X		X	X	13′ - 20′	One of the most durable of small trees. Characteristics of tree vary with habitat. Difficult to transplant. Growth rate is medium.
Black Walnut *Juglans nigra*	D	4	X			6.0 - 8.0		X	X		27′ - 40′	Roots give off toxic substance making it difficult to grow other plants nearby. Fruit can be a nuisance. Difficult to transplant. Native tree. Growth rate is medium slow.

Large Trees

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American Sweetgum *Liquidambar styraciflua*	D	4	X			6.0 - 7.0	X		X		20′ - 30′	One of better trees for fall color for deep South. Usually maroon but may be red or yellow. Seed balls may be a nuisance in landscapes. They do not decay readily. Not easily transplanted in larger sizes. One of few trees that tolerates topping at an old age. Growth rate is medium.
Tulip Magnolia *Liriodendron tulipifera*	D	4	X	X		6.0 - 7.0	X		X		17′ - 25′	Does not transplant easily in larger sizes. Sensitive to poorly drained soils or soils with high water table. Rapid growth when fertilized in late winter with high nitrogen fertilizer. Growth rate is medium.
Bois-d-Arc, Bodark, or Osage-Orange *Maclura pomifera*	D	5	X	X		6.0 - 7.5			X		27′ - 40′	Fruit and deadwood are a maintenance problem. Difficult to grow other plants beneath this one. Inner bark is orange colored. Root system shallow and competitive. Sap is milky. Wood is very durable. Growth rate is fast.
Southern Magnolia *Magnolia grandiflora*	B	7	X	X	X	5.0 - 6.0	X	X			30′ - 45′	Leaf litter objectionable. Best when the lower branches are retained and allowed to sweep the ground. Difficult to transplant in large sizes. Growth rate is medium slow.
Sweetbay Magnolia *Magnolia virginiana*	B	6	X	X	X	5.0 - 6.0	X		X		10′ - 15′	Sheds leaves in spring. Difficult to transplant. Sprouts readily from the roots. Not drought tolerant. Foliage silvery below. Do not confuse this plant with the cooking bay some times also called sweetbay. Growth rate is medium fast.
Dawn Redwood *Metasequoia glyptostroboides*	D	5	X	X		5.5 - 6.5	X		X		33′ - 50′	Prior to 1944 this tree was known only by its fossil records. Found in China in that year. It existed in a small China providence of Szechuan-Hupeh for over a million years until its discovery. Much variation found in seedlings. Growth rate is fast.
Tupelo Blackgum *Nyssa sylvatica*	D	4	X	X		6.0 - 7.0	X		X		20′ - 30′	Native tree distributed along streams and near bogs. Early fall color and leaf drop. Growth rate is medium.
Canary Island Date Palm *Phoenix canariensis*	P	9	X	X		5.5 - 6.5	X				17′ - 25′	Will withstand heavy mulching. Requires much fertilizer. When started small, can be confined to a container. Difficult to tell from regular Date Palm. Manganese deficiency can occur in alkaline soils. Maintain pH within recommended limits. Growth rate is medium.

Large Trees

Average mature height between 40 feet and greater

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COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Accent	LANDSCAPE USES: Screen	LANDSCAPE USES: Shade	LANDSCAPE USES: HOrch	Spacing	NOTES AND COMMENTS
Slash Pine *Pinus elliottii*	N	8	X			5.0 - 6.5	X		X		17′ - 25′	Cones 2-6 inches long and stalked. Can be damaged by ice storms. Difficult to transplant past the seedling stage. Excellent canopy tree for azaleas and camellias. Growth rate is fast.
Longleaf Pine *Pinus palustris*	N	7	X	X	X	4.5 - 5.0	X		X		20′ - 30′	Slow growth for first 2-3 years then fast. Needles 8-18 inches long. Easily damaged by ice storms. Excellent canopy for camellias and azaleas. Growth rate is fast.
White Pine *Pinus strobus*	N	3	X	X		5.0 - 6.0		X	X		13′ - 20′	Very soft textured pine. Bark smooth on young limbs and trunks. Not recommended for lower south, Zone 8 and south. Plant is affected by day length, which varies less in the deep south. Growth rate is fast.
Loblolly Pine *Pinus taeda*	N	6	X	X	X	5.0 - 6.0	X	X	X		17′ - 25′	Difficult to transplant in large sizes. Excellent canopy for azaleas and camellias. Cones 3-6 inches long with almost no stem. Needles 6-9 inches long. Growth rate is fast.
Japanese Black Pine *Pinus thunbergiana*	N	7	X			5.5 - 6.5	X		X		17′ - 25′	Needles 3-4 inches long. Ideal for Japanese garden effect. Growth rate is fast.
London Plane Tree *Platanus acerifolia*	D	4	X			6.0 - 7.5	X		X		27′ - 40′	Cross between American and Oriental Sycamores. Reported to be less susceptible to anthracnose. Is very similar to American Sycamore except smaller in scale. Growth rate is fast.
American Sycamore *Platanus occidentalis*	D	5	X			6.0 - 7.5	X		X		27′ - 40′	Short-lived tree. Leaves may be a litter problem. Attractive bark. Brown exfoliating to white under bark. Due to disease and insect problems, it is questionable if this tree should be planted in deep south. Growth rate is fast.
Eastern Poplar *Populus deltoides*	D	2	X			5.5 - 7.0	X		X		20′ - 30′	Seeds often a nuisance. Quick shade but short lived. A major tree for pulpwood because of rapid growth. Massive fibrous root system may invade sewer lines and fertile moist planting beds. Dioecious. Male trees not a litter problem. Growth rate is fast.
Lombardy Poplar *Populus nigra* 'Italica'	D	2	X			5.5 - 7.0	X	X			7′ - 10′	Short-lived tree. Highly advertised tree through mail order sources. Shallow roots with many suckers. Growth rate is fast.

Large Trees

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Sawtooth Oak *Quercus acutissima*	D	4	X			5.0 - 6.5	X		X		27′ - 40′	Acorn about 1 inch in diameter with long scales covering about 1/2 the acorn. Takes 2 seasons to mature. Sometimes confused with chestnut oak. Growth rate is medium fast.
White Oak *Quercus alba*	D	4	X			5.0 - 6.5	X		X		33′ - 50′	Attains a massive size but is slow growing. Not easily adaptable to city conditions. Leaves are large. Growth rate is slow.
Southern Red Oak *Quercus falcata*	D	5	X	X		4.0 - 5.0	X		X		33′ - 50 ‘	Bark dark brown or black and deeply fissured. Easily transplanted. One of the best oaks for the south. Grows better in drier locations. Growth rate is medium fast.
Swamp Red Oak *Quercus pagoda*	D	5	X	X		4.0 - 5.0	X		X		33′ - 50′	Easily transplanted. Taller growing than Southern Red Oak. Galls may be unsightly. Growth rate is medium fast.
Laurel Oak or Diamond Oak *Quercus laurifolia*	S	7	X	X		5.0 - 6.0	X		X		27′ - 40′	Acorn 1/2 inch long. Plant difficult to transplant. Long-lived tree. Attractive, symmetrical tree. Growth rate is medium.
Chinkapin Oak *Quercus muehlenbergii*	D	3	X	X		5.0 - 7.5	X		X		27′ - 40′	Bark ashy gray and flaky. Acorn about 1/2 inch long, oval, dark brown with cap covering about 1/4 of acorn. Not especially well suited for coastal counties. Does well on soils with high pH. Growth rate is medium slow.
Water Oak *Quercus nigra*	D	6	X	X		5.5 - 6.5	X		X		27 ‘- 40′	Bark grayish-black, rough. Excellent for city conditions. Leaves may be retained part of the winter. A good oak for the landscape. Leaves spatulate at the end, often developing three lobes. Growth rate is medium fast.
Pin Oak *Quercus palustris*	D	5	X			5.0 - 6.5	X		X		27′ - 40′	Easily transplanted. Becomes chlorotic if grown in alkaline soils. Not very drought tolerant. Leaves deeply cut with 5 to 9 lobes. Tolerates city conditions. Growth rate is medium fast.
Willow Oak *Quercus phellos*	D	5	X	X		5.0 - 6.0	X		X		33′ - 50′	Retains leaves late in fall. Leaves resemble those of black willow. Long-lived tree. Acorn about 1/2 inch long, oval to flattened, with cap covering about 1/4 of acorn. Growth rate is medium fast.
Swamp Chestnut Oak *Quercus michauxii*	D	4	X	X		5.0 - 6.0	X		X		27′ - 40′	Difficult to transplant. Excellent fall color not found in other chestnut oaks. Acorn about 1 1/2 inches long, lustrous brown, with cap covering about 1/3 of acorn. Growth rate is medium.

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Large Trees

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English Oak or British Oak *Quercus robur*	D	5	X	X		5.5 - 6.5	X		X		53′ - 80′	Many cultivars available. Difficult to transplant. Acorn 1 inch long on stalk. Growth rate is slow.
Shumard Oak *Quercus shumardii*	D	5	X	X		6.0 - 7.5	X		X		47′ - 70′	Good substitute for Scarlet Oak. Very attractive symmetrical tree. Acorn 3/4 to 1 1/4 inches long. Growth rate is medium fast.
Post Oak *Quercus stellata*	D	4	X	X	X	5.0 - 6.0	X		X		27′ - 40′	Rather difficult to transplant. Dead leaves fall throughout the winter. Not often used in the landscape. Will tolerate moist well-drained areas. Acorn about 1/2 inch long with cup covering 1/4 to 1/2 of the acorn. Growth rate is medium slow.
Common Bald Cypress *Taxodium distichum*	D	4	X	X		5.5 - 6.5	X		X		17′ - 25′	Tolerates very dry to very wet sites. Cypress knee production occurs in wet or poorly drained soils. Growth rate is slow.
American Linden *Tilia americana*	D	5	X	X		5.0 - 6.5	X		X		20′ - 30′	Flowers attract bees in large numbers, since they are a good source of nectar for honey. Tolerant of most soils but does well in moist, fertile, well drained ones. Growth rate is medium fast.
Littleleaf Linden *Tilia cordata*	D	3	X			5.5 - 7.5	X		X		20′ - 30′	An attractive tree. More tolerant of alkaline soils. Does not tolerate dry sites. Drainage must be good. Growth rate is fast.
California Fan Palm *Washingtonia filifera*	P	9		X	X	5.5 - 6.5	X				12′ - 18′	Tall straight trunks with globular head of foliage. Trunk very thick. Will withstand temperatures to 15 °F when older. When young, 25 °F can burn the foliage. Manganese deficiency can occur in alkaline soils. Maintain pH within recommended limits. Growth rate is medium slow.
Mexican Fan Palm *Washingtonia robusta*	P	9	X	X		5.5 - 6.5	X				7′ - 10′	Tall, slender trunks. Foliage injury common during winter. Manganese deficiency can occur in alkaline soils. Maintain pH within recommended limits. Growth rate is medium.

Vines

COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Wall	LANDSCAPE USES: Trellis	LANDSCAPE USES: Accent	LANDSCAPE USES: Hor ch	Spacing	NOTES AND COMMENTS
Fiveleaf Akebia *Akebia quinata*	V	4	X	X	X	5.0 - 6.5		X			7′ - 10′	Very aggressive vine. Can become a nuisance if not controlled. When controlled, one of the best foliage vines. May be called Chocolate Vine. Growth rate is fast.
Blueberry Ampelopsis *Ampelopsis brevipedunculata*	V	6	X	X		5.0 - 7.0	X	X			5′ - 8′	Deciduous vine. May be difficult to keep in bounds. Worthy of more use as a climbing vine. Growth rate is medium fast.
Coral Vine *Antigonon leptopus*	V	8	X	X		5.0 - 7.0	X	X	X		7′- 10′	Dies back in winter but returns from the root. Popular vine in intercities. Cut foliage back to ground after first frost. Growth rate is fast.
Common Trumpet Creeper *Campsis radicans*	V	4	X	X	X	6.0 - 7.0	X	X			7′ - 10′	Several hybrids on market but may be hard to find. Requires support for heavy growth. Growth rate is fast.
American Bittersweet *Celastrus scandens*	V	2	X	X	X	4.5 - 6.0	X	X			5′ - 8′	Can girdle and kill shrubs and trees. Do not let this plant twine on them. Dioecious. Only female vine has fruit. Growth rate is medium fast.
Evergreen Armand Clematis *Clematis armandii*	V	8	X	X		6.0 - 7.0	X	X	X		7′ - 10′	Evergreen vine. White flowers star like. Superb for fences, walls, and trellises. Prune after flowering. Plumed fruit persists over winter. Growth rate is medium fast.
Clematis *Clematis hybrids*	V	4	X	X		6.0 - 7.0	X	X	X		7′ - 10′	Will not flower well in shade but afternoon shade is okay. Some species flower on new wood, others on old. Deciduous. Growth rate is medium fast.
Carolina Snailseed *Cocculus carolinus*	V	7	X	X		5.0 - 6.5	X	X			5′ - 8′	Not readily available as a cultivated vine. Requires several years to reach fruiting size. When pulp removed from seed, seed are snail shaped. Growth rate is fast.
Tree Ivy or Fatshedera *Fatshedera lizei*	V	8		X		6.0 - 7.0	X				1′ - 2′	A bi-generic cross between Hedera and Fatsia. Not self supporting. Severe winters will burn foliage. Lower stems tend to be bare. Growth rate is medium fast.
Climbing Fig *Ficus pumila*	V	8	X	X	X	5.5 - 7.5	X	X			5′ - 8′	Milky sap typical of fig family. Slow to establish. Very difficult to clean walls if plant dies or needs to be removed. Growth rate is medium fast.
Dwarf Climbing Fig *Ficus pumila minima*	V	8	X	X	X	5.5 - 7.5	X	X			5′ - 8′	See Climbing Fig. Leaves smaller than climbing fig. Growth rate is medium fast.

Type Codes:
V = Vine

Vines

COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Wall	LANDSCAPE USES: Trees	LANDSCAPE USES: Accent	LANDSCAPE USES: Hor ch	Spacing	NOTES AND COMMENTS
Carolina Jessamine *Gelsemium sempervirens*	V	7	X	X		5.0 - 6.0	X	X			7′ - 10′	Roots and bark are poisonous. Not difficult to keep in bounds. Evergreen. When on fence, train vines to prevent all growth on top. Growth rate is medium fast.
Algerian Ivy *Hedera canariensis*	V	8			X	6.0 - 8.0					.75′ - 1.5′	More susceptible to fungus attacks than English Ivy. Will winter kill in severe winters. Mature leaves less lobed. Many selections available. Growth rate is medium.
English Ivy *Hedera helix*	V	5		X	X	6.0 - 8.0	X	X			1′ - 2′	Slow to spread for first couple of years. Will tolerate more sun if well watered. Susceptible to root rots. Fruit on old plants only. Growth rate is medium.
Morning Glory *Ipomoea purpurea*	V		X	X		5.0 - 6.5	X	X	X		5′ - 8′	Annual. Many horticultural varieties available. May become a pest. Flower size decreases with season. Growth rate is fast.
Hall's Japanese Honeysuckle *Lonicera japonica* 'Halliana'	V	4	X	X	X	6.0 - 7.5	X	X	X		5′ - 8′	Vigorous but less vigorous than Wild Honeysuckle. Semi-evergreen vine. Best used in areas where growth can be controlled. Growth rate is fast.
Purpleleaf Japanese Honeysuckle *Lonicera japonica* 'Purpurea'	V	4	X	X	X	6.0 - 7.5	X	X	X		5′ - 8′	See Wild Honeysuckle. Foliage has rich purple tint. Growth rate is fast.
Trumpet Honeysuckle *Lonicera sempervirens*	V	4	X	X	X	6.0 - 7.5	X	X	X		5′ - 8′	Not as vigorous as some vines in same genus. Easy to manage growth and to keep within limits. Needs support. May be evergreen in zones 9a and 8b. May be deciduous in Zone 8a and north. Growth rate is medium slow.
Virginia Creeper *Parthenocissus quinquefolia*	V	4	X	X	X	5.0 - 7.5	X	X			5′ - 8′	Not readily available through nurseries. Occurs naturally. Growth rate is fast.
Boston Ivy *Parthenocissus tricuspidata*	V	4	X	X		6.0 - 8.0	X	X			5′ - 8′	Deciduous. Handsome vine grown more in colder climates. Has English ivy characteristics. Leaves glossy. Growth rate is fast.
Blue Passion Flower *Passiflora incarnata*	V		X	X		6.0 - 7.0	X	X			3′ - 5′	Flowers reported to be of symbolic significance. Thought to have been associated with the Crucifixion. Several cultivars available with red, white, or blue flowers. Sometimes called Maypop. Growth rate is fast. Annual.
Lady Banksia Rose *Rosa banksiae*	V	7	X	X		6.0 - 7.0	X	X	X		10′- 15′	Single- and double-flowered forms available. Requires support for walls. May not be easily controlled. Popular vine in old southern gardens. Few problems. Growth rate is medium fast.

Type Codes:
V = Vine

Vines

COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Wall	LANDSCAPE USES: Trees	LANDSCAPE USES: Accent	LANDSCAPE USES: Horch	Spacing	NOTES AND COMMENTS
Southern Smilax *Smilax laurifolia*	V	7	X	X		5.0 - 6.0	X	X	X		10′ - 15′	A tough evergreen vine. Sometimes called Lanceleaf Greenbriar. Vine is easily kept within bounds. Not noticed in trees until leaves have fallen and green foliage is noticed. Growth rate is medium.
Asiatic Jasmine *Trachelospermum asiaticum*	V	7	X	X	X	5.5 - 6.5	X	X			1′ - 2′	Variegated form available. Shear every 2-3 years to keep beds attractive. Difficult to use with small mounding shrubs. Does not flower. To add fragrance, interplant one Confederate jasmine for every 15-20 Asiatic jasmine planted. Growth rate is fast.
Confederate Jasmine *Trachelospermum jasminoides*	V	8	X	X	X	5.5 - 6.5	X	X			7′ - 10′	Sometimes used as a ground cover in large areas but coverage not as dense as Asiatic jasmine. Not fully hardy in Zone 8a and north. Often interplanted into Asiatic jasmine to add fragrance. Growth not difficult to control. Growth rate is fast.
Muscadine Grape *Vitis rotundifolia*	V	5	X			6.0 - 7.0	X	X		X	13′ - 20′	Vines may have perfect flowers (male and female) or female flowers only. Female vines require perfect vines in order to bear fruit. Female varieties to consider are 'Fry' with bronze fruit or 'Jumbo' with purple fruit. Perfect vines to consider, by fruit color, are Bronze fruit: 'Carlos,' 'Magnolia,' 'Summit,' or 'Roanoke.' Black fruit: 'Noble' or 'Tarheel.' Growth rate of all vines is considered to be medium fast.
Chinese Wisteria *Wisteria sinensis*	V	5	X	X	X	6.0 - 7.0	X	X	X		10′ - 15′	Flowers poorly in shade. Flowers well on poor soils. 'Alba' is a white flowering form. May take 10 years to flower if rooted from nonflowering wood or grown from seed. Growth rate is fast.
Pindo or Jelly Palm *Butia capitata*	P	9	X	X		5.5 - 6.5		X	15		7′ - 10′	Long, arching, plume or feather-like branches. Winter kills north of Neshoba and Madison counties. Winter kills along the coast with very severe winters (temperatures at or below 10 °F). Sometimes labeled in the trade as Cocos australis. Short lived (30-40 years). Manganese deficiency can occur in alkaline soils. Maintain pH within recommended limits. Growth rate is medium.

Type Codes:
V = Vine

Palms

COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Accent	Avg. Hgt.	Spacing	NOTES AND COMMENTS
Mexican Blue Palm *Brahea armata*	P	9	X	X		5.5 - 6.5		X	25	7′-10′	May be killed with temperatures of 15 °F. Recommended for Zone 9 and south unless in a well protected area. Very tolerant of heat and wind. A rugged palm. Highly alkaline water may cause tip burn. Manganese deficiency can occur in alkaline soils. Maintain pH within recommended limits. Growth rate is slow.
Chilean Palm *Jubaea chilensis*	P	9	X	X	X	5.5 - 6.5		X	40	7′ - 10′	Hardy to 15 °F. Recommended for Zone 9 only. Slow growing palm with long, arching, feathery fronds. Not commonly grown but a good plant. Will need protection with severe cold spells. Manganese deficiency can occur in alkaline soils. Maintain pH within recommended limits. Growth rate is slow.
Canary Island Date Palm *Phoenix canariensis*	P	9	X	X		5.5 - 6.5	X	X	50	17′ - 25′	Will withstand heavy mulching. Needs much fertilizer. When started small, can be confined to a container. Difficult to tell from regular Date Palm. Manganese deficiency can occur in alkaline soils. Maintain pH within recommended limits. Growth rate is medium.
Date Palm *Phoenix dactylifera*	P	9		X	X	5.5 - 6.5		X	40	13′ - 20′	Usually a very large palm. Needs lots of room. Leaves will burn at 20 °F. Palm may be killed at 10 °F. Once it reaches larger sizes, this palm seems to be more hardy. Protect when small. May not flower and fruit on sandy, droughty soils. Manganese deficiency can occur in alkaline soils. Maintain pH within recommended limits. Growth rate is medium slow.
Pygmy Date Palm *Phoenix humilis*	P	9		X	X	5.5 - 6.5	X	X	20	5′ - 8′	May reach 20 feet in height. Hardy to 20 °F. Protect palm if temperatures are expected to drop that low. Foliage plume-like. Manganese deficiency can occur in alkaline soils. Maintain pH within recommended limits. Growth rate is medium slow.

Type Codes:
P = Palm

Palms

COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Accent	Avg. Hgt.	Spacing	NOTES AND COMMENTS
Needle Palm *Rhapidophyllum hystrix*	P	8		X	X	5.5 - 6.5		X	5	3′ - 4′	A fan type palm. Dark green leaves silvery beneath. Makes an attractive accent plant. Black, needle-like spines arise along the trunk. Manganese deficiency can occur in alkaline soils. Maintain pH within recommended limits. Growth rate is medium fast.
Lady Palm *Rhapis excelsa*	P	8	X	X	X	5.5 - 6.5	X	X	10	3′ - 4′	Excellent for containers. Dense foliage makes this plant an excellent one for accent. Manganese deficiency can occur in alkaline soils. Maintain pH within recommended limits. Growth rate is medium.
Dwarf Palmetto *Sabal minor*	P	7	X	X		5.5 - 6.5		X	5	3′ - 5′	Size varies with habitat. Plants in swampy areas taller than those in drier locations. Difficult to transplant from the wild. May be considered a nuisance in pastures. Deer often eat the fruit. Manganese deficiency can occur in alkaline soils. Maintain pH within recommended limits. Growth rate is slow.
Cabbage or Palmetto Palm *Sabal palmetto*	P	9	X	X		5.5 - 6.5		X	25	4′ - 6′	Very easy to transplant in large sizes. Base of old leaf petioles decays, leaving a relatively smooth trunk. Palm much like a lollypop in profile. Tolerant of salt spray. Only one growing bud. When transporting or transplanting, tie leaves together for protection. Manganese deficiency can occur in alkaline soils. Maintain pH within recommended limits. Growth rate is medium.
Windmill Palm *Trachycarpus fortunei*	P	8		X	X	5.5 - 6.5		X	15	5′ - 7′	Easily transplanted. Hardy in most areas where other palms may be killed. Trunk covered with fibers, giving the appearance of being covered with dark burlap. Will not grow well in poorly drained areas. Tolerant of salt spray. Highly resistant to wind. Manganese deficiency can occur in alkaline soils. Maintain pH within recommended limits. Growth rate is slow.
California Fan Palm *Washingtonia filifera*	P	9		X	X	5.5 - 6.5		X	50	12′ - 18′	Tall, straight trunks with globular head of foliage. Trunk very thick. Will withstand temperatures to 15 °F when older. When young, 25 °F can burn the foliage. Manganese deficiency can occur in alkaline soils. Maintain pH within recommended limits. Growth rate is medium slow.

Type Codes:
P = Palm

Palms

COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Accent	Avg. Hgt.	Spacing	NOTES AND COMMENTS
Mexican Fan Palm *Washingtonia robusta*	P	9	X	X		5.5 - 6.5		X	50	7′ - 10′	Tall, slender trunks. Foliage injury common due to cold. Manganese deficiency can occur in alkaline soils. Maintain pH within recommended limits. Growth rate is medium.

Type Codes:
P = Palm

Annuals, Tender Perennials, and Bulbs

For seasonal color and use COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Bordr	LANDSCAPE USES: GCovr	LANDSCAPE USES: Accent	Spacing	Type Codes: A = Annual, b = Bulb, T = Tender Perennial NOTES AND COMMENTS
Copper Plant *Acalypha wilkesiana*	T	9	X	X		5.0 - 7.0				X	3′ - 4′	Color more intense in full sun. Plant after danger of frost has passed. Excellent bedding plant. Sometimes carried over in pots. Growth rate is fast.
Lily of the Nile *Agapanthus africanus*	b	9	X	X		5.5 - 6.5		X		X	1′ - 2′	Well-drained soil essential. Good for container culture. Fertilize 3-4 times per year with high nitrogen, water soluble fertilizer. 'Alba' is tall with white flowers; 'Peter Pan' and 'Rancho' are dwarf with dark blue flowers; 'Queen Anne' is intermediate with blue flowers. Growth rate is fast.
Ageratum *Ageratum houstonianum*	A		X	X		5.5 - 6.5		X	X	X	.75′ - 1.5′	Annual. Often used as a bedding plant. Growth rate is fast.
Joseph's Coat *Alternanthera amoena*	T	9	X			5.0 - 7.0		X	X	X	.5′ - 1′	Not winter hardy. Popular bedding plant for elaborate color displays. Nearly evergreen in Zone 10. Easily rooted and carried over winter. Growth rate is fast.
Joseph's Coat *Alternanthera bettzickiana*	T	9	X			5.0 - 7.0		X	X	X	.4′ - .8′	See 1st listing of Joseph's Coat. Plant height is 1/2 foot. Growth rate is fast. Leaf texture is fine and color is red to yellow. Growth rate is fast.
Joseph's Coat *Alternanthera versicolor*	T	9	X			5.0 - 7.0		X	X	X	.5′ - 1′	See 1st listing of Joseph's Coat. Average height is 1 foot. Growth rate is fast. Leaf texture is fine and color is red. Growth rate is fast.
Snapdragon *Antirrhinum majus*	A		X			6.0 - 7.5		X		X	1′ - 2′	Annual. Not well adapted for Deep South. Grown as a cool-season annual for central to north Mississippi. Good bed preparation essential. Growth rate is fast.
Sprenger Asparagus Fern *Asparagus densiflorus* 'Sprengeri'	T	10	X	X	X	5.5 - 7.0	X	X	X		2′ - 2.5′	Not fully winter hardy. Dwarf forms available. Growth rate is medium fast.
Waxleaf Begonia *Begonia semperflorens*	T	9		X	X	5.5 - 7.5	X	X		X	.75′ - 1.5′	Used as an outdoor bedding plant. Many hybrids available in the nursery trade. Over watering causes root rot. Growth rate is fast.
English Daisy *Bellis perennis*	T	3	X			6.0 - 7.0	X	X		X	.5′ - 1′	May be used in perennial cut flower gardens. Used for accent and color. Growth rate is medium fast.
Common Caladium *Caladium bicolor*	b			X	X	5.5 - 6.5	X	X		X	.5′ - 1′	Annual. Tubers may be lifted in fall and stored in a cool, dry area. Leaves larger with ample rainfall. Growth rate is fast.

Annuals, Tender Perennials, and Bulbs

For seasonal color and use COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Bordr	LANDSCAPE USES: GCovr	LANDSCAPE USES: Accent	Spacing	Type Codes: A = Annual, b = Bulb, T = Tender Perennial NOTES AND COMMENTS
Calendula *Calendula officinalis*	A		X			5.0 - 6.5	X	X		X	.5′ - 1′	Annual. Used for winter flowers and color. Early flowers large; later flowers more but smaller. Soil must be loose and porous. Growth rate is fast.
Madagascar Periwinkle *Catharanthus roseus*	T	9	X			5.0 - 7.0	X	X		X	1′ - 2′	Used as an annual for color. Reseeds itself. Drought tolerant. Growth rate is fast.
Cockscomb *Celosia argentia cristata*	A		X			5.5 - 7.0	X	X		X	1′ - 2′	Annual. Many selections available. Sensitive to over fertilization. Used as a bedding plant for accent. Flower heads dry and hold color well. Growth rate is fast.
Bachelor's Button *Centaurea cyanus*	A		X	X		5.5 - 6.5	X	X		X	2′ - 2.5′	Annual. Double flowered and pink and white flowered forms available. Growth rate is fast.
Florist Chrysanthemum *Chrysanthemum morifolium*	T	8	X			5.8 - 6.8	X	X		X	.75′ - 1.5′	Fertilize monthly, after new growth begins, until late summer. To keep cushion form, pinch terminal buds. Don't pinch after July 15. Flowers when days are short. Growth rate is fast.
Shasta Daisy *Chrysanthemum x superbum*	T	7	X			5.8 - 6.8	X	X		X	.75′ - 1.5′	Divide plants every 2-3 years to prevent overcrowding and keep flowers large. Drainage essential to prevent root rot in lower south. Growth rate is fast.
Coleus *Coleus blumei*	T	9		X	X	5.5 - 7.0		X		X	1′ - 2′	Used as an annual. Easy to root. Many leaf forms and colors available. A sun coleus is available. Pinching keeps plant compact. Growth rate is fast.
Lily of the Valley *Convallaria majalis*	b	8			X	5.5 - 6.5	X	X	X	X	1′ - 2′	Once established, needs little care. Foliage dies to ground in fall. Growth rate is medium fast.
Crocus *Crocus species*	b	6	X	X	X	5.0 - 6.5	X			X	.25′ - .5′	Perennial bulb. One of the earliest flowering. Adapts to container growth well. Plant 3-4 inches deep in fall. Growth rate is fast.
Umbrella or Flat Sedge *Cyperus alternifolius*	T	8	X	X		5.5 - 7.0	X			X	3′ - 4′	Not fully hardy. Will die to the ground, usually coming back from the roots. Will grow in water. Clump forming. Growth rate is fast.
Dahlia *Dahlia pinnata*	T	10	X	X		5.8 - 6.8	X	X		X	1′ - 2′	Does best in sandy loam soils. Needs at least 6 hours of sun per day. Water frequently. Fertilize at emergence with 1/3 cup 510. Growth rate is fast.
Dwarf Sweet William *Dianthus deltoides*	T	3	X			6.0 - 7.0	X	X		X	.75′ - 1.5′	This plant is the one that comprises the annual pinks most commonly grown in the garden. Growth rate is fast.

Annuals, Tender Perennials, and Bulbs

For seasonal color and use COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Bordr	LANDSCAPE USES: GCovr	LANDSCAPE USES: Accent	Spacing	Type Codes: A = Annual, b = Bulb, T = Tender Perennial NOTES AND COMMENTS
Sweet William *Dianthus barbatus*	T	3	X			6.0 - 7.5	X	X		X	1′ - 2′	Annual. May be biennial but is treated as an annual. A very popular plant for the old fashioned garden. Best in the deep south when grown in the cooler seasons. Growth rate is fast.
Strawberry *Fragaria chiloensis*	T		X	X	X	6.0 - 7.0			X		.75′ - 1.5′	Excellent vigorous ground cover for a wide range of hardiness zones and soils. Easy to grow and propagate. Growth rate is fast.
Daylily *Hemerocallis* hybrids	T	5	X			5.0 - 7.0		X	X	X	1′ - 2′	Many varieties available. Height can vary from 9 inches to 4 feet. Re-bloomers common. Easy to hybridize. Growth rate is medium fast.
Chinese Hibiscus *Hibiscus rosa-sinensis*	T	10	X			6.0 - 7.5	X			X	3′ - 5′	Flowers when roots become restricted. Many varieties available. Tender plant; winter protection needed. Needs lots of water. Growth rate is fast.
Variegated Chinese Hibiscus *Hibiscus rosa-sinensis* ‘Variegata’	T	10	X			6.0 - 7.5	X	X		X	3′ - 5′	See Chinese Hibiscus. Growth rate is fast.
Common Hyacinth *Hyacinthus orientalis*	b	5	X	X		5.0 - 7.0	X			X	.25′ - .5′	In Deep South, discard old bulbs and replant each year. Flowers poorly in hardiness zones 9-10. For best results, cool bulbs for 6 weeks at 40 °F before planting. Growth rate is fast.
Sultana or Impatiens *Impatiens wallerana*	A				X	5.5 - 7.0		X		X	.5′ - 1′	Annual. Reseeds itself often. Culture is easy. Plants killed by freeze. Good soil drainage essential to prevent root rot. Growth rate is fast.
Dutch Iris *Iris xiphium*	b	7	X	X		5.5 - 7.0	X	X		X	.75′ - 1.5′	See Iris species. ‘Professor Blaauw’ is deep blue; ‘Wedgewood’ is light blue; ‘Golden Harvest’ is yellow; ‘LeMogul’ is bronze; ‘Pride of Holland’ is yellow. Growth rate is medium.
Louisiana Iris *Iris* hybrids	b	7	X	X		5.5 - 7.0	X	X	X	X	.75′ - 1.5′	Iris ‘Louisiana’ is the name given to several Iris species found native to Gulf Coast states including I. *fulva, I. virginica, I.foliosa, and I. gigan ticaerulea*. Relatively long spring flowering season. Growth rate is medium.
Bearded Iris *Iris germanica*	b	5	X	X		5.5 - 7.0	X	X	X	X	.75′ - 1.5′	Evergreen foliage. Not suitable to heavy soils. Good drainage is essential. Divide in fall. Fertilize plantings after flowering. There are many cultivated selections with flowers from white to purple. Growth rate is medium.

Annuals, Tender Perennials, and Bulbs

For seasonal color and use COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Patio	LANDSCAPE USES: Bordr	LANDSCAPE USES: GCovr	LANDSCAPE USES: Accent	Spacing	Type Codes: A = Annual, b = Bulb, T = Tender Perennial NOTES AND COMMENTS
Iris *Iris species*	b	7	X	X		5.0 - 6.5	X	X		X	.75′ - 1.5′	Many horticulture varieties. Good drainage essential, except aquatic species. Fertilize after flowering. Dig and divide every 3-5 years. Growth rate is medium.
Common Lantana *Lantana camara*	T	10	X			5.0 - 7.0	X	X	X	X	2′ - 3′	Frequent tip pruning will encourage reflowering throughout the season. Salt tolerant. Recommended for sandy and seashore locations. Usually treated as an annual. Several varieties available. Growth rate is fast.
Trailing Lantana *Lantana montevidensis*	T	9	X			5.0 - 7.0	X	X	X	X	3′ - 5′	May be killed back to roots with severe winters. May look bad during winter. Tolerant of wind and poor, dry soils. When in containers, frequent watering required. Growth rate is fast.
Sweetpea *Lathyrus odoratus*	A		X			5.5 - 6.5				X	1′ - 2′	Annual. Plant seed in November for spring flowers. Cannot withstand summer heat. A cool season plant. Many varieties offered in the trade. Hard freezes will kill foliage to stem. Growth rate is fast.
Summer Snowflake *Leucojum aestivum*	b	6	X	X		6.0 - 7.0		X	X	X	.25′ - .5′	Allow foliage to mature before cutting in early summer. Allow bulbs to remain undisturbed for several years before dividing. This will cause flowers to be larger. Growth rate is fast.
Easter Lily *Lilium longiflorum*	b	8	X	X		5.5 - 6.5	X	X		X	.5′ - 1′	Normal flowering season is July. Flowers for Easter only with proper greenhouse forcing techniques. Flowers are fragrant. Growth rate is fast.
Sweet Alyssum *Lobularia maritima*	A		X	X		6.5 - 7.0	X	X		X	.5′ - 1′	Annual. Many selections to choose from. Sow seed in March and April. Flowers occur several weeks later. Last to be killed by frost. Midsummer sowing ensures an abundance of fall flowers. Growth rate is fast.
Spider Lily *Salvia splendens*	b	6	X	X		5.5 - 6.5		X	X	X	.25′ - .5′	Bulbs will rot in heavy, poorly drained soils. Flowers occur before foliage is seen. Fertilize in late fall after flowers. Foliage matures in late fall and early winter and dies in early spring. Flowers poorly in deep shade. Growth rate is fast.

Annuals, Tender Perennials, and Bulbs

For seasonal color and use COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT Sun Full	Sun Part	Shade	pH Range	LANDSCAPE USES Patio	Border	Gr Covr	Accent	Spacing	Type Codes: A = Annual b = Bulb T = Tender Perennial NOTES AND COMMENTS
Stock *Matthiola incana*	T	10	X			5.5 - 6.5		X		X	1′ - 2′	An old-fashioned garden plant. May be annual, perennial, or biennial, but treat as an annual. Stock are very dependable, producing fragrant flowers that are excellent cut flowers. Growth rate is medium fast.
Four-O'Clock *Mirabilis jalapa*	T	7	X	X		5.5 - 6.5		X		X	3′ - 4′	May become a pest in some locations. May freeze back to ground but regrows from roots. A perennial used in many of the old gardens in the South. Flowers open in late afternoon (hence the name). Growth rate is fast.
Narcissus, Jonquil, or Daffodil *Narcissus* hybrids	b	3	X	X	X	5.5 - 6.5	X	X	X	X	.75′ - 1.5′	Select only the largest bulbs your budget can stand. Some bicolored selections available. Varieties recommended are Carlton, Unsurpassable, Mount Hood, Fortune, Brookville, Trevithian. Will become naturalized. Growth rate is fast.
Fish Geranium *Pelargonium hortorum*	T	8	X	X		5.5 - 7.0	X	X		X	1′ - 2′	Foliage fragrant when crushed. Must protect from freezing temperatures. Pinch terminal growth to encourage branching. Remove old flower stalks to prevent seed production. Large number of cultivars on market. Growth rate is medium.
Common Petunia *Petunia hybrida*	A		X			5.5 - 7.0	X	X	X	X	.75′ - 1.5′	Annual. Many flower forms and colors available. Many hybrids on the market. Not always true from seed. Excellent bedding plant for annual beds. Growth rate is fast.
Creeping Phlox *Phlox subulata*	T	3	X	X		5.5 - 6.5	X	X			.5′ - 1′	Ideal for rock gardens and slopes. Semi-evergreen. Many varieties available. Growth rate is fast.
Moss Rose *Portulaca grandiflora*	A		X			6.0 - 8.0	X	X	X	X	.5′ - 1′	Annual. A good annual for hot dry areas. Many varieties available. May live for more than one year. Well drained bed and full sun a must for good growth. Growth rate is fast.
Primrose *Primula species*	T	5		X		5.5 - 6.5	X	X	X	X	.5′ - 1′	Not drought tolerant. Adapt themselves well to mass planting. Growth rate is fast.
Salvia *Salvia splendens*	A		X			5.5 - 6.5		X		X	.75′ - 1.5′	Annual. A showy hot weather annual. Red calyx attracts hummingbirds. For repeat flowering, remove spent flowers. Many selections available. Some are dwarf (6-12); others intermediate(12-20) and some tall (2-3). Flowers may be red, blue, purple, variegated. Growth rate is fast.

Annuals, Tender Perennials, and Bulbs

For seasonal color and use COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT Sun Full	Part	Shade	pH Range	LANDSCAPE USES Patio	Bordr	GCovr	Accent	Spacing	Type Codes: A = Annual b = Bulb T = Tender Perennial NOTES AND COMMENTS
Goldmoss Sedum *Sedum acre*	T	8	X			6.0 - 8.0		X	X	X	.5′ - 1′	Vigorous growth. Can withstand abuse. In moist, fertile soils will grow taller. Growth rate is fast.
Dragon's Blood Sedum *Sedum spurium*	T	3	X	X		6.0 - 8.0		X	X		.5′ - 1′	Withstands a great deal of abuse. Requires little soil for active growth. Growth rate is medium fast.
Marigold *Tagetes erecta*	A		X			5.0 - 7.0	X	X		X	.75′ - 1.5′	Annual. Many forms available from dwarf (under 15) to standards (up to 3). Used as a bedding plant and for cut flowers. Foliage has a pungent scent when crushed or handled. Remove old flower heads to encourage continued flowering. Water during drought. Fertilize monthly. Growth rate is fast.
Tulip *Tulipa* hybrids	b	4	X			5.5 - 6.5	X	X		X	.5′ - 1′	Treat as an annual in zones 8a and b. Used as a bedding plant for early spring color. Many varieties and selections to choose from. Plant in November through December. Refrigerate bulbs at 40 °F for 6 weeks before planting. Growth rate is fast.
Garden Verbena *Verbena hybrida*	T	8	X	X		5.5 - 6.5	X	X	X	X	2′ - 3′	Often used as an annual bedding plant. Because of open density, weeds may be a problem. Flower color varies with variety but may be red, white, pink, or yellow. Growth rate is fast.
Sweet Violet *Viola odorata*	T	6	X	X	X	5.5 - 7.0	X	X	X	X	.5′ - 1′	Excellent for containers. Double flowering selections available. Growth rate is medium fast.
Pansy *Viola tricolor hortensis*	A		X			5.5 - 7.0	X			X	.25′ - .5′	Annual. Often grown as a cool season bedding plant. Many flower forms and selections are available. Not a true annual but a short-lived perennial. Growth rate is fast.
Common Zinnia *Zinnia elegans*	A		X	X		6.0 - 7.0		X		X	1′ - 2′	Annual. Excellent annual for bedding plants. Many horticultural varieties with various flower colors, growth habits, and flower types available. Growth rate is fast.

Plants That Attract Birds and Other Wildlife

COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Accent	Border	Foundation	Patio	Hedge	Ground Cover	Walls	Trees	Shade	Wind Break	Herb	Spacing	Refer to page 6 for type codes in this section. ATTRACTANT FOR WILDLIFE
Blueberry Ampelopsis *Ampelopsis brevipedunculata*	V	6	X	X		5.0 - 7.0							X	X				5′ - 8′	fruit
Black Barberry *Berberis gagnepaini*	B	5	X	X		6.0 - 8.0		X	X		X							3′ - 4′	fruit; shelter
Wintergreen Barberry *Berberis julianae*	B	5	X	X		6.0 - 8.0		X	X		X							2′ - 3′	fruit; shelter
Mentor Barberry *Berberis mentorensis*	B	5	X	X		6.0 - 8.0		X	X		X							3′ - 5′	fruit; shelter
Hollygreen Barberry *Berberis pruinosa*	B	7	X	X		6.0 - 8.0		X	X		X							5′ - 7′	fruit; shelter
Japanese Barberry *Berberis thunbergii*	D	3	X	X		6.0 - 8.0		X	X		X							4′- 6′	fruit; shelter
Rose Glow Japanese Barberry *Berberis thunbergii atropurpurea* 'Rose Glow'	D	4	X			6.0 - 8.0	X	X			X							2′ - 3′	fruit; shelter
Redleaf Japanese Barberry *Berberis thunbergii atropurpurea*	D	4	X			6.0 - 8.0	X	X			X							3′ - 4′	fruit; shelter
Golden Japanese Barberry *Berberis thunbergii* 'Aurea'	D	3	X			6.0 - 8.0	X	X										3′ - 4′	fruit; shelter
Crimson Pygmy Japanese Barberry *Berberis thumbergii atropurpurea* 'Crimson Pygmy'	D	4	X			6.0 - 8.0	X	X										2′ - 3′	fruit; shelter
Common Paper Mulberry *Broussonetia papyrifera*	D	6	X	X		5.5 - 7.0								X				20′ - 30′	fruit
American Beautyberry *Callicarpa americana*	D	7	X	X		6.0 - 8.0		X										3′- 5′	fruit
White American Beautyberry *Callicarpa americana lactea*	D	6				6.0 - 8.0		X										3′ - 5′	fruit
Purple Beautyberry *Callicarpa dichotoma*	D	7	X	X		6.0 - 8.0		X										2′ - 3′	fruit
Pecan *Carya illinoensis*	D	7	X			6.4 - 8.0								X			X	27′ - 40′	fruit
American Bittersweet *Celastrus scandens*	V	2	X	X	X	4.5 - 6.0		X					X	X	X			5′ - 8′	fruit
Sugar Hackberry *Celtis laevigata*	D	5	X	X		6.0 - 8.0	X							X				33′ - 50′	fruit

Plants That Attract Birds and Other Wildlife

COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Accent	Border	Foundation	Patio	Hedge	Ground Cover	Walls	Trellis	Shade	Wind Break	HOrch	Spacing	Refer to page 6 for type codes in this section. ATTRACTANT FOR WILDLIFE
Carolina Snailseed *Cocculus carolinus*	V	7	X	X		5.0 - 6.5							X	X				5′- 8′	fruit
Flowering Dogwood *Cornus florida*	D	4	X	X	X	5.0 - 6.5	X	X										17′- 25′	fruit
Gray Dogwood *Cornus racemosa*	D	2	X	X	X	5.5 - 6.5	X	X										7′- 10′	fruit
Goldentwig Dogwood *Cornus sericea* ‘Flaviramea’	D	2	X	X		6.0 - 8.0	X	X				X	X					3′ - 4′	fruit
Redtwig Dogwood *Cornus sericea coloradensis*	D	2	X	X		6.0 - 8.0	X	X				X	X					3′ - 5′	fruit
Crown Vetch *Coronilla varia*	B	3	X	X	X	5.0 - 7.0						X						1′ - 2′	fruit
Creeping Cotoneaster *Cotoneaster adpressa*	B	4	X	X		6.0 - 7.0		X				X						2′ - 3′	fruit
Bearberry Cotoneaster *Cotoneaster dammeri*	B	4	X			6.0 - 7.0						X						3′ - 4′	fruit
Washington Hawthorn *Crataegus phaenopyrum*	D	5	X	X	X	6.0 - 7.0	X	X										13′ - 20′	fruit
Thorny Elaeagnus *Elaeagnus pungens*	B	7	X			6.0 - 8.0		X	X		X							5′ - 8′	fruit; shelter
Dwarf Winged Euonymus *Euonymus alatus* ‘Compactus’	D	5				6.0 - 8.0	X	X			X							2′ - 3′	fruit
Silver King Evergreen Euonymus *Euonymus japonicus* ‘Silver King’	B	7	X	X	X	6.0 - 8.0	X	X	X	X	X							3′ - 5′	fruit
Silver Queen Evergreen Euonymus *Euonymus japonicus* ‘Silver Queen’	B	6	X	X		6.0 - 8.0	X	X	X		X							3′ - 5′	fruit
Manhattan Spreading Euonymus *Euonymus kiautschovicus* ‘Manhattan’	B	5	X	X		6.0 - 8.0	X	X	X		X							5′ - 8′	fruit
Common Pearlbush *Exochorda racemosa*	D	4	X	X		5.5 - 6.0	X	X	X									4′ - 6′	fruit
Pineapple Guava *Feijoa sellowiana*	B	8	X	X	X	6.0 - 7.5	X	X			X						X	5′ - 8′	fruit
Common Fig *Ficus carica*	D	6	X	X		5.5 - 7.5					X		X				X	10′ - 15′	fruit

Plants That Attract Birds and Other Wildlife

COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Accent	Border	Foundation	Patio	Hedge	Ground Cover	Walls	Trees	Shade	Wind Break	Horch	Spacing	Refer to page 6 for type codes in this section. ATTRACTANT FOR WILDLIFE
Algerian Ivy *Hedera canariensis*	V	8			X	6.0 - 8.0						X						.75′ - 1.5′	fruit
Inkberry *Ilex glabra*	B	3	X	X		4.0 - 5.0	X	X										3′ - 5′	fruit
Keteleer Chinese Juniper *Juniperus chinensis* ‘Keteleeri’	N	4	X			6.0 - 8.0		X		X								7′ - 10′	fruit; shelter
Blue Vase Juniper *Juniperus chinensis* ‘Blue Vase’	N	5	X			6.0 - 8.0		X	X		X					X		4′ - 6′	fruit; shelter
Blue Column Juniper *Juniperus chinensis* ‘Columnaris’	N	5	X			6.0 - 8.0	X	X	X									2′ - 3′	fruit; shelter
Variegated Hollywood Juniper *Juniperus chinensis* ‘Corymbosa Variegated’	N	5	X			6.0 - 8.0	X	X	X		X							5′ - 8′	fruit; shelter
Hetz Chinese Juniper *Juniperus chinensis* ‘Hetzi’	N	5	X			6.0 - 8.0	X	X	X		X							10′ - 15′	fruit; shelter
Golden Pfitzer Juniper *Juniperus chinensis* ‘Pfitzeriana Aurea’	N	5	X			6.0 - 8.0	X		X		X							7′ - 10′	fruit; shelter
Nick’s Compact Pfitzer Juniper *Juniperus chinensis* ‘Pfitzeriana Compacta’	N	5	X			6.0 - 8.0		X	X		X							5′ - 6′	fruit; shelter
Pfitzer Chinese Juniper *Juniperus chinensis* ‘Pfitzeriana’	N	5	X			6.0 - 8.0		X	X		X							7′ - 10′	fruit; shelter
Hollywood Juniper *Juniperus chinensis* ‘Torulosa’	N	5	X			6.0 - 8.0	X	X			X							5′ - 8′	fruit; shelter
Blue Haven Juniper *Juniperus scopulorum* ‘Blue Haven’	N	4	X			5.5 - 7.0		X			X					X		8′ - 12′	fruit; shelter
Gray Gleam Juniper *Juniperus scopulorum* ‘Gray Gleam’	N	4	X			6.0 - 8.0	X	X			X							8′ - 12′	fruit; shelter
Weeping Rocky Mountain Juniper *Juniperus scopulorum* ‘Pendula’	N	4	X			6.0 - 8.0	X											5′ - 8′	fruit; shelter
Eastern Red Cedar *Juniperus virginiana*	N	2	X			5.5 - 8.0		X			X							13′ - 20′	fruit; shelter

Plants That Attract Birds and Other Wildlife

COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Accent	Border	Foundation	Patio	Hedge	Cover	Walls	Trees	Shade	Wind Break	Horch	Spacing	Refer to page 6 for type codes in this section. ATTRACTANT FOR WILDLIFE
Canaert Eastern Red Cedar *Juniperus virginiana* 'Canaerti'	N	3	X			6.0 - 8.0		X			X							10′ - 15′	fruit; shelter
Hillspire Juniper *Juniperus virginiana* 'Cupressifolia'	N	5	X			6.0 - 8.0	X	X								X		5′ - 8′	fruit; shelter
Skyrocket Juniper *Juniperus scopulorum* 'Skyrocket'	N	4	X			6.0 - 8.0	X											3′ - 4′	fruit; shelter
Japanese Ligustrum *Ligustrum japonicum*	B	7	X	X	X	6.0 - 7.0	X	X	X		X							5′ - 8′	fruit; shelter
Roundleaf Japanese Ligustrum *Ligustrum japonicum* 'Rotundifolium'	B	7	X	X	X	6.0 - 7.0	X	X	X		X							5′ - 8′	fruit; shelter
Glossy Privet *Ligustrum lucidum*	B	7	X	X	X	6.0 - 7.0		X			X							10′ - 15′	fruit; shelter
Chinese Privet *Ligustrum sinense*	S	7	X	X	X	6.0 - 7.0		X	X		X							5′ - 8′	fruit; shelter
Weeping Chinese Privet *Ligustrum sinense* 'Pendulum'	S	7	X	X	X	6.0 - 7.0	X											5′ - 8′	fruit; shelter
Vicary Golden Privet *Ligustrum x vicaryi*	D	4	X	X		6.0 - 7.0	X	X	X		X							4′ - 6′	fruit; shelter
Trumpet Honeysuckle *Lonicera sempervirens*	V	4	X	X	X	6.0 - 7.5	X						X	X				5′ - 8′	fruit
Yulan Magnolia *Magnolia denudata*	D	5	X	X		5.0 - 6.0	X	X										13′ - 20′	fruit
Southern Magnolia *Magnolia grandiflora*	B	7	X	X	X	5.0 - 6.0	X											30′ - 45′	fruit
Star Magnolia *Magnolia stellata*	D	5	X	X		5.0 - 6.0	X	X										4′ - 6′	fruit
Sweetbay Magnolia *Magnolia virginiana*	B	6	X	X	X	5.0 - 6.0	X								X			10′ - 15′	fruit
Oregon Grape Mahonia *Mahonia aquifolium*	B	5	X	X	X	6.0 - 8.0	X		X			X						2′ - 3′	fruit
Leatherleaf Mahonia *Mahonia bealei*	B	6		X	X	6.0 - 8.0	X	X	X									2′ - 3′	fruit
Chinese Mahonia *Mahonia fortunei*	B	8		X	X	6.0 - 8.0	X	X	X									3′ - 4′	fruit

Plants That Attract Birds and Other Wildlife

COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Accent	Border	Foundation	Patio	Hedge	Groundcover	Walls	Trees	Shade	Wind Break	Hor ch	Spacing	Refer to page 6 for type codes in this section. ATTRACTANT FOR WILDLIFE
Callaway Crabapple *Malus* 'Callaway'	D	3	X			5.0 - 6.5	X	X										13′ - 20′	fruit
Southern Waxmyrtle *Myrica cerifera*	B	6	X	X		4.0 - 6.0	X				X							10′ - 15′	fruit
Heavenly Bamboo or Nandina *Nandina domestica*	B	7	X	X	X	5.5 - 7.0	X	X	X		X							3′ - 4′	fruit
Tupelo Blackgum *Nyssa sylvatica*	D	4	X	X		6.0 - 7.0	X								X			20′ - 30′	fruit
Virginia Creeper *Parthenocissus quinquefolia*	V	4	X	X	X	5.0 - 7.5							X	X				5′ - 8′	fruit; shelter
Boston Ivy *Parthenocissus tricuspidata*	V	4	X	X		6.0 - 8.0							X	X				5′ - 8′	fruit; shelter
Blue Passion Flower *Passiflora incarnata*	V	5	X	X		6.0 - 7.0							X	X				3′ - 5′	fruit
Fraser's Photinia *Photinia* 'Fraseri'	B	7	X	X		6.0 - 7.0	X	X	X		X							5′ - 8′	fruit
Japanese Photinia *Photinia glabra*	B	7	X	X		6.0 - 7.0	X		X		X							5′ - 8′	fruit
Chinese Photinia *Photinia serrulata*	B	7	X	X		6.0 - 7.0	X	X	X		X							7′ - 10′	fruit
Slash Pine *Pinus elliottii*	N	8	X			5.0 - 6.5	X								X	X		17′ - 25′	cones; shelter
Spruce Pine *Pinus glabra*	N	8	X	X		5.5 - 7.0	X	X							X	X		13′ - 20′	cones; shelter
Longleaf Pine *Pinus palustri*	N	7	X	X	X	4.5 - 5.0	X								X	X		20′ - 30′	cones; shelter
White Pine *Pinus strobus*	N	3	X	X		5.0 - 6.0					X				X	X		13′ - 20′	cones; shelter
Loblolly Pine *Pinus taeda*	N	6	X	X	X	5.0 - 6.0	X				X				X	X		17′ - 25′	cones; shelter
Japanese Black Pine *Pinus thunbergiana*	N	7	X			5.5 - 6.5	X	X							X	X		17′ - 25′	cones; shelter
Virginia Pine *Pinus virginiana*	N	5	X			5.5 - 6.5	X				X				X	X		13′ - 20′	cones; shelter
Variegated Tobira Pittosporum *Pittosporum tobira* 'Variegata'	B	8	X	X		6.0 - 7.5	X	X	X		X							5′ - 8′	fruit

Plants That Attract Birds and Other Wildlife

COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Accent	Border	Foundation	Patio	Hedge	Ground Cover	Walls	Trees	Shade	Wind Break	Herb or Orch	Spacing	Refer to page 6 for type codes in this section. ATTRACTANT FOR WILDLIFE
Carolina Cherry Laurel *Prunus caroliniana*	B	7	X	X		5.5 - 6.5	X		X		X			X	X			10′ - 15′	fruit
Purpleleaf Plum *Prunus cerasifera*	D	4	X	X		5.5 - 6.5	X	X										10′ - 15′	fruit
Black Cherry *Prunus serotina*	D	3	X	X		6.0 - 7.5	X								X			13′ - 20′	fruit
Yoshino Cherry *Prunus yedoensis*	D	5	X			6.0 - 7.0	X	X							X			23′ - 35′	fruit
Aristocrat Flowering Pear *Pyrus calleryana* ‘Aristocrat’	D	5	X			5.5 - 6.5	X											17′ - 25′	fruit
Bradford Flowering Pear *Pyrus calleryana* ‘Bradford’	D	5	X			5.5 - 6.5	X											17′ - 25′	fruit
Capital Flowering Pear *Pyrus calleryana* ‘Capital’	D	5	X			5.5 - 6.5	X											10′ - 15′	fruit
Whitehouse Flowering Pear *Pyrus calleryana* ‘Whitehouse’	D	5	X	X		5.5 - 6.5	X				X				X			7′ 10′	fruit
Sawtooth Oak *Quercus acutissima*	D	4	X			5.0 - 6.5	X								X			27′ - 40′	fruit; shelter
White Oak *Quercus alba*	D	4	X			5.0 - 6.5	X								X			33′ - 50′	fruit; shelter
Southern Red Oak *Quercus falcata*	D	5	X	X		4.0 - 5.0	X								X			33′ - 50′	fruit; shelter
Swamp Red Oak *Quercus pagoda*	D	5	X	X		4.0 - 5.0	X								X			33′ - 50′	fruit; shelter
Laurel Oak *Quercus laurifolia*	S	7	X	X		5.0 - 6.0	X								X			27′ - 40′	fruit; shelter
Chinkapin Oak *Quercus muehlenbergii*	D	3	X	X		5.0 - 7.5	X								X			27′ - 40′	fruit; shelter
Water Oak *Quercus nigra*	D	6	X	X		5.5 - 6.5	X								X			27′ - 40′	fruit; shelter
Pin Oak *Quercus palustris*	D	5	X			5.0 - 6.5	X								X			27′ - 40′	fruit; shelter
Willow Oak *Quercus phellos*	D	5	X	X		5.0 - 6.0	X								X			33′ - 50′	fruit; shelter
Swamp Chestnut Oak *Quercus michauxii*	D	4	X	X		5.0 - 6.0	X								X			27′ - 40′	fruit; shelter

Plants That Attract Birds and Other Wildlife

COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Accent	Border	Foundation	Patio	Hedge	Ground Cover	Walls	Trees	Shade	Wind Break	Horch	Spacing	Refer to page 6 for type codes in this section. ATTRACTANT FOR WILDLIFE
English Oak or British Oak *Quercus robur*	D	5	X	X		5.5 - 6.5	X								X			53′ - 80′	fruit; shelter
Shumard Oak *Quercus shumardii*	D	5	X	X		6.0 - 7.5	X								X			47′ - 70′	fruit; shelter
Post Oak *Quercus stellata*	D	4	X	X	X	5.0 - 6.0	X								X			27′ - 40′	fruit; shelter
Live Oak *Quercus virginiana*	B	8	X			5.0 - 6.0	X								X			50′ - 75′	fruit; shelter
Flameleaf Sumac *Rhus copallina*	D	4	X	X		5.5 - 7.0	X	X										7′ - 10′	fruit
Smooth Sumac *Rhus glabra*	D	4	X	X		5.0 - 6.0	X	X										4′ - 6′	fruit
Staghorn Sumac *Rhus typhina*	D	3	X	X		5.0 - 6.0	X	X										13′ - 20′	fruit
Black Locust *Robinia pseudoacacia*	D	4	X	X		6.0 - 8.0	X	X							X			13′ - 20′	fruit
Rugose Rose *Rosa rugosa*	D	6	X			6.0 - 7.0	X				X							3′ - 4′	fruit
Dwarf Palmetto *Sabal minor*	P	7	X	X		5.5 - 6.5	X	X	X									3′ - 5′	fruit
Cabbage or Palmetto Palm *Sabal palmetto*	P	9	X	X		5.5 - 6.5	X	X										4′ - 6′	fruit
Elderberry *Sambucus canadensis*	D	4	X	X	X	6.0 - 8.0		X										3′ - 5′	fruit
Sassafras *Sassafras albidum*	D	4	X	X		6.0 - 8.0	X	X							X			13′ - 20′	fruit
Southern Smilax *Smilax laurifoila*	V	7	X	X		5.0 - 6.0	X						X	X				10′ - 15′	fruit; shelter
Indiancurrent Coralberry *Symphoricarpos orbiculatus*	D	7	X	X		5.5 - 7.5		X										1′ - 2′	fruit
Japanese Cleyera *Ternstroemia gymnanthera*	B	7		X	X	5.5 - 7.0	X	X	X		X							5′ - 8′	fruit
Variegated Japanese Cleyera *Ternstroemia gymnanthera* 'Variegata'	B	7		X	X	5.5 - 7.0	X	X	X		X							5′ - 8′	fruit

Plants That Attract Birds and Other Wildlife

COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Accent	Border	Foundation	Patio	Hedge	GCover	Walls	Trees	Shade	WindBrch	HOrch	Spacing	Refer to page 6 for type codes in this section. ATTRACTANT FOR WILDLIFE
Windmill Palm *Trachycarpus fortunei*	P	8		X	X	5.5 - 6.5	X		X									5′ - 7′	fruit
Japanese Viburnum *Viburnum japonicum*	B	7	X	X	X	5.5 - 6.5	X	X	X		X							3′ - 4′	fruit
Sweet Viburnum *Viburnum odoratissimum*	B	9	X			6.5 - 7.5		X			X							4′ - 6′	fruit
Leatherleaf Viburnum *Viburnum rhytidophyllum*	B	5	X	X		6.0 - 7.0	X		X									4′ - 6′	fruit
Sandankwa Viburnum *Viburnum suspensum*	B	7	X	X		6.0 - 8.0	X	X	X									3′ - 4′	fruit
Doublefile Viburnum *Viburnum tomentosum*	D	4	X	X	X	6.5 - 7.5	X	X										5′ - 8′	fruit
Muscadine Grape *Vitis rotundifolia*	D	5	X			6.0 - 7.0							X	X			X	13′ - 20′	fruit

Plants for the Home Orchard

COMMON NAME *SCIENTIFIC NAME*	Type	Zone	LIGHT: Sun: Full	LIGHT: Sun: Part	LIGHT: Shade	pH Range	LANDSCAPE USES: Accent	Border	Foundation	Patio	Hedge	Ground Cover	Walls	Trees	Shade	Wind Break	Horch	Spacing
Pindo or Jelly Palm Butia capitata	P	9	X	X		5.5 - 6.5	X										X	7′ - 10′
Pecan Carya illinoensis	D	7	X			6.4 - 8.0									X		X	27′ - 40′
Chinese Flowering Quince *Chaenomeles sinensis*	D	4	X			6.0 - 7.0	X	X									X	5′ - 8′
Japanese Persimmon *Diospyros kaki*	D	7	X			5.5 - 7.0	X										X	7′ - 10′
Fuyugaki Japanese Persimmon *Diospyros kaki* ‘Fuyugaki’	D	7	X			5.5 - 7.0	X										X	7′ - 10′
Tamopan Japanese Persimmon *Diospyros kaki* ‘Tamopan’	D	7	X			5.5 - 7.0	X										X	7′ - 10′
Tani Nashi Japanese Persimmon *Diospyros kaki* ‘Tani Nashi’	D	7	X			5.5 - 7.0	X										X	7′ - 10′
Common Persimmon *Diospyros virginiana*	D	4	X			5.0 - 6.5	X								X			13′ - 20′
Loquat *Eriobotrya japonica*	B	8	X	X		6.0 - 8.0	X										X	8′ - 12′
Pineapple Guava *Feijoa sellowiana*	B	8	X	X	X	6.0 - 7.5	X	X			X						X	5′ - 8′
Common Fig *Ficus carica*	D	6	X	X		5.5 - 7.5					X		X				X	10′ - 15′
Strawberry *Fragaria chiloensis*	T		X	X	X	6.0 - 7.0						X					X	.75′ - 1.5′
Black Walnut *Juglans nigra*	D	4	X			6.0 - 8.0									X		X	27′ - 40′
Chickasaw Plum *Prunus angustifolia*	D	5	X			5.5 - 7.0	X	X									X	4′ - 6′
Flowering Peach *Prunus persica*	D	5	X			6.0 - 7.5	X										X	7′ - 10′
Flowering Pomegranate *Punica granatum*	D	8	X	X		5.5 - 7.0	X	X									X	7′ - 10′
Dwarf Flowering Pomegranate *Punica granatum* ‘Nana’	D	8	X	X		5.5 - 7.0	X	X									X	3′ - 4′
Common Pear *Pyrus communis*	D	4	X			6.0 - 7.5	X										X	13′ - 20′
Rabbit-Eye Blueberry *Vaccinum ashei*	D	7	X			4.5 - 5.5					X						X	4′ - 6′
Muscadine Grape *Vitis rotundifolia*	V	5	X			6.0 - 7.0							X	X			X	13′ - 20′

Refer to page 6 for type codes in this section.

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Mulches for the Landscape

Mulch helps keep your garden and landscape healthy. Mulching occurs regularly in nature with fallen leaves, twigs, spent flowers, and other materials. These natural mulches have provided a protective covering for the soil. They, along with inorganic mulches, can do the same in your garden.

Benefits of Mulching

- Help the soil hold moisture by reducing evaporation.
- Control weeds in a garden. To prevent weeds, mulches should be weed-free and must be applied deep enough to prevent weed seed germination as well as smother existing weeds.
- Regulate soil temperature. They keep the soil cooler during hot days and warmer during cold days.
- Prevent soil crusting, thus improving water absorption and percolation. This helps reduce soil erosion.
- Improve the soil structure through decomposition and the addition of organic matter to the soil.
- Enhance soil aeration, water percolation, and retention. Organic matter also adds nutrients to the soil.
- Reduce soil splashing, which prevents soil-borne diseases from splashing onto plants.
- Protect ripening vegetables (tomatoes, melons, pumpkins, squash) from contact with the soil, reducing rotting and "bad" spots on the fruit.
- Protect the trunks of trees and shrubs from lawn equipment such as string trimmers. Lawn equipment can severely damage trees and shrubs by girdling or wounding the trunk, affecting the movement of water, minerals, and sugars through the plant.
- Beautify your garden and landscape.

Types of Mulch

Mulch can be any material that provides these benefits. To be effective, mulch should be porous enough to let water and air pass through it, as well as dense enough to prevent weed growth. Two basic types of mulches are organic and inorganic.

Organic mulches are plant material and will decompose and help build soil structure. Organic mulches must be replenished periodically.

Inorganic mulches are inert and are not composed of organic material. Inorganic mulches, (stone, plastic, or fabric) do not decompose, generally stay in place, do not contain weed seeds, and do not deplete nitrogen from the soil. However, they can be expensive and they do not contribute organic matter to improve soil structure. Unless used with landscape fabric, inorganic mulches may migrate down into the soil.

See **Table 1** for more information on the different types of mulch and the benefits and drawbacks of each.

How to Mulch

New plantings—Mulching around new plantings helps keep moisture in the root ball of the new plant until the roots have established in the surrounding soil.

Annual and perennial flower beds and vegetable gardens—Mid-spring is the ideal time to mulch annual and perennial flower beds and vegetable gardens after the soil has warmed for active root growth. Remove existing weeds before applying the mulch. Apply winter mulches after the soil has cooled but before it has frozen. Mulch the entire bed. For more information on mulching a vegetable garden, see Extension Publication 1091, *The Garden Tabloid*.

Table 1. Mulches for the Landscape

Mulches	Advantages	Disadvantages	Application Rate
Pine or hardwood bark	Slow to decompose, resists compaction, does not blow away, very attractive, readily available	Large nuggets tend to float away in heavy rain; not recommended next to foundations as may attract termites	2 to 3 inches
Cypress bark	Tends not to float, long lasting, some insect resilience, should only be from sustainable sources	Sometimes hard to find from sustainable sources, expensive, difficult to wet once dry	2 to 3 inches
Cocoa-bean hulls	Long lasting	Compact, expensive	3 to 4 inches
Compost	Organic matter, contains minerals, microorganisms, improves structure and drainage	None	2 to 3 inches
Geotextiles (landscape fabrics, groundcloths*)	Reduces weeds, allows air and water to penetrate, easy to apply	Not attractive, needs to be tied down or covered with another type mulch	1 layer
Grass clippings	Readily available, nutrient recycling	May mat, herbicide residues may harm plants, better left on the lawn, may contain weed seeds	1 to 2 inches
Gravel, pebbles, stones*	Inexpensive, wide selection, permanent	Use weed fabric underneath to prevent weeds, gets hot and has reflective heat, don't use around acid-loving plants as leeching may increase the alkalinity of the soil	1-inch layer
Leaves	Readily available, nutrient recycling, shredded leaves best	Decompose rapidly, whole leaf may mat when wet or blow away when dry	Whole – 6 inches Shredded – 2 to 3 inches
Newspapers	Readily available, good for weed control, good for vegetable gardens	Not attractive, needs another mulch to hold down and make more attractive	3 to 6 sheet layers
Pecan, nut shells	Effective in retaining soil moisture, durable	Limited availability	1 to 2 inches
Plastics*	Retains soil moisture, controls weeds	Not attractive, needs another mulch to hold down, not recommended in areas with poor drainage, must cut holes to allow water into the soil	1 layer
Pine needles	Attractive, decomposes slowly, readily available, stays in place	Will lower soil pH, can be a fire hazard	6 to 8 inches
Recycled rubber tires*	Long lasting, does not blow away	Heat can build up, not biodegradable, expensive	2 to 4 inches
Sawdust	Acidifying effect on soils	Poor weed prevention, packs down making it hard to wet, depletes nitrogen	2 to 3 inches
Wheat straw	Inexpensive, insulating, good for vegetable gardens	Decomposes rapidly, can deplete nitrogen, unattractive	6 to 8 inches
Wood chips, or shredded wood	Slow to decompose, readily available, resists compaction, remains in place, weathers well	Can deplete nitrogen, should not be used next to foundations as may attract termites	2 to 4 inches

*Inorganic mulch

Trees and shrubs—For trees and shrubs in a bed, mulch the entire bed. For those in a lawn, mulch a 3- to 6-foot-wide ring from the trunk out. It should be about 4–6 inches deep. Keeping trees and shrubs mulched will prevent lawn equipment damage. DO NOT place mulch directly against the trunk of the trees and shrubs. Pull the mulch back from the trunk about 2 to 3 inches. This will prevent problems caused by wet mulch and rodent damage. See **Figure 1**.

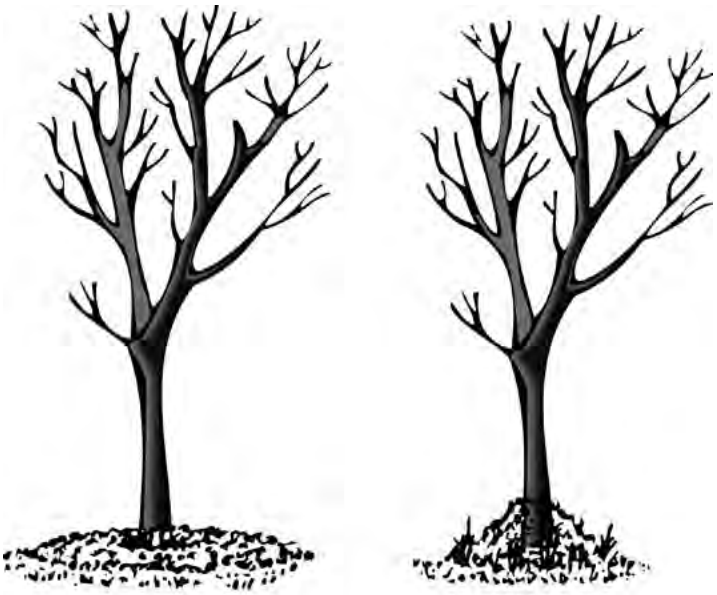


Figure 1. Pull mulch back from the trunk about 2 to 3 inches.

Mulching Tips

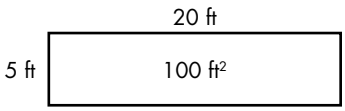
- Weed an area before applying mulch. This is also a good time to apply a preemergence herbicide.
- Maintain mulched areas and keep mulch uniform in depth. This will prevent weed problems.
- Heavy mulching (with organic mulches) over several years may result in a buildup of soil around the base of plants. This can damage plants and may result in insect and disease damage. After 3 years, rake off old mulch and apply a new layer. This buildup may also affect the soil chemistry, so be sure to have the soil tested.
- If the mulch pile starts to smell like vinegar, ammonia, sulfur, or silage, your mulch has gone sour. Soured mulch can damage plants and be unpleasant. To prevent mulch from souring or to cure soured mulch, turn the mulch pile once or twice a month, or more frequently if the pile is wet. Good aeration should eliminate toxic chemicals within 24 hours.

How Much Mulch Do You Need?

Before purchasing mulch, you need to calculate the area and depth of coverage to determine how many cubic feet of mulch you should buy. Bulk quantities of mulch are sold in cubic yard volumes.

First, determine the square foot measurement of the areas to be mulched. For example, if you have a perennial/shrub border 5 feet wide and 20 feet long, the area to be mulched equals 100 square feet:

5 feet
x 20 feet
---
100 square feet



Now, if you are going to apply mulch 4 inches deep to this area, convert the 4 inches to a fraction of a foot.

4 inches / 12 inches = ⅓ foot or .33 feet

Multiply this fraction by the square foot measurement of the area to be covered.

.33 feet
x 100 square feet
---
33 cubic feet

One cubic yard equals 27 cubic feet. In the example above, you need 1 cubic yard of mulch plus an extra 5 cubic feet of mulch.

27 cubic feet (1 cubic yard)
\+ 5 cubic feet
---
33 cubic feet

Before you purchase mulch in bulk (by the cubic yard), compare the cost with purchasing your mulch in smaller units.

Bagged mulch is also available in amounts such as 1.25 cubic feet or 2.0 cubic feet. If you purchase the mulch needed for the example given above in 1.25 cubic feet bags, you will need 27 bags (33 cubic feet divided by 1.25 cubic feet = 26.4 bags). If you purchase bags of 2.0 cubic feet, you will need 17 bags (25 cubic feet divided 2 cubic feet = 16.5 bags).

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Foundation Plantings



Figure 1. This evergreen foundation planting is formal and in scale with the home. (Photo: Shelaine Pennington)

The foundation planting in today's landscaping world has evolved from its original function. In the past, most homes had unsightly foundation walls or were built on stone or blocks with the areas open under the house. A foundation planting was designed to hide the foundation walls or conceal the open areas.

Contemporary homes are not built this way. Most have attractive siding or brick going all the way to the ground. Contemporary landscape foundation plantings are now viewed not so much as "camouflage" but as an integral part of the overall public area of the landscape design. To many homeowners, this is the most important part of the landscape because it is the first impression of their home for a passerby and contributes to the "curb appeal."

Foundation plantings can be part of this public entry area to your home. To be effective, they should complement the home and provide a transition between the home and its natural surroundings. Foundation plantings should not be massive or overpowering, so avoid the tendency to overplant.

Plantings should frame and anchor the home to its site. It might help to think of the home as jewel in a ring. The plantings are the setting that surrounds and accents the jewel. See **Figures 1–4** for examples of foundation plantings for several styles of homes.

Today's foundation plantings, when thoughtfully designed, can be part of a dynamic landscape that can be used and enjoyed. Some landscape designs actually blend the foundation planting into an entry court or garden that provides seating or some other functionality (see **Figure 5**).

As you think about how to develop an effective foundation planting for your home, keep these objectives in mind:

1. **Accent the main entrance**. Create an accent by using plants and architectural details that attract the eye and hold attention. It should be clear to someone approaching the home where the homeowner wants visitors to enter. Accent plants should have an interesting color, shape, or texture. Architectural details such as light fixtures,

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door knockers, glass panels, carved doors, painted doors, and planters are frequently used to create an attractive entrance accent. See **Figures 6 and 7** for good examples of accenting the entry to your home. See **Figure 8** for an example of an unsuitable entry accent.

2. **Avoid competing elements.** Competing elements can ruin the effectiveness of the accented entrance.
3. **Avoid using scattered plantings and specimen plants in the open lawn area.**
4. **Plant for visual balance.** Study the appearance and style of your house. Imagine the entrance as a pivot point for balancing. The house may appear heavy on one side and lighter on the other. The lighter side needs more massive plants to balance the visual weight of the heavy side. See **Figure 3**.
5. **Avoid the congested, overgrown look.** Mature plants should be in scale with the height and width of your house. Avoid plants that obscure windows, doors, and other architectural features of the house (as in **Figure 9**). One-story houses and houses with tall, steep roofs can accommodate larger and taller plants. In general, the mature foundation plant should be one-third to one-half the height from the ground to the bottom of the roof. Corner plantings may be slightly taller.
6. **Create unity.** The basic foundation planting has greater unity if it is a continuous planting bed with a defined edge. Edging material could range from an elaborate brick edging to something as simple as a small trench dividing the bed area from the lawn. Bordering the bed could be a line of low-growing shrubs or ground covers that would contribute to the unity of the planting area and provide a visual line to direct the eye. Planting individual and separate plants in the lawn next to the house creates a choppy effect (see **Figure 10**).
7. **Use low-maintenance techniques.** Choose plants and construction materials that require the least maintenance. Plants that require constant watering, pruning, and spraying are time-consuming and expensive to maintain. Try to use improved varieties that resist insects and diseases. Native plants, which require less maintenance than some introduced plants, are a good choice. Also, mowing or trimming is easier when you use a continuous bed planting with an edge.

Selecting Plants

Using a combination of evergreen, deciduous, and herbaceous plants will make the planting more interesting and attractive. A traditional rule of thumb is 80 percent evergreen and the 20 percent deciduous and herbaceous. Ultimately, you should choose the plants and plant combinations that suit your individual tastes. After all, it is your home and should reflect your individuality.

Plants should be well adapted to your soil and climate zone. Choose plants that will mature at the desired height and width, or be prepared to prune and maintain them so they will fit into their surroundings and be in scale with the house. Plants should have similar cultural requirements such as pH, moisture, and light. Create unity by selecting plants that complement one another in form, texture, color, or other characteristics.

Avoiding Common Mistakes

One common mistake is planting too close to the walls of the house. It is important that plants have adequate space and light to develop. Allow at least 3 feet between the wall and the planting.

Do not put mulch against the house as it can invite pests, especially termites, into the structure.

Avoid planting directly under the roof's drip line by moving plants slightly forward. Avoid planting under large roof overhangs unless supplemental irrigation is provided.

Another common mistake is placing the small, new shrubs too close together. With a few years' growth, the plants will fill out and form a nice foundation planting.



Figure 2. This country estate home has a mixture of evergreen, deciduous, and herbaceous perennial plants to create a balanced and attractive planting. (Photo: Shelaine Pennington)



Figure 3. This is a simple but effective landscape design for this small home located in a small-town neighborhood. The asymmetrical architecture of the house is visually balanced by using the mass of large shrubs on the left side to counter the heavier weight of the gable over the porch on the right side. (Photo: Shelaine Pennington)



Figure 4. A well-executed landscape frames this two-story home. (Photo: Lelia Scott Kelly)



Figure 5. The foundation planting around this home extends out at the front door to create a lovely and effective entry garden. (Photo: Shelaine Pennington)



Figure 6. This homeowner used a beautiful stained glass door to accent the entry. The bright pink-blooming geraniums also draw the viewer's eye to the front entrance. The light-colored monkey grass brightens the entrance and draws attention to this area, as well. (Photo: Patrick Poindexter)



Figure 7. An oversized door with elaborate decorative hinges draws attention to this front entrance. The beautiful urns planted with large ferns contribute to the effect and enhance the entry. (Photo: Shelaine Pennington)



Figure 8. Choosing plants that will outgrow the scale of your home is the wrong way to draw attention to your front door. In this example, the plants are completely out of scale with the home and should be removed and replaced with more appropriately sized plants. (Photo: Lelia Scott Kelly)



Figure 9. Using plants that obscure windows and doors gives an overgrown, cluttered look to the home and blocks the view from inside the house. (Photo: Lelia Scott Kelly)



Figure 10. The shrubs around the base of this home look choppy and disconnected. Maintenance also is more difficult because the homeowner will have to mow the grass around the base and between these shrubs. (Photo: Lelia Scott Kelly)

Other Extension Resources for Home Landscape Planning

- *Home Landscape Design* (Publication 2698). This 28-page booklet gives a step-by-step explanation of developing a home landscape plan.
- *Selecting Landscape Plants* (Publication 666). This publication gives an extensive listing of plants suitable for Mississippi with their characteristics, including optimum pH requirements.
- *Selecting Landscape Shrubs: With Special Comments on Invasive and Native Plants* (Publication 2651).
- *Selecting Landscape Trees: With Special Comments on Invasive and Native Plants* (Publication 2679).
- *Ornamental Grasses for the Midsouth Landscape* (Publication 2532).
- Other good information is listed here: ***http://msucares.com/lawn/landscape/plants/index.html***.
- A series of online "Gardening through the Seasons" videos is available here: ***http://msucares.com/gardenvideos/index.html***. These short instructional videos are designed to provide seasonal tips and techniques for the home gardener.
- The Home Landscape section of ***msucares.com*** features numerous ideas and tips on creating successful home landscape environments: ***http://msucares.com/lawn/landscape/index.html***.

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Establishing a Backyard Wildlife Habitat


Audubon Mississippi




Audubon Mississippi

"Nature, in her blind search for life, has filled every possible cranny of the earth with some sort of fantastic creature."

Joseph Wood Krutch (1893–1970), American critic and naturalist

Creating a landscape to attract wildlife is a goal of many homeowners. As natural areas for wildlife have decreased because of urbanization, more and more homeowners are realizing there is more to a landscape than a sterile arrangement of plants. It can and should be a vibrant mix of elements in which animals, plants, and humans happily coexist.

Many people envision gaily colored butterflies and birds feeding and flitting about the yard. That is the more visible aspect of a backyard habitat. Striving for biodiversity in the backyard that includes less noticed and less appreciated creatures increases the sustainability of your habitat and your enjoyment of the area.

Many insects, spiders, reptiles, amphibians, and even small mammals can keep pests in check. Letting them live together with the showier butterflies and birds helps keep the "undesirables" like flies, mosquitoes, slugs, rodents, and other creatures balanced within your habitat. Designing a balanced habitat encourages a diverse population that provides a natural system of checks and balances.

Three Basic Needs of Wildlife

Creating your backyard habitat can be very easy once you understand that wildlife, just like people, have three basic needs—food, water, and cover. Meeting all three of these needs will attract wildlife to your backyard habitat. It takes only a small investment of time to make your yard or garden "wildlife friendly" by adding these essentials.

Food

You can provide food in two ways:

1. Artificial feeding—bird feeders, squirrel feeders, and such.
2. Natural vegetation—planting a variety of native trees, shrubs, grasses, and flowering plants that provide nuts, seeds, nectar, fruit, and other sources of nourishment. Providing food through natural vegetation is preferred. It tends to encourage the "natural feeding mechanism" wildlife uses. It does not encourage animals to congregate, which can cause several problems, including disease spread, and it provides a seasonal approach that is enjoyable from a gardening and recreational wildlife standpoint. This will encourage a wider range of creatures already used to using these plants. Using natural vegetation, compared to providing artificial feed, is less costly over time and is easier to maintain. After all, you may forget to keep those feeders full of food! Remember, including plants that provide foraging opportunities in the winter offers an almost year-round supply of food. Refer to Table 5 for more information about winter food.

Water

Providing water for both drinking and bathing is vital to wildlife. You can include it by having birdbaths, drippers, or small ponds. Garden ponds that are large enough to include water animals (fish, frogs, toads, salamanders, snails) and water plants are beneficial and complement most backyard habitat settings. Surrounding the pond with plants adds to the attraction for wildlife. Be sure the water source is dependable year-round.

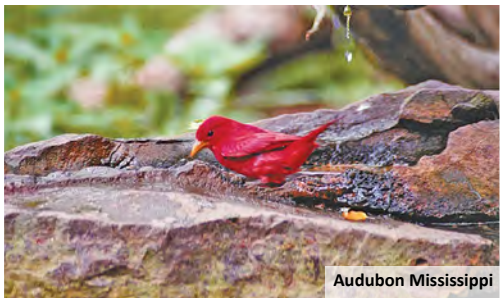
Shelter/Reproductive Areas (space)

Nesting and shelter areas where wildlife are protected from the weather and predators is essential. Various species require different landscape features for these needs. Providing a diversity of plant material that includes evergreen and deciduous trees, vines, shrubs, herbaceous plants, grasses, and ground covers lets wildlife select the right areas for their feeding, nesting, and shelter needs. Ideal habitats have plants of various sizes, densities, and types. Evergreens are particularly valuable for winter cover. Grouping plants close to sources of food and water provides the cover wildlife need to feel safe while feeding or drinking. Of course, you should select plants that provide food as well as good cover and nesting.

Living plants are only one way to provide shelter and nesting areas. Using bat houses, birdhouses, toad houses, and other artificial shelters is an easy way to meet this basic need. Providing shelter is especially important if you have a new landscape where trees and shrubs are not large enough to provide the necessary habitat. Old tree stumps, fallen logs, and brush and rock piles can also provide a great habitat for wildlife. Learning to appreciate these features (a dead tree or pile of brush) for their natural artistry and wildlife benefits is helpful when creating a backyard habitat.



Food



Water



Shelter/reproductive areas

Attracting Specific Wildlife

Birds

Birding is one of the most popular leisure activities in the United States and is well suited to the home environment. You can design your landscape to provide comfortable indoor observation. You can attract birds to your backyard by simply putting out bird feeders and baths, but you can see many more species of birds by adding their favorite plants.

Birds you see in an area are either permanent residents, summer residents, or winter residents. Twice annually, transient migrants come through on their way to winter or breeding areas. Species you often find throughout the year around homes are mockingbirds, sparrows, cardinals, blue jays, Carolina wrens, mourning doves, Carolina chickadees, tufted titmice, American robins, Eastern bluebirds, woodpeckers, and more. Birds that reside in the southeastern U.S. during the winter include American goldfinches, various waterfowl, hermit thrushes, pine siskins, purple finches, certain sparrows, and cedar waxwings. Birds that stay in summer include orioles, buntings, martins, warblers, vireos, summer and scarlet tanagers, great-crested flycatchers, wood thrushes, white-eyed vireos, gray catbirds, and hummingbirds. Also, many more transient species stop to visit during their migratory journeys, including rose-breasted grosbeaks, magnolia warblers, blackburnian warblers, and black-throated blue warblers.

A successful garden for birds uses a wide variety of garden edges, plant layers, open spaces, and plants. Edges, also called "ecotones," are the areas between tree and shrub zones and open spaces, such as lawns. Many birds that frequent home gardens prefer perching areas on trees and shrubs that face an open area. With more edges to the garden, birds have more opportunities to use an area. "Plant layers" refers to the vertical layers of the garden. By providing many height layers of vegetation, such as canopy trees, understory trees, large shrubs, small shrubs, and groundcovers, you create more environments for the various bird species to use.

Large, open lawns are not only boring to look at, but they don't help attract birds. You want some open areas for ground-feeding birds, but you also need nearby shrubs and trees for ready cover.

Food

Backyard birds require a wide variety of foods, from small seeds to berries, nuts, fruits, and insects. A variety of plants that provide these foods attracts and supports a larger variety of birds.

All birds need food, water, shelter, and breeding habitat. In addition to the wildland food plants, birds eat a large number of insects, especially during the nesting season—so it is important to avoid using pesticides in the garden.

Table 1 lists plant species that provide food for birds (including hummingbirds) and are suitable for growing in Mississippi. Native plants are highly recommended, and invasive exotic plants should be discouraged from any garden use.

TABLE 1. FOOD PLANTS FOR BIRDS.

Common name	Scientific name	Native (X) Exotic (–)	USDA zone
Large trees			
American beech	*Fagus grandifolia*	X	3–9
American elm	*Ulmus americana*	X	4–9
Black gum	*Nyssa sylvatica*	X	4–10
Cow oak	*Quercus michauxii*	X	4–9
Green ash	*Fraxinus pennsylvanica*	X	4–9
Hackberry	*Celtis laevigata*	X	5–9
Live oak	*Quercus virginiana*	X	7–10
Longleaf pine	*Pinus palustris*	X	7–9
Nuttall oak	*Quercus nuttallii*	X	8–9
Slash pine	*Pinus elliottii*	X	8–9
Southern magnolia	*Magnolia grandiflora*	X	7–9
Southern red oak	*Quercus falcata*	X	5–9
Spruce pine	*Pinus glabra*	X	8–9
Sweet gum	*Liquidamber styraciflua*	X	5–9
Tulip tree	*Liriodendron tulipifera*	X	4–9
White oak	*Quercus alba*	X	4–9
Willow oak	*Quercus phellos*	X	6–8
Small and medium-sized trees			
Black cherry	*Prunus serotina*	X	4–9
Box elder	*Acer negundo*	X	3–9
Cherry laurel	*Prunus caroliniana*	X	7–9
Chickasaw plum	*Prunus angustifolia*	X	6–9
Crab apple	*Malus angustifolia*	X	5–8
Dogwood	*Cornus florida*	X	4–9
Eastern red cedar	*Juniperus virginiana*	X	4–9
Fringe tree	*Chionanthus virginiana*	X	4–8
Hawthorns	*Crataegus* spp.	X	5–9
Hollies	*Ilex* spp.	X	5–9
Ironwood	*Carpinus caroliniana*	X	3–9
Persimmon	*Diospyros virginiana*	X	4–9
Sassafras	*Sassafras albidum*	X	4–9
Serviceberry	*Amelanchier arborea*	X	4–9
Silverbell	*Halesia diptera*	X	7–9
Sumac	*Rhus* spp.	X	4–9
Sweet bay magnolia	*Magnolia virginiana*	X	6–10
Wild plum	*Prunus americana*	X	4–9

Common name	Scientific name	Native (X) Exotic (–)	USDA zone
Shrubs			
American beautyberry	*Callicarpa americana*	X	6–9
Arrowwood	*Viburnum* spp.	X	6–9
Blueberries	*Vaccinium* spp.	X	7–9
Chokeberry	*Aronia arbutifolia*	X	4–9
Devil's walking stick	*Aralia spinosa*	X	6–9
Elderberry	*Sambucus canadensis*	X	4–10
Hollies	*Ilex* spp.	X	5–9
Huckleberry	*Gaylussacia* spp.	X	7–9
Red buckeye	*Aesculus pavia*	X	6–9
Wahoo	*Euonymus americanus*	X	6–9
Vines			
Blackberry	*Rubus* spp.	X	6–9
Coral honeysuckle	*Lonicera sempervirens*	X	4–9
Cross vine	*Bignonia capreolata*	X	6–9
Cypress vine	*Ipomea quamoclit*	X	8–9
Greenbriar	*Smilax* spp.	X	7–9
Trumpet vine	*Campsis radicans*	X	4–9
Virginia creeper	*Parthenocissus quinquefolia*	X	4–9
Perennials			
Bee balm	*Monarda* spp.	X	4–9
Black-eyed Susan	*Rudbeckia hirta*	X	3–10
Butterfly ginger	*Hedychium coronarium*	–	8–10
Carolina vetch	*Vicia caroliniana*	X	7–11
Cigar flower	*Cuphea* spp.	–	8–10
Coralbean	*Erythrina herbacea*	X	8–10
Firebush	*Hamelia patens*	–	8–10
Foxtail grass	*Setaria geniculata*	–	4–9
Ironweed	*Vernonia altissima*	X	5–9
Lantana	*Lantana camara*	–	8–10
Lespedeza	*Lespedeza virginica*	X	4–9
Partridge pea	*Chamaecrista fasciculata*	X	4–9
Pentas	*Pentas* spp.	–	9–10
Purple coneflower	*Echinacea purpurea*	X	3–9
Red hot poker	*Kniphofia uvaria*	–	6–9
Rosin weed	*Silphium integrifolium*	X	7–9
Salvia	*Salvia* spp.	X	7–11
Sunflowers	*Helianthus* spp.	X	6–11



Black cherry fruit



American beautyberry fruit



Purple coneflower seed

Water

Water is a critical element for wildlife, especially during winter and times of drought. Birds often get water from fruits and other juicy sources, but they need water regularly. Keeping a birdbath filled with clean water is one of the best things you can do for birds. Besides quenching their thirst, they can take baths and clean off parasites. Birds drink water from anything available, including puddles, streams, ponds, ditches, and water bowls.

Shelter and Nesting

Spring brings a bundle of activity to the backyard. Parent birds collect twigs, leaves, spider webs, bark, feathers, hair, mud, lichen, dryer lint, thread, and grasses to create the perfect nest. These nests are used only for rearing a brood and are often used only once. Birds usually select an area that is well hidden and in dense foliage. Thorns and prickly leaves are an extra benefit. Spiny shrub thickets make an excellent nesting spot.

Planting and keeping a fair amount of dense shrub thickets provides safe nesting space as well as an area for birds to shelter in bad weather. It is also important to include evergreen trees and shrubs for winter cover. Cavity-nesting birds, such as woodpeckers and owls, require snags (standing dead trees) they can hollow out for a nest. If there are no snags, some species nest in bird boxes.

The Truth about Purple Martins



Do attract these birds if you want to be entertained with aerial acrobatics and musical chatter!

Don't attract these birds thinking you will rid your landscape of mosquitoes. These birds do not eat vast quantities of mosquitoes as popularly believed. We know martins eat mostly beetles, dragonflies, moths, butterflies, leafhoppers, horseflies, and wasps. Mosquitoes make up less than 1 percent of their diet. Bats, dragonflies, and toads are the real mosquito-eaters!

Basic Requirements

Provide at least four separate nesting rooms or gourds. These birds nest in groups or colonies.

Use the correct size of nesting house. The interior should be 6-by-6 inches; the opening should be 2½ inches; and the nesting house should be 12–20 feet from the ground. Many models are available to purchase, from aluminum multi-level "condos" to natural or artificial gourds. When setting up your houses, remember that you must clean, maintain, and store them every year.

Locate houses on open lawns or meadows at least 40 feet from any flight obstruction. Martins like to approach the nests in long, gliding swoops. If possible, locate houses close to water. Locating houses anywhere near extensive wooded areas encourages owls that prey on martins.

Protect from competition. English house sparrows and European starlings invade martin houses. To avoid these nuisance birds, do not hang houses until "martin scouts" (the earliest arriving birds apparently arriving at nesting sites before the rest of the colony) arrive. Placing plastic cups over house holes until you spot these "scouts" is another way to keep out sparrows and starlings. You may spot martin scouts as early as January in south Mississippi and as late as March in north Mississippi.

Tip: To clean the old nests from gourd houses, use the claw-like kitchen utensil you use to pick up cooked spaghetti. It works like a charm to remove a 6-inch nest from a 2½-inch-diameter hole!

Tip: Install predator guards on poles to keep out rat snakes, raccoons, squirrels, and other mischief-makers.

Hummingbirds

Many Mississippi gardeners enjoy attracting hummingbirds to the landscape. These active birds provide hours of entertainment. They display extraordinary abilities to turn, hover, and fly. The males of these "high-octane" bundles of energy have beautiful feather colors of red, pink, bronze, purple, blue, red, and orange.

Hummingbirds are unique to the American continents, and 21 species are in North America. Only ruby-throated hummingbirds, the most extensive travelers, are known to breed east of the Mississippi River.

Hummingbirds are neotropical migrants. That means they spend their winters in Central and South America, return to Mississippi in early spring, and leave usually by late October.

You can easily attract hummingbirds to visit your garden. These tiny birds like flashy bright colors, and a red plastic feeder lets the birds know where your garden is.

You can purchase commercially made hummingbird nectar for the feeder, or make your own. Simply mix one part granular sugar to four parts water and boil to dissolve the granules. Let the mixture cool, and fill the feeder. You do not have to add red food coloring to the mixture. It is very important to keep the feeders clean, especially in hot weather. Change the mixture regularly. Never feed honey to hummingbirds. Honey mixed with water causes a fungus to form on the tongues of hummers, which kills them. You can leave up a feeder or two during the winter to attract other wintering species not present during the breeding season (such as the rufous hummingbird). Leaving feeders up year-round does not keep hummingbirds from migrating.

While hummingbirds are easily attracted to plastic nectar feeders, there are other ways to meet their needs. As with all other birds, hummingbirds need food, water, shelter, and nesting habitat.

Food

In addition to sugar water, hummingbirds need a variety of food types. Tiny, flying insects are another important source of food, especially during the nesting season. They eat spiders, aphids, and many types of flying insects. Because of this, it is very important not to use pesticides on plants when providing for the needs of hummingbirds.

You do not have to provide sugar water feeders when you add the correct combinations of flowering plants to the garden, especially ones with bright red or orange tubular flowers. When you do this, it is important either to provide plant types that flower throughout the growing season or to use combinations of different plants that will extend nectar sources all year long. The more types of food plants and environments you add, the greater the variety of birds and other animals you will see. Even if there is little room in the landscape for hummingbird plants, patio containers or hanging baskets are perfectly suitable for attracting these birds.


Audubon Mississippi

To attract hummingbirds, plant a large group of flowering plants rather than one source. The extra blooms provide more food and are more noticeable. Since these birds are fiercely territorial, provide various locations of plants throughout the landscape.

Hummingbirds typically arrive in Mississippi in mid-March, about the time red buckeye, coral honeysuckle, and native azalea shrubs flower. Hummingbirds are said to follow the bloom time of these plants on their migration north. Mark on your calendar or field notebook the dates when these shrubs begin to bloom in your area. These and other spring-blooming plants will attract them earlier to your garden. Most hummingbird flowers are tubular, have no scent, are brightly colored, and are easy for hummingbirds to hover around. As hummingbirds visit the flowers, the pollen from the male flower parts often coats the birds' feathers and pollinates the next flowers the birds visit.

Table 2 lists flowering plants that grow in Mississippi that hummingbirds use for food.

TABLE 2. FOOD PLANTS FOR HUMMINGBIRDS.

Common name	Scientific name	Flowering time	Native (X) Exotic (–)	USDA zones
Annuals				
Begonia	*Begonia* spp.	spring, summer, fall	–	4–10
Fuschia	*Fuschia* spp.	spring	–	4–11
Geranium	*Pelargonium* spp.	summer	–	4–11
Impatiens	*Impatiens* spp.	spring, summer	–	4–11
Jewelweed	*Impatiens capensis*	summer, fall	X	6–9
Nasturtium	*Tropaeolum majus*	spring	–	4–11
Petunia	*Petunia* spp.	spring, summer	–	4–11
Scarlet sage	*Salvia splendens*	summer, fall	–	4–11
Zinnia	*Zinnia* spp.	spring, summer	–	4–11
Perennials				
Anise hyssop	*Agastache foeniculum*	summer	–	6–10
Bee balm	*Monarda* spp.	summer	X	4–9
Blazing star	*Liatris* spp.	fall	X	3–9
Butterfly weed	*Asclepias tuberosa*	summer	X	4–9
Canna	*Canna* × *generalis*	summer	–	7–10
Cardinal flower	*Lobelia cardinalis*	fall	X	2–9
Carpet bugle	*Ajuga reptans*	spring	–	3–10
Cigar plant	*Cuphea ignea*	summer, fall	–	8–10
Columbine	*Aquilegia canadensis*	spring	X	3–9
Copper iris	*Iris fulva*	spring	X	4–9
Coral bells	*Heuchera sanguinea*	spring, summer	X	4–9
Dianthus	*Dianthus* spp.	spring	–	3–9
Firebush	*Hamelia patens*	summer	–	8–10
Fire pink	*Silene virginica*	summer	X	5–9
Four o' clock	*Mirabilis jalapa*	summer, fall	–	8–10
Gladiolus	*Gladiolus* × *hortulanus*	summer	–	7–9
Indian pink	*Spigelia marilandica*	summer	X	5–10
Lantana	*Lantana camara*	summer	–	8–10
Lily	*Lilium* spp.	spring	–	4–11
Penstemon	*Penstemon laevigatus*	spring	X	6–10
Phlox	*Phlox divaricata*	spring	X	5–9
Pineapple sage	*Salvia elegans*	summer	X	8–11
Red hot poker	*Kniphofia uvaria*	summer	–	6–9
Red sage	*Salvia coccinea*	summer, fall	X	7–11
Turks cap	*Malvaviscus arborea*	summer, fall	–	9–10
Verbena	*Verbena rigida*	spring, summer	X	6–10
Shrubs				
Abelia	*Abelia grandiflora*	spring, summer	–	5–9
Althea	*Hibiscus syriacus*	summer	–	5–9
Butterfly bush	*Buddleia davidii*	summer, fall	–	5–9
Century plant	*Agave americana*	rarely blooms	X	8–10
Flowering quince	*Chaenomeles japonica*	spring	–	4–9
Jasmine	*Jasminum* spp.	spring, summer	–	7–10

Common name	Scientific name	Flowering time	Native (X) Exotic (–)	USDA zones
Native azalea	*Rhododendron canescens*	spring	X	6–9
Red buckeye	*Aesculus pavia*	spring	X	6–9
Weigela	*Weigela* spp.	spring	–	5–9
Yucca	*Yucca* spp.	summer	X	7–10
Vines				
Coral honeysuckle	*Lonicera sempervirens*	spring, summer	X	4–9
Crossvine	*Bignonia capreolata*	spring, summer	X	6–9
Cypress vine	*Ipomea quamoclit*	summer, fall	X	8–9
Morning glory	*Ipomea* spp.	summer	X	4–9
Trumpet creeper	*Campsis radicans*	spring	X	4–9
Trees				
Chaste tree	*Vitex agnus-castus*	summer	–	7–9
Coralbean	*Erythrina crista-galli*	summer	–	8–10
Crabapple	*Malus* spp.	spring	X	5–9
Hawthorne	*Crataegus* spp.	spring	X	5–9
Locust	*Robinia* spp.	spring	X	4–9
Tulip poplar	*Liriodendron tulipifera*	spring	X	4–9



Native azalea



Red buckeye



Tulip poplar

Water

Water is important for hummingbirds. They take in as much as eight times their body weight per day! They use any source of water but usually don't land on the ground. They prefer safe water sources. Typically they avoid deep water, as in a birdbath, but they can use this source if you add a few rocks or bricks to decrease depth.

A great source of water for hummers in the summer is a garden mister. This small hose attachment shoots a fine spray or mist into the air. Hummers fly through the mist to cool down on hot days or will drink from it. As water collects on leaves, hummingbirds often bathe on them.

Shelter

A variety of landscape spaces appeal to hummingbirds and other birds. Open, sunny areas and partial- and dense-shade areas provide opportunities for birds to either warm up or cool down. Groups of shrubs and trees let birds perch and survey their territory or favorite plants and keep an eye out for predators. The birds spend about four-fifths of each day perching in trees or shrubs. Males usually perch anywhere in the open, while the females tend to perch in protected areas of shrubs or trees.

Nesting Space

Hummingbirds favor horizontal limbs of trees as nesting sites, especially over water sites. They most often attach the nest to a branch, and it looks like a growth or knot. They use plant fibers, fluffy seeds, lichens, and spider webs to build the tiny nest. Leave plenty of these items for them in your yard through the year. Allow undisturbed areas of your yard to grow with thickets of trees, shrubs, and vines for nesting space. Birds usually won't nest in high-traffic areas.

Butterflies

Butterflies provide a beautiful living element in the landscape with their myriad colors, sizes, and forms. They also play an important role by pollinating many wildflowers, shrubs, vines, and other woody plants. The key to attracting butterflies is to simply provide their food sources and other living needs, both for adults and caterpillars. While providing for these needs, you can create a beautiful flowering garden.

Certain butterfly species are specific to particular environments, ranging from deep, shady woods to open, sunny meadows and dunes. Each type selects a particular place according to a certain geographic elevation, latitude, available plant species, lack of predators, and other factors. The more variety of habitats and plants provided on your property, the more diverse species of butterflies will occur.

The Butterfly Life Cycle

Though we most often enjoy and appreciate the winged adults, understanding the butterfly life cycle is important when encouraging butterflies. A butterfly's life begins as an egg laid on a host plant. Usually, the eggs are laid on the bottoms of the leaves and can vary widely in shape, form, size, and color. Within 2 weeks, the tiny eggs hatch and tiny caterpillars emerge. The larva consumes the host plant's leaves and will shed its skin as it grows. In about a month, the larva is ready to form a chrysalis (pupa). After a few weeks, the magical transformation takes place and an adult butterfly emerges. Most adult butterflies live for only a short time. Some species mate and live for just a few days; others are known to live over a year.

The Butterfly Garden

A successful garden for attracting butterflies provides for their food, shelter, and breeding needs. Since butterflies are cold-blooded, they require sunny areas in order to warm up and move around. At night, they hide under the cover of leaves of shrubs and trees, so they need densely vegetated areas, as well.



Monarch on ironweed



Monarch caterpillars

Unless these needs are provided for in your neighborhood, you will see few butterflies in your backyard. Avoid using pesticides in the garden. Place butterfly gardens away from bird-feeding areas to avoid conflicts of interest.

Food

Butterfly food falls into two categories: host plants and nectar plants, both of which are necessary to sustain populations. Eggs are laid on host plants and caterpillars feed on them. Adult butterflies feed on nectar plants.

Tables 3 and 4 list host and nectar plants that successfully grow in Mississippi.

Shelter

Butterflies need shelter from wind and rain, and a roosting place for the night. Shrub foliage is often used for protection and sleeping quarters. Create a butterfly shelter area by constructing a simple log pile in a corner of the back yard. Simply stack cut logs anywhere from 3 to 5 feet high. Be careful—this provides butterfly shelter but will also provide shelter for other wildlife.

Mud Puddles

Butterflies use mud puddles for additional water and minerals. Sulphurs, swallowtails, skippers, and blues commonly visit these wet areas. Simply provide a wet, muddy area in the garden, or provide a manmade stream or mud-bottomed pond where water can splash.

Rocks

A few flat stones placed in open, sunny areas of the garden give butterflies an area to warm up on cool mornings. They will also use brick or concrete patios, walkways, or decks for basking.

See MSU Extension Information Sheet 1661 *Butterfly Plants and Mississippi Butterflies* for more butterfly gardening information.

TABLE 3. HOST PLANTS FOR BUTTERFLIES.

Common name	Scientific name	Native (X) Exotic (–)	USDA zone	Butterfly types
Herbaceous				
Aster	*Aster* spp.	X	5–9	Pearl crescent
Clover	*Trifolium arvense*	X	4–10	Clouded sulphur, eastern tail blue
Hollyhock	*Alcea rosea*	–	5–9	Painted lady
Mallow	*Hibiscus* spp.	X, –	9–10	Gray hairstreak
Marigold	*Tagetes* spp.	–	4–10	Dainty sulphur
Milkweed	*Asclepias* spp.	X	4–9	Monarch, queen
Senna	*Cassia* spp.	–	8–10	Cloudless sulphur
Smartweed	*Polygonum* spp.	X, –	4–10	Purplish copper
Snapdragon	*Antirrhinum* spp.	–	4–10	Buckeye
Sneezeweed	*Helenium* spp.	X	4–8	Sulphurs
Various grasses	various	X	4–10	Wood nymph, wood satyr, skippers
Wild carrot	*Daucus pusillus*	X	3–10	Swallowtails
Shrubs and vines				
Blueberry	*Vaccinium* spp.	X	7–9	Brown elfin
False indigo	*Amorpha* spp.	X	2–9	Dog face, silver skipper
Passionflower vine	*Passiflora* spp.	X	7–9	Gulf fritillary, zebra
Pawpaw	*Asimina triloba*	X	5–9	Zebra swallowtail
Pipevine	*Aristolochia* spp.	X	5–9	Pipevine swallowtail
Spicebush	*Lindera benzoin*	X	5–9	Swallowtails
Trees				
Birch	*Betula* spp.	X	4–9	Mourning cloak, admirals
Cherry	*Prunus* spp.	X	4–9	Red-spotted purple, swallowtail
Cottonwood	*Populus* spp.	X	4–9	Admirals, red-spotted purple, viceroy, mourning cloak
Dogwood	*Cornus florida*	X	4–9	Spring azure
Elm	*Ulmus* spp.	X	4–9	Comma, question mark, mourning cloak
Hackberry	*Celtis laevigata*	X	5–9	Question mark, comma, hackberry butterfly, tawny emperor, snout
Hardy orange	*Poncirus trifoliata*	–	10–11	Anise swallowtail, giant swallowtail
Locust	*Robinia* spp.	X	4–9	Silver-spotted skipper
Oaks	*Quercus* spp.	X	4–10	Sister, banded hairstreak
Sassafras	*Sassafras albidum*	X	4–9	Spicebush swallowtail
Tulip poplar	*Liriodendron tulipifera*	X	4–9	Swallowtails
Willow	*Salix* spp.	X	4–10	Admirals, viceroy, swallowtails



Passionflower


Aster


Milkweed

TABLE 4. NECTAR PLANTS FOR BUTTERFLIES.

Common name	Scientific name	Native (X) Exotic (–)	USDA zone	Flowering time
Herbaceous				
Ageratum	*Ageratum* spp.	–	4–9	spring
Aster	*Aster* spp.	X	5–9	fall
Bee balm	*Monarda* spp.	X	4–9	summer
Bidens	*Bidens aristosa*	X	8–10	fall
Black-eyed Susan	*Rudbeckia* spp.	X	5–9	summer
Blazing star	*Liatris* spp.	X	3–9	fall
Boneset	*Eupatorium* spp.	X	3–9	fall
Butterfly weed	*Asclepias* spp.	X	4–9	summer
Clover	*Trifolium* spp.	X	4–10	spring
Coreopsis	*Coreopsis* spp.	X	3–8	summer
Daylily	*Hemerocallis* spp.	–	3–9	summer
Goldenrod	*Solidago odora*	X	3–9	fall
Ironweed	*Vernonia* spp.	X	5–9	fall
Joe-pye weed	*Eupatoriadelphus* spp.	X	3–9	summer
Lantana	*Lantana camara*	–	8–10	summer
Mountain mint	*Pycnanthemum* spp.	X	4–9	summer
Pentas	*Pentas* spp.	–	9–10	summer
Prairie phlox	*Phlox pilosa*	X	5–9	spring
Purple coneflower	*Echinacea purpurea*	X	3–9	summer
Thistle	*Cirsium* spp.	X	4–9	summer
Verbena	*Verbena canadensis*	X, –	8–10	spring/summer
Wild carrot	*Daucus pusillus*	X	3–10	spring
Yarrow	*Achillea* spp.	X	3–9	summer
Shrubs				
Abelia	*Abelia* × *grandiflora*	–	5–9	summer
Butterfly bush	*Buddleia davidii*	–	5–9	summer
Buttonbush	*Cephalanthus occidentalis*	X	5–9	summer
Pepperbush	*Clethra alnifolia*	X	4–9	summer
Native azalea	*Rhododendron canescens*	X	6–9	spring
New Jersey tea	*Ceanothus americanus*	X	4–8	summer
Spicebush	*Lindera benzoin*	X	5–9	spring
Trees				
Buckeye	*Aesculus* spp.	X	6–9	spring
Cherry	*Prunus* spp.	X	4–9	spring
Willow	*Salix* spp.	X	4–10	spring



Verbena



Lantana


Joe-pye weed

Other Creatures

Bats

Perhaps because bats are featured as villains in late-night horror flicks, these very beneficial and interesting mammals have been saddled with a negative reputation. Bats play a major role in the reduction of night-flying insects, especially mosquitoes. For that reason alone, bats should be a welcome addition to your backyard habitat. It is estimated that a single brown bat can catch up to 600 mosquitoes in an hour!

Most bats prefer a warm, dark, protected place to rest during the day. Providing this type of habitat by installing bat houses is one way to attract these mammals. Locate the bat house at least 15 feet above the ground in an area that receives at least 7 hours of sun a day. Do not attach them directly to your home.

Some bats will roost under house eaves, in garages, under loose tree bark, and in tree cavities. Be aware of the potential for attracting bats into your residence. Make sure that there are no openings or gaps in the eaves of your home or around vents in the roof if you decide to put bat houses nearby.

Some species of bats are migratory and hibernate during the winter months in caves, mines, or buildings. Never disturb a roosting or hibernating bat. As with all wildlife, observe only—do not handle.



Bat box

Snakes, Lizards, Salamanders, Turtles, Toads, and Frogs

Like bats, some reptiles and amphibians are looked upon as undesirables in the landscape. While turtles, toads, and frogs are usually considered welcome inhabitants of the backyard, snakes and lizards have bad reputations.

Most homeowners are concerned whether the snakes they encounter in their gardens are venomous or not. Many snakes that commonly dwell in backyard gardens are harmless to people. The garter snake is the most prevalent of these common backyard reptiles. It feeds on slugs and snails, which is a plus for most gardeners.

Many snakes kill and eat rats, mice, insects, moles, and other pests. King, milk, black racer, and eastern indigo snakes commonly eat rodents as well as other snakes, including venomous ones. Snakes can help keep pest numbers to a manageable level because snakes often capture pests in areas other predators cannot access.

If we can overcome our phobias about these nonvenomous, beneficial reptiles and let them peacefully occupy our backyards, our landscapes and we will benefit. But beware—there are venomous snakes out there to avoid. For your safety, become familiar with the venomous snakes in your area. Extension Publication 3529 *Snakes Alive! How to Identify Snakes* will help differentiate between the venomous and nonvenomous types.

Four groups of venomous snakes in Mississippi are potentially dangerous: cottonmouths, copperheads, rattlesnakes, and coral snakes. To protect yourself from these venomous snakes, wear high boots when walking or working in areas frequented by snakes. Avoid putting your hands or feet where you can't see, such as in crevices, under rock ledges, or in any other concealed hiding places. For example, if a log is across a trail, step on top of it instead of over it.

Lizards, including skinks and anoles, feed on insects and pose no threat to humans. Skinks and anoles are famed for a defense mechanism they employ when threatened. They have breakaway tails that thrash for several minutes when detached, serving as a distraction while the lizard escapes from its attacker. Consider yourself fortunate if your garden already has this beneficial inhabitant.

Salamanders are smooth-skinned amphibians that commonly eat insects, slugs, earthworms, and other invertebrates. Some eat leeches, tiny mollusks, crustaceans, and frogs' eggs. Most salamanders can be distinguished from lizards by their moist or slimy skin covering. These creatures depend on water and moisture for their existence. Usually they can be found under logs and rocks and near any area where the ground is moist and shaded such as around shady water features. Salamanders are generally active when there is no sunshine. They do not cause damage to people or property and none have a venomous bite. Common names for these creatures include mud puppy and water dog.



Marbled salamander



Gray rat snake



Gopher tortoise

Providing a protected, sunny, rocky hillside, wall, or other area where radiant heat will warm the bodies of these cold-bloodied animals will encourage reptiles and amphibians to inhabit your landscape and give you an area to observe and view them. Thick, leafy ground covers and other undergrowth areas will provide them with a cool retreat and hiding place during the hottest part of the day. Brush piles, rock piles, and woodpiles will also provide resting and hiding places.

A small pond is the best way to attract frogs, toads, salamanders, dragonflies, and turtles to your backyard. These creatures' diets include insects, tiny aquatic plants, tadpoles, and snails.

The Mischief-Makers

Deer, rodents, moles, raccoons, rabbits, opossums, armadillos, skunks, and other unwelcome guests

Ideally, the backyard habitat is a balanced, diverse, essentially self-regulating community. In reality, there are certain animals that, because of their voracious feeding habits, are a nuisance and can be detrimental to our landscapes. These creatures are not easily tolerated or controlled.

Deer feed on whatever plant material is available. This includes many prized garden plants. Rabbits will eat many types of plants. Rodents, including rats, mice, and voles, feed on plant parts above and below the ground. They can girdle the trunks of small trees and shrubs. Moles tunnel through yards in search of insects, grubs, and worms, leaving behind unsightly networks of mounds. Raccoons, opossums, skunks, and armadillos pilfer through the landscape. Their disruptive activities include uprooting plants, eating pet food, getting in garbage cans, and being a nuisance in general.

There are no easy ways to control these problem animals' access to your garden. But with a little ingenuity and work, you can limit their access. The problem is that their requirements are the same as the wildlife we want to attract: shelter, water, and food. So, if you eliminate shelter for these animals, you are also doing so for the wildlife you want to attract.

The best and most effective strategy is to use fencing or other barriers to keep these pests out. However, excluding deer with barriers or fencing is a challenge. Sometimes the barrier or fence can distract from the beauty of the landscape. Which is worse? A large, unsightly fence or the presence of animals that can lay waste to your garden? These are questions you must address. Plant cages and other barriers to protect your plants have the same problem. Would you like to look out on a garden full of cages, wires, and other barriers?

There are some animal repellents available. Trapping and moving the animal is a short-term solution. (But trapping is the best way to control moles.) You can use electric fences and motion detectors that trigger noisemakers, sprinkler systems, and lights. Putting out decoy predator animals, such as owls, hawks, and snakes may also help. A family dog or cat can be a deterrent. Ultimately, perhaps, if you truly want to accommodate wildlife, you may need to cultivate a tolerance for these animals in your landscape.



Vole damage on hosta

Sustaining Backyard Habitats

Being able to sustain your backyard habitat is a critical concern for anyone interested in participating in wildlife recreation. Understanding the biological impacts of available habitat on wildlife is essential for meeting the long-term or life-cycle needs of species.

Simply attracting wildlife to your backyard or garden may be your intent, but also consider the perspective of the species. The interactions that occur during their visit determine if they will return. Whether you realize it or not, wildlife is locked into a daily struggle for life, and every action they make counts as either a negative or a positive toward their existence.

Often, people create habitats that provide only parts of what wildlife need. Instead, you need to construct habitats that contain as many pieces as possible of a complete ecosystem. This approach helps many species throughout the changing seasons and addresses habitat deficiencies in an area. Only this completeness will encourage continued use by wildlife. These complete habitat designs also improve the scenery for people.

Incorporate the elements of native habitats, including extra features such as water sources, nesting areas or materials, and cover. Your site will be attractive to wildlife, give them a better chance of completing their annual life cycles, and keep them returning in future seasons.

Understand the timing of seasonal management. Consider using plants whose seeds or flowers mature at different dates. Plants with seeds that mature in late summer or early fall are extremely useful to wildlife during fall migrations and overwintering periods. Select a mixture of trees and shrubs, some with late-maturing fruit. This allows many species of wildlife to remain on your property later into the year. Table 5 lists selected native/nonnative plant species that provide food in fall and winter.

Consider feeding needs at different points of the year. How does food selection change during different seasons of the year? When using feeders or other supplemental forms of feeding, always consider the use patterns of wildlife and the potential impacts of removing these food sources. Once you set things in motion, consider how disturbance negatively or positively impacts one species or another.

Dr. Aldo Leopold, the "father of wildlife management," said, "Habitat is like spokes in a wheel ..." If you remove one or more spokes, you weaken the habitat's stability. To make a habitat more sustainable, try to replace the "spokes" that may be missing.

One idea is to collaborate with your neighbors to disperse the elements of habitat between several yards. Try to arrange key pieces of habitat that may be crucial to one or more species across the properties evenly.



Mixed border of perennial and annual flowers, grasses, and shrubs.

Plant Selection Checklist

- Does it serve as food or shelter?
- Does it attract many types of wildlife? For example, does it provide nectar for butterflies as well as fruit/seed/shelter for birds? This is an important consideration if backyard space is limited.
- Is it adapted to the area so it will survive with minimal effort (consider climatic zone, wet/dry, shade/sun, soil pH, space, etc.)?
- Does it have attractive features that contribute to the overall beauty of the landscape?

TABLE 5. SELECTED NATIVE/NONNATIVE PLANT SPECIES THAT PROVIDE FOOD IN FALL AND WINTER.

Fruit/seed timing	Selected species
Fall fruit/seed	*Aralia spinosa* (devil's walking stick)
	Callicarpa americana (American beautyberry)
	Cornus spp. (flowering dogwood, rough-leaf dogwood, cornelian cherry)
	Coreopsis spp. (coreopsis)
	Echinacea spp. (purple coneflower)
	Euonymus americana (strawberry bush)
	Rudbeckia spp. (black-eyed Susan)
	Gaillardia pulchella (blanketflower)
	Malus spp. (apples and crabapples)
	Parthenocissus quinquefolia (Virginia creeper)
	Viburnum spp. (arrowwood, cranberry bush, and many others)
	Vitis spp. (native grape)
	Helianthus spp. (sunflower)
	Lindera benzoin (spicebush)
Fruit/seed persisting into winter	*Celtis laevigata* (hackberry)
	Crataegus spp. (hawthorns)
	Ilex spp. (hollies, evergreen and deciduous)
	Rosa spp. (numerous roses provide hips; e.g., *Rosa palustris*)
	Rhus spp. (sumac)
	Solidago spp. (goldenrod)
	Myrica cerifera (wax myrtle)
	Quercus spp. (oaks, acorns)
	Veronica noveboracensis (ironweed)
	Carya spp. (hickory/pecan nuts)
	Fagus grandifolia (American beech nut)
	Pinus spp. (pine)

Tips for Success

Here are 10 tips to fulfill the three basic needs of wildlife and enhance your wildlife landscape:

1. Adjust your attitude—think like a wilding and have a heart!
2. Reduce the lawn area.
3. Use native plants where and when possible.
4. Create islands of vegetation with vertical layering.
5. Remove invasive exotic plants.
6. Manage pets—keep cats indoors during the day if possible.
7. Reduce pesticide/fertilizer use.
8. Encourage your neighbors.
9. Install a small pond.
10. Relax and enjoy.



Let some of your lawn area become a meadow.

1 **Adjust your attitude**, if necessary, to appreciate the beauty and usefulness of "eyesores" such as old tree snags, stumps, brush piles, and rocks in your backyard.

Dead trees provide homes for more than 400 species of birds, mammals, and amphibians. They make excellent and valuable sources of cover, nesting, and food for all types of wildlife. Consider leaving dead or dying trees in your landscape if they don't threaten people or property. You can discreetly tuck brush, wood, and rock piles out of the way and in secluded areas of your landscape to lessen their "messiness." Think like a wilding, and have a heart!

Anyone who wants to have continual contact with nature has to realize that the attitudes, experiences, and actions of urban citizens determine the success or failure of conservation and nature-based programs in the future. Successful urban wildlife management must make up for the human influences on wildlife ecology. Factors such as personal income or opposing beliefs regarding wildlife may pose management problems in neighboring areas.

2 **Reduce the lawn area.** Let some of your lawn area be meadow. You can easily do this by forgetting to mow the grass regularly! Check your meadow for weeds and unwanted grass, and quickly get rid of these. Replace lawn with ground cover. Both of these suggestions are more valuable to wildlife than mown grass, not to mention less work for you.

3 **Use native plants.** Using plants that occur naturally in your region is an economical, easy way to provide habitat that is familiar and useful to local wildlife. Once established, native plants typically require less water and maintenance compared to nonnative species. Native plants are better adapted to local soil types and in general do not require fertilizing for good growth. Typically, these plants require fewer pesticide applications, since they are more resistant to insects and diseases. See Extension Publications 2334 *Native Shrubs for Mississippi Landscapes* and 2330 *Natives Trees for Mississippi Landscapes* for more information on using native plants in the landscape.

4 **Create islands of vegetation with vertical layering**. If your landscape is open lawn with a few large trees and nothing in between, add areas of vegetation that include layers of plant material to fill the space between lawn and trees. This is called "vertical layering." These planting areas should include vegetation of varying heights and widths, such as groundcovers, wildflowers, and evergreen and deciduous shrubs and trees. Connect these islands or locate them near each other, if possible, so wildlife can move from area to area with little open exposure to predators.

Small, ground-dwelling animals and birds benefit from islands of thick, layered vegetation. Locating artificial feeding stations near these islands provides cover safety while wildlife feed. Always remember that individual species have specific preferences for foraging, loafing, and nesting within habitats.



Vertical layering



Island of vegetation

5 **Remove invasive exotic plants.** See *Mississippi's Worst Invasive Weeds* (Extension publication M1194) for a list of the most common invasive plant species. Remove and destroy any of these you have in your home landscape. What you do in your backyard does affect the community at large. Invasive exotic plants probably destroy more natural habitat every year than development. Once established, these species can replace native plants, destroying habitat and changing the natural ecology. This decreases food, shelter, and other essentials.

6 **Manage pets.** Make sure your family pet does not kill the wildlife you so painstakingly attract to your yard. Cats are particularly good hunters and kill for sport. Female cats tend to be more aggressive hunters than males and, in general, cats are thought to be the number one predator of songbirds in the United States. Dogs harass and kill small mammals and other wildlife.

A well-fed pet will still hunt. Unless you restrain your pet, you can expect its natural predatory behavior.

Unfortunately, the cover you provide for wildlife can hide predators. Minimizing open areas where wildlife are exposed to attack helps. Strategically placing feeding stations also helps. Wildlife species are typically most susceptible to predators during feeding. Locate feeders no closer than 5 feet from dense, covered areas.

Young pets are more likely to be skilled hunters than older pets. Sometimes losing a bird, squirrel, or other creature to an unrestrained family pet happens. But if your pet regularly brings you little animal trophies, consider not leaving the pet unsupervised outdoors.

7 **Reduce pesticide/fertilizer use.** The more you can reduce pesticides and chemicals in your landscape, the better it is for wildlife. Most pesticides do not target one pest but eliminate a broad range, including some that are beneficial.

Most wildlife rely on insects either directly or indirectly for survival. Some prey on insects for food. Others prey on birds that, in turn, rely on insects for their food. Everything is interconnected. Misusing chemicals and pesticides tends to break these connections. If there is a wide variety of insects in your landscape, there will be a good variety of wildlife. Limiting pesticides is one way to have this.



Encourage your neighbors to make their yards more wildlife-friendly.

If pesticides are necessary, spot treat or use baits that target specific pests. Always read and follow label instructions when applying lawn care products. Also try to limit fertilizers to only what is recommended for good plant growth. Take a soil sample to your county MSU Extension office for analysis. Note: A major pollutant of ground water is too much nitrogen, often from applying too much lawn chemicals. These pollutants can harm fish, wildlife, and humans. Remember: What we do today will impact us tomorrow.

8 **Encourage your neighbors.** If your yard is the only wildlife-friendly landscape in a neighborhood, your habitat will not provide enough space to attract and keep a variety of wildlife. Encouraging your neighbors to install more wildlife-friendly areas in their yards by letting them visit yours to see the joys and benefits of wildlife gardening is one way to broaden the wildlife community in your area and draw more wildlife to your yard!

Wildlife habitat has to fit in order to deliver the desired richness and abundance of species. For instance, take four adjacent, average-sized lots in an urban or suburban Mississippi neighborhood. Individually, they may offer very little in the way of habitat for backyard wildlife species. But you and your neighbors together can increase the area's attractiveness to wildlife.

9 **Install a small pond.** Adding a small pond to the landscape provides water for wildlife. It is an attractive addition to the landscape that you and your family will enjoy. Put the pond where you can see it easily from your house, deck, or porch. Water gardening is popular, and there are prefabricated pond kits you can buy and easily install.

Wildlife ponds are more suitable for hardy, native fish. These fish are usually easier to find and cheaper to replace than ornamental fish. Different species of fish have different environmental preferences and feed at different water levels. Before buying fish, get the pond ready for the specific species you plan to introduce. Koi, for example, require water at least 3 feet deep.

There are many books on water gardening that can guide you in installing and maintaining a small garden pond. Your pond will be a natural draw for frogs, salamanders, birds, and numerous other small creatures. Encouraging scavengers such as aquatic snails and tadpoles helps with the cleanliness and overall health of your pond.

Including aquatic plants is also beneficial and can be a source of food and cover for wildlife. Most species that prefer moist or wetland sites must have associated plant communities. Plants should range from short herbaceous to knee-high vegetation.

10 **Relax and enjoy.** Understand that you are creating an ever-changing habitat based on the species in it. Sometimes, it may appear to others to be messy or unorganized. Over time, you will naturally develop an ability to make formerly "messy" garden arrangements look tidier. Don't become discouraged; this talent comes gradually with a practiced eye.

Don't forget that you are the main participant. Your backyard should be your sanctuary, a place you can find rest, relaxation, and pleasure. It should also be a sanctuary for wildlife. Recognize that some wildlife will prey on others in the garden, as they would in the wild. Take pride in fostering a balanced community of animals and plants. And above all, take time to observe and enjoy these creatures as you provide a safe haven for them.

Benefits of Backyard Habitats

1. Provides a source of enjoyment and recreation
2. Promotes environmental stewardship
3. Decreases landscape maintenance
4. Provides education for children and adults alike
5. Restores/conserves local wildlife communities
6. Adds beauty to the landscape
7. Is economical
8. Endorses nature-based ethics



Audubon Mississippi



Audubon Mississippi



Getting Started

Now that you have decided to establish a backyard habitat, you should plan to make it happen. These five steps will guide you:

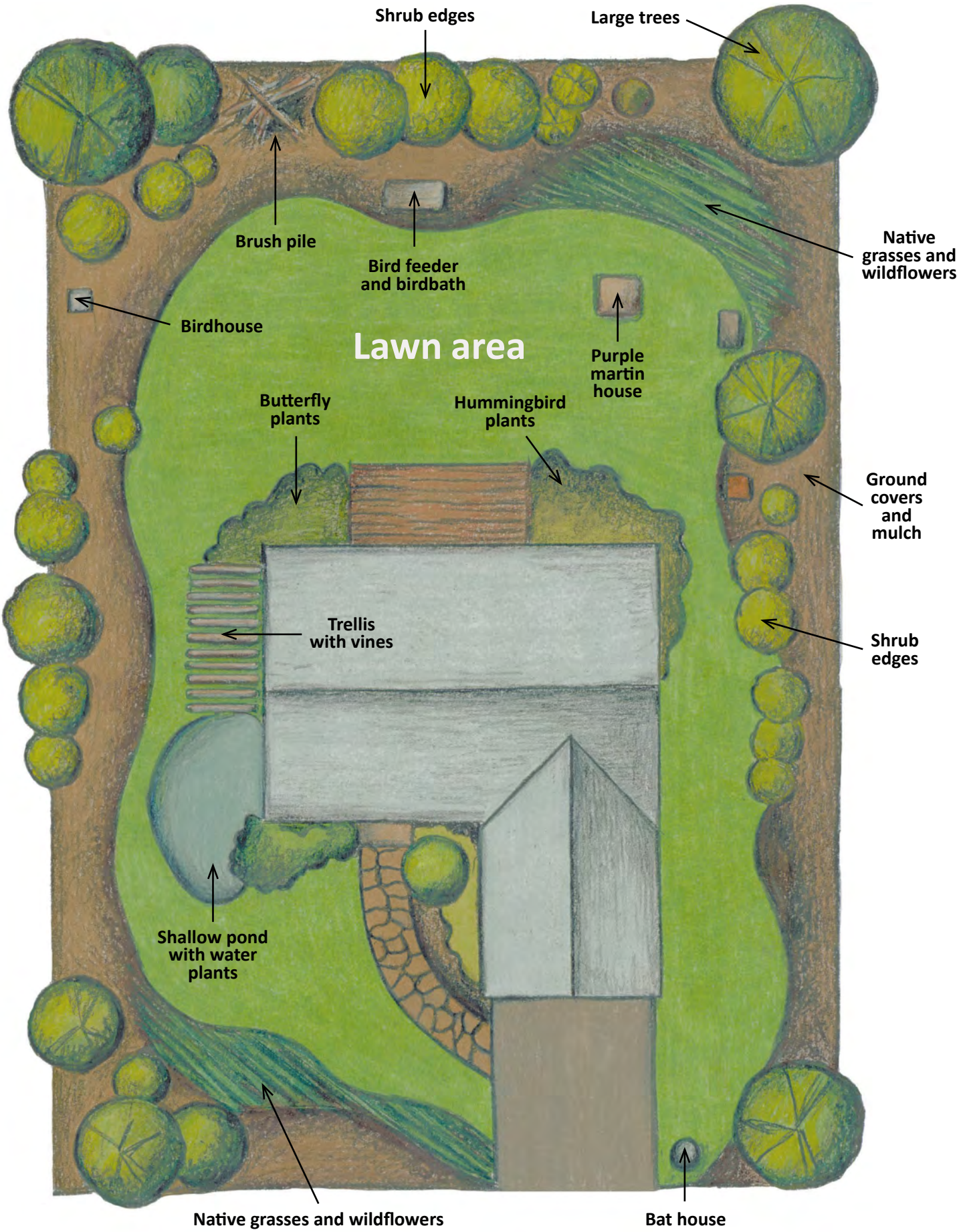
1. Set your goals and priorities. What wildlife species do you want to attract?
2. Inventory your landscape. What habitat features do you already have? What plants and animals already live there? What are you missing?
3. Envision how to attract wildlife that will complement your existing activities without negative impacts (for instance, garden, trail, landscape).
4. List and rank the objectives that will meet your wildlife goals.
5. Implement the plan based on your needs and the needs of the wildlife you want to attract.

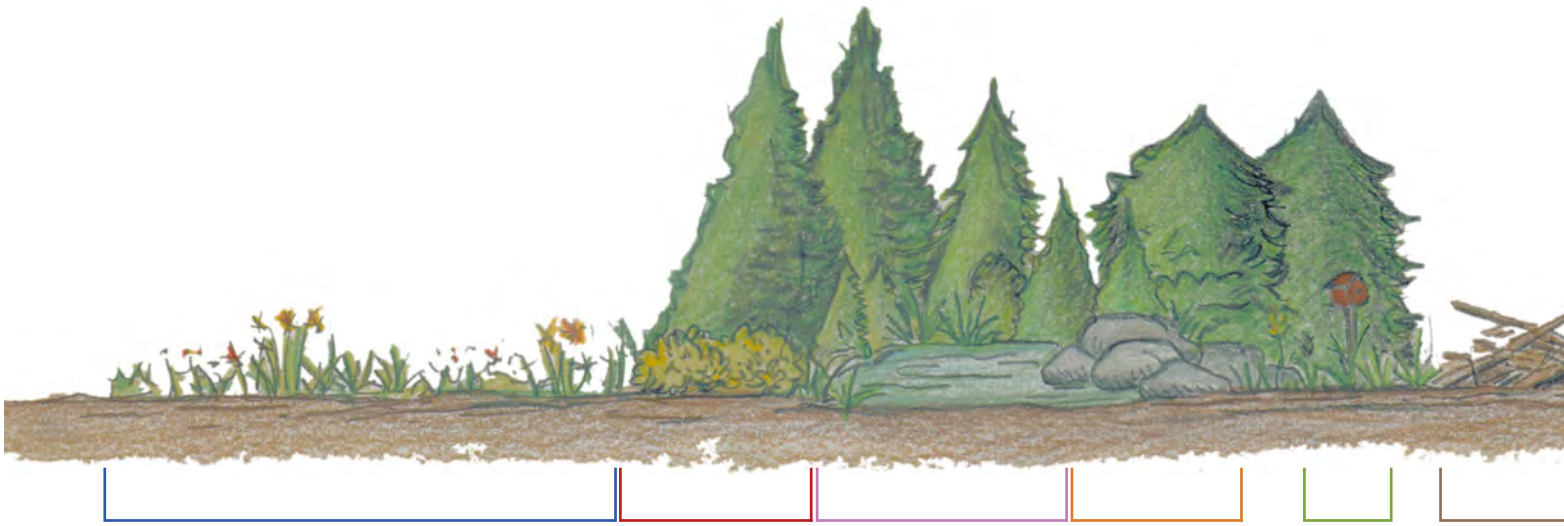
Hint: When beginning your plan, think like an architect. Try to envision how wildlife will come into your setting by developing the travel paths or roadmap they will use to enter. Wild creatures use their instinct to pick desirable habitats. Once you have wildlife, consider the ecological elements that will keep them returning daily, seasonally, and yearly.



Remember to strive for a wildlife community with a balance of all habitat fundamentals, harmonizing your needs with the needs of nature. These planning techniques will help you develop and enjoy your wildlife area.

Example of a Backyard Habitat





Meadow



Pond



Birdhouse



Forest



Rock pile



Creating a Wildlife Habitat Trail

For larger properties, including schools, municipalities, private lands, and even small communities or neighborhoods, creating a trail is another way to attract and benefit from our natural wildlife resources. A trail would provide unique educational, economical, and recreational opportunities for many groups of people. A meandering trail can provide opportunities for discovery, as suggested sections would reveal a diverse landscape including meadows, wetlands, forests, feeding stations, and educational stations.



Brush pile



Seating and observation



Feeding station



Education station



Snag



The goal when designing a trail is the same as when designing a backyard habitat. Include the basic needs of targeted wildlife by using a diverse mix of elements. Trails are meant to be an active form of recreation and enjoyment, so consider planning your wildlife enhancements over larger space with repeated frequency (i.e., multiple applications of each habitat element). Your trail will be a corridor that enters the wildlife habitat, and people will explore it by moving around. When designing a trail habitat, be sure to include a buffer area, which is simply space between the active trail and the wildlife habitat. This helps to minimize human disruption of the natural setting.

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Mississippi Forestry Commission
https://www.mfc.ms.gov/

Mississippi Museum of Natural Science
http://www.mdwfp.com/museum.aspx

USDA Natural Resources Conservation Service (Mississippi)
https://www.nrcs.usda.gov/wps/portal/nrcs/site/ms/home/

Other Sources of Information

Audubon Mississippi
https://ms.audubon.org/

Strawberry Plains Audubon Center
https://strawberry.audubon.org/

Garden Centers/Nurseries

Garden Clubs

Native Plant Societies

Nature Centers

Arboreta/Botanical Gardens

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Mississippi Master Gardeners



Butterfly weed



Blackberry



Native azalea



Dogwood



Ageratum



Black gum

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Roses in Mississippi







MISSISSIPPI STATE UNIVERSITY™
EXTENSION

The rose is one of the most popular flowering plants in the world. Its beauty, fragrance, and diversity provide value beyond our physical needs. That is why gardeners give prominent space to roses in their gardens and spend time, labor, and money to have roses in their lives. And gardeners challenge themselves not only to grow roses but to grow them better than their neighbors. We humans are very interesting creatures.

Rose species are native to the northern hemisphere, from eastern Asia to western North America. The beginnings of rose domestication are unclear, but it is likely that centers of cultivation began in early Chinese, Persian, Greek, and Roman cultures. Travel and trade among regions surely included the barter of valuable roses. The establishment of rose gardens led to natural and experimental crosses between the roses of the East and the West. Garden roses were diversified well before they came to North America.

These roses followed human migration westward, and some of their progeny now live alongside native species and on old homestead sites and in cemeteries.

In other words, trading and business have always been at the heart of garden rose development. The wealthy sent out plant explorers to search for exotic plants for beauty and commerce. Breeders and growers of roses produced plants that met aristocrats' and tycoons' plant needs and obsessions.

Today, breeders continue to define rose perfection. Often they promote one characteristic to the detriment of others. Many cultivars that are front-page headlines today will disappear within a year or two of dismal performance. But good roses endure and thrive. That is why old garden roses do so well: they are the survivors. The same will happen with modern roses. Gardeners will continue to select roses that grow well and make people happy.

Considering adding roses to your garden? Here are some tips for success:

1. Choose a planting location. Roses should receive a minimum of 6 hours of direct sunlight daily. Be sure the soil is fertile and well-drained.
2. Select cultivars or species that thrive in the climate and soil conditions you have and that can resist pests and diseases that are common to your site conditions.
3. Decide how much time and effort you are willing to invest in controlling disease before making your rose choices. Select cultivars and species based on your time and effort commitment.
4. Decide if you are comfortable using chemicals or prefer to use an organic approach to growing roses before choosing which roses to grow. Select cultivars and species based on your maintenance direction.
5. Buy vigorous, healthy plants from a reliable source. Cultivate plants using proper pruning, mulching, watering, and fertilization practices.

Getting to Know Your Roses

Roses are grouped into classes to make sense of the great diversity of known cultivars. Groupings are subjective, and major rose societies sometimes group cultivars differently. The following list describes some commonly accepted groupings. Not all classes of roses grow well in the Southeast. Those classes will be noted in their description where they are listed.

Species and Old Garden Rose Classes: Prior to 1867

Species roses are the basis on which the garden rose is developed. Knowing where these species come from helps us to understand where genetic tolerance to heat and cold come from, as well as various plant characteristics. They fall into four basic geographic groups. Not all rose species are listed, just those often genetically important to commercial or garden rose development.

ASIAN SPECIES

Southern Asia

- *R. chinensis*
- *R. laevigata*
- *R. bracteata*
- *R. banksiae*
- *R. multiflora*
- *R. wichuraiana*
- *R. brunonii*
- *R. filipes*
- *R. moyesii*

Northern Asia

- *R. rugosa*

Middle Eastern species

- *R. foetida* (*R. foetida* and its forms are important breeding roses for yellow flower color and thought to carry genetic susceptibility to blackspot.)
- *R. hemisphaerica*
- *R. x damascena* (*R. x damascena* and its forms are an important source of attar of roses.)
- *R. x centifolia*

EUROPEAN SPECIES

Northern Europe

- *R. canina* (dog rose)
- *R. eglanteria* (sweetbriar rose)
- *R. villosa* (apple rose)
- *R. pimpinellifolia* (Scotch rose)
- *R. arvensis* (field rose)

Central and Eastern Europe

- *R. gallica*

Southern Europe and the Mediterranean

- *R. moschata*

American species did not directly contribute to the development of old garden rose classes. However, *R. virginiana*, *R. carolina*, and *R. palustris* (swamp rose) are garden plants in their own right. Other species exist but are found outside the Southeast.

Climbing species roses are distinct and have their own groups of hybrids. Banksian roses are a small group originating from China. They were introduced into the Southeast in the early 19th century. 'Lady Banks Rose' (*R. banksiae lutea*) is the most widely seen rose of this group in Mississippi. Banksian roses are very large climbers that are semi-evergreen and thornless.

GALLICA ROSES ('Rose of Provins') are an ancient group of roses derived from *R. gallica*, native to central and southern Europe. They are thought to have been grown by ancient Greeks and Romans and possibly earlier. The shrub is upright in growth habit, about 3 to 4 feet tall, is freely suckering, and has many small, bristly thorns. Flowers are pink, 2 to 3 inches in diameter, highly fragrant, and followed by round, red hips. Foliage is rough, dark green, and oval.





Lady Banks Rose



DAMASK ROSES were brought back to Europe by returning crusaders in the 12th and 13th centuries and found to be hardy in northern gardens. They are an ancient rose group thought to originate with the Persians from a cross between a Gallica rose and *R. phoenicea*. The petals were used to make perfume. 'Autumn Damask' is the only cultivar to bloom twice a year, with references dating back to Greek and Roman cultures. 'Kazanlik' is the only Damask rose grown in the Veterans Memorial Rose Garden, and its natural growth habit is coarse and wild. The foliage is gray, downy, and soft to the touch. The rest of the plant is highly thorny and difficult to handle. Its flower fragrance is not strong in our climate.

Kazanlik

ALBA ROSES are an ancient group of roses thought to be a cross between a Damask or Gallica rose and *R. canina*. They may have been brought to Britain by the Romans, and they appear in paintings from the Middle Ages. These are tough, large rose shrubs, 6 feet or more, with mounding growth habit and soft, gray-green foliage. Flowers are delicate white, blush, or pink, and mostly fragrant. 'Madame Plantier' is an Alba/Noisette hybrid that thrives in the Veterans Memorial Rose Garden.



Madame Plantier





CENTIFOLIA (PROVENCE) ROSES, based on *R. x centifolia* and its hybrids, were developed by Dutch breeders in the 15th and 16th centuries, possibly later. They have an awkward growth habit; coarse, dark-green foliage prone to powdery mildew; and many thorns. The flowers are highly double, pink, fragrant, and cabbage-like in form. Centifolia roses are not recommended as being sufficiently heat-tolerant for the Veterans Memorial Rose Garden.

MOSS ROSES apparently developed as a sport of a Centifolia rose in the early 18th century. They are known for their highly developed prickles, found on the stems, foliage, flower buds, and hips. These prickles may be soft or bristly. 'Henri Martin' is reportedly more heat-tolerant than other moss roses.



Henri Martin

Mutabilis

CHINA ROSES are different from the earliest types of roses because they flower in repeating cycles. Early China roses are thought to have developed from *R. chinensis* and *R. gigantea*. Roses of hybrid form are documented in artifacts dating to the 10th century, with European introduction in the late 18th century from trade by the British East India Company. The shrubby growth habit is airy, with slender, twiggy growth and few thorns. Foliage is sparse, with pointed leaves and a shiny surface. New growth is often red on both the leaves and stems. Blooms are casual in form and intensify in color as they age. Growth is stronger and larger in warm climates. 'Comtesse du Cayla', 'Cramoisi Supérieur', and 'Mutabilis' are China roses grown in the Veterans Memorial Rose Garden. 'Climbing Cécile Brünner' is considered either a China or a Polyantha rose, depending on source.







Cramoisi Supérieur

Comtesse du Calya

PORTLAND ROSES developed in France in the late 18th century. They are thought to have Damask, Gallica, and possibly China parentage. They are small, upright shrubs with a strong Damask resemblance, repeat flowering, and Damask fragrance. Flower stems are short, with a tight cluster of leaves just below the bloom. 'Rose de Rescht' is reportedly more heat-tolerant than other Portland roses.



Rose de Rescht





BOURBON ROSES came from a chance cross between the China 'Old Blush' and the Damask 'Quatre Saisons' (syn. 'Autumn Damask') on the Ile de Bourbon in the southern Indian Ocean in the late 18th century to the early 19th century. They represent a transition phase between old garden roses and modern roses. The flowers are like old roses, and the growth form is shrubby. However, the foliage and stems look more like a hybrid tea, and the roses bloom in repeating cycles. 'Louise Odier' and 'Kronprinzessin Viktoria' represent this class in the Veterans Memorial Rose Garden.



Kronprinzessin Viktoria





Céline Forestier

NOISETTE ROSES arose in Charleston, South Carolina, in the late 18th century, when John Champneys, a rice grower, collected seeds from a crossing between the China 'Old Blush' and *R. moschata*. His neighbor, Phillipe Noisette, continued crossing these seedlings and sent them back to France. Many of these are large climbers with continuous flowering through the growing season. Their growth is refined and delicate, with fragrant old rose- style blooms. They are less hardy than other classes but do well in the warm Southeast. 'Céline Forestier' represents this class in the Veterans Memorial Rose Garden.





Duchesse de Brabant

TEA ROSES developed in China about the same time as the hybrid perpetual roses in the early 19th century. They developed from a cross between 'Hume's Blush China' and 'Park's Yellow Tea Scented China'. The early tea roses were part of an active breeding program in China at the time the East India Company exported much tea to Great Britain. The story is that these roses were named for their tea-like fragrance, but it is just as plausible that they acquired the name because they were often shipped with tea. Yellow flowers came from this breeding program, and tea roses became a parent of the hybrid tea class. Tea roses developed a high-centered bud form that was carried into the hybrid teas, but the growth habit is twiggy and airy, and the floral stems are slender and weak like China roses. Tea roses prefer a warmer climate than England's, where it developed as a hot-house plant. 'Duchesse de Brabant' is a tea rose in the Veterans Memorial Rose Garden.





Ferdinand Pichard

HYBRID PERPETUAL roses were first recognized in the 1820s. They were bred for rose shows where bloom form, especially the bud, was considered the ultimate ideal. The growth habit tends to be large, narrow, and upright to sprawling. The flowers are large and less refined than hybrid teas. They may become large, vigorous bushes if given good cultural care and pruning. Hybrid perpetual roses were historically relegated to cutting gardens. Most of them are fragrant and repeat blooming, and have an old rose flower form. 'Ferdinand Pichard' is the only hybrid perpetual growing in the Veterans Memorial Rose Garden.

PIMPINELLIFOLIA (SCOTCH, SPINOSISSIMA) ROSES are a small group that grow well on their own roots and sucker freely. They are easy to grow and reproduce. An American cultivar, 'Harison's Yellow', became The Yellow Rose of Texas and spread west with homesteaders.

CLIMBING ROSES are often formed from sports of existing cultivars that produce long canes requiring some support. Old garden rose and modern rose climbers may develop from either sports or seedlings. Climbers are often trained on trellises, pillars, or fences, or draped over banks or retaining walls. They are hardy plants and may become popular in their own right compared to the original shrub. Old garden rose climbers are grouped into several accepted classes, such as Climbing Bourbon, Climbing China, Climbing Moss, and Climbing Hybrid Perpetual.

Modern Rose Classes: From 1867

HYBRID TEA ROSES generally grow as a narrow, upright shrub well suited for formal gardens. The flowers are usually double with spiraling petals around a high center, a "typical" rose bloom form. Single blooms develop at the end of a long stem, which is prized for cut flowers. Blooms may or may not be fragrant, and they repeat in cycles throughout the growing season. Hybrid tea rose cultivars have been introduced since 1867. For example, 'La France' is considered the beginning of modern classes of roses. 'Elina' and 'Jane Pauley' are two examples of hybrid tea roses.



Elina

POLYANTHA ROSES originated in France (Guillot) in 1860 as seedlings from *R. multiflora* and probably a China rose that developed large sprays of small pink flowers. Their small shrub size is excellent for mass planting or for borders with perennials. They are grouped with modern roses, but are a very early modern class. 'Climbing Cécile Brünner' is classified as either a China or Polyantha rose, depending on reference source. It will thrive in Mississippi.

Jane Pauley



Climbing Cécile Brünner







HYBRID MUSK ROSES are another early modern group of shrubby roses, based on a rambler called 'Trier' and different Noisette, Polyantha, hybrid tea, and tea roses. They are large shrubs with a graceful form and sprays of small to medium size flowers of soft colors. With good care, they rebloom well, providing masses of floral display. The growth habit has a classic feel to it with modern-style foliage of smooth, shiny leaves. 'Buff Beauty' is a hybrid musk grown in the Veterans Memorial Rose Garden.

Buff Beauty

HYBRID RUGOSA ROSES appeared in the late 19th century continuing into the 20th century, based on *R. rugosa* of Japan. These hardy roses make good landscape roses. The growth form is dense, and the leaves are deeply veined and rugged. The flowers are casual, and the bloom repeats or continuously cycles. 'Dr. Eckener' is a cultivar reportedly more heat-tolerant than other hybrid Rugosa roses.

Dr. Eckener



FLORIBUNDA ROSES were developed by a cross between a Polyantha and a hybrid tea in the early 20th century (Poulsen). Floribundas bear flowers in sprays on a usually rounded, well-branched shrub. Bloom form can be diverse, but individual blooms may resemble hybrid teas. Floribundas generally require less work than hybrid teas, making them great garden plants. Their freely blooming nature makes them good choices for mass color in beds. 'Julia Child' is an example of a Floribunda.

Julia Child





GRANDIFLORA ROSES resemble hybrid teas in shrub form, bloom form, and hardiness. Blooms occur singly or in small groups at the end of long stems. 'Queen Elizabeth' (1954) was the first cultivar to be labeled a Grandiflora. 'Melody Parfumée' is an example of a Grandiflora.

Melody Parfumée



MODERN SHRUB ROSES include a genetically diverse and complex group bred from wild species, differing classes, and with some hybrid tea or Floribunda character. Cultivars may be small or large, with upright, spreading, or bushy growth useful in general landscape schemes. Flowers may be small and simple or large and showy and have light to intense fragrance. Most cultivars bloom in repeating cycles or continuously bloom with masses of flowers. Some bear attractive fruit (hips) in the fall. Many of the larger roses can be trained on supports such as pillars, trellises, or walls. 'Carefree Spirit' is an example of a shrub rose.

- English roses are a blending of old garden roses and modern roses to create the growth habit, fragrance, and flower formof the old roses with repeat flowering and brighter flowercolors of modern roses.



Carefree Spirit

Home Run



Red Drift





Lady Elsie May

MODERN CLIMBING ROSES form in the same way as old garden rose climbers. Accepted classes are Climbing Polyantha, Climbing Floribunda, Climbing Hybrid Tea, Climbing Miniature, Climbing Tea, Large-flowered Climber, and Ramblers.

- **Climbing Polyantha and Floribunda** flowers are generally identical to their original bush forms. Bloom is fairly continuous and hardiness is better than climbing hybrid teas.
- **Climbing hybrid tea roses** are usually given the same name as the bush variety from which they originated. In general, climbing forms do not bloom as continuously as the parent shrub, but flowers and foliage usually are identical.
- **Large-flowered climbers** grow slower than ramblers do, are often trained on posts or some other type of support, and may require heavy annual pruning. They are adapted to small gardens for growth near fences, walls, or small trellises. When well grown, flowers are large and useful for cutting. Many varieties do not bloom as freely when canes are trained ver-tically as when trained horizontally.
- **Ramblers** are very hardy, fast-growing roses. Flowers are small and clustered. Plants flower once an-nually on year-old wood. Foliage is glossy, but many varieties are susceptible to powdery mildew. New cultivars are bred for larger flowers, a long growing season, and powdery mildew resistance. Small groups of rambling roses have been named for the species on which their breeding is based. These subgroups are Ayrshire Hybrids, Sempervirens Hybrids, Multiflora Hybrids, Wichuraiana Hybrids, and Everblooming Climbers.



White Dawn



Highway 290
Pink Buttons



MINIATURE ROSES are very small in both growth habit and flower. For most varieties, maximum height is 12 inches. They are used in rock gardens, edging, and potted plants. Miniatures have become very popular since 1970, with many varieties available. 'Highway 290 Pink Buttons' is both a miniature and a found rose.

Other Groups

TREE OR STANDARD ROSES are those with a trained plant form with unique use. Roses with attractive growth habit and bloom are grafted on rootstock that forms upright trunks. Many popular bush rose varieties are available as tree roses. They are often used in formal plantings, as accent plants, and as potted specimens.

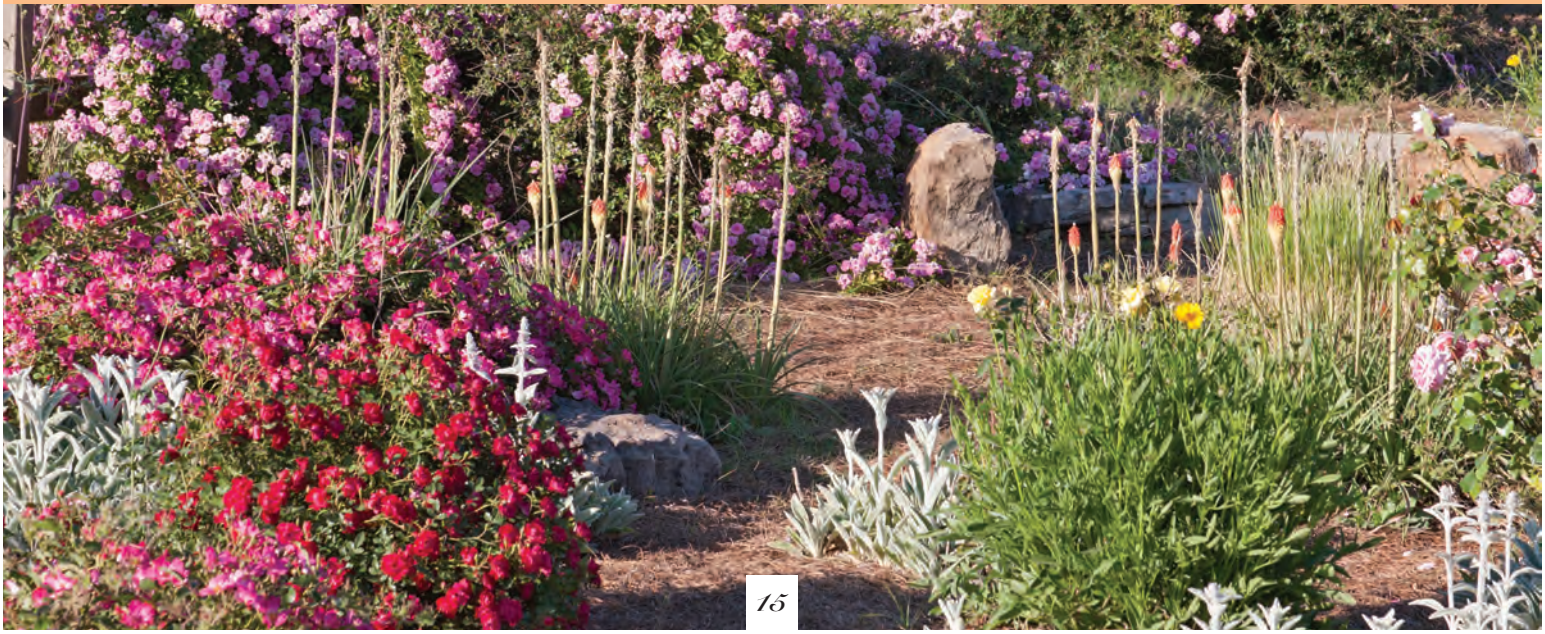
TRAILING, PROCUMBENT, OR GROUNDCOVER ROSES are climbing or low-growing, spreading roses adapted to use on slopes, banks, and walls. They produce long canes that creep along the ground, making a pleasing ground cover. Flowers are diverse, simple, or casual in form, but bloom is often continuous and freely produced throughout the growing season. Many of these cultivars are mannerly spreaders, but some are aggressive and can grow out of bounds.

MINIFLORA OR PATIO ROSES are becoming popular as roses for small gardens or containers. These roses range in size between floribunda and miniature roses.

FOUND ROSES are a group that have been collected from cemeteries, old homesteads, or family sources where the original names have been lost. 'Peggy Martin' is an example of a found rose.

THE MYSTERY ROSES OF BERMUDA are a group of warm-climate roses similar to Chinas and teas that have flourished in the gardens of Bermuda for many years. Links to their old garden rose ancestry have been lost, and they have developed in isolation long enough to have acquired local names and lore. They flourish in the tropical island climate where temperate climate roses would not thrive.

Peggy Martin



Roses for Mississippi Gardens

Mississippi's climate creates challenges for many rose cultivars, but those with good tolerance to heat, humidity, and diseases will grow well. Most hybrid tea roses perform better if sprayed regularly, but a few survive reasonably well without fungicide treatment if well maintained. The roses listed below have been grown at the Magnolia Botanic Garden (MBG)—Crofton Sloan-Verona; Veterans Memorial Rose Garden (VMRG)—Pamela Collins-Starkville; Truck Crops Branch Station (TCBS)—Bill Evans-Crystal Springs; and South Mississippi Branch Experiment Station (SMBES)—Eugene Blythe-Poplarville.

#	CLASS	CULTIVAR	BLOOM COLOR	SPRAYED/ NO SPRAY	BLOOM CYCLE	SITE
1	Species form	*R. banksiae lutea* Lady Banks Rose	light yellow	no spray	spring only	VMRG
2	Alba	Madame Plantier	white	no spray	spring only	VMRG
3	China	Comtesse du Cayla	orange blend	no spray	repeat	VMRG
4	China	Cramoisi Supérieur	medium red	no spray	repeat	VMRG
5	China	Mutabilis	yellow/pink	no spray	continuous	VMRG
6	China/ Polyantha	Climbing Cécile Brünner	light pink	no spray	spring only	VMRG
7	Bourbon	Kronprinzessin Viktoria	white	no spray	repeat	VMRG
8	Bourbon Climbing	Zéphirine Drouhin	medium pink	sprayed	repeat	MB
9	Tea	Duchesse de Brabant	light pink	no spray	repeat	VMRG
10	Hybrid Tea	Big Ben	dark red	sprayed	repeat	SMBES
11	Hybrid Tea	Elina	light yellow	no spray	repeat	VMRG SMBES
12	Hybrid Tea	Frederick Mistral	light pink	sprayed	repeat	MBG
13	Hybrid Tea	Granada	yellow/red blend	sprayed	repeat	SMBES
14	Hybrid Tea	Jane Pauley	orange blend	no spray	repeat	VMRG
15	Hybrid Tea	Lemon Spice	yellow	sprayed	repeat	SMBES
16	Hybrid Tea	Marijke Koopman	medium pink	sprayed	repeat	SMBES
17	Hybrid Tea	Mr. Lincoln	dark red	sprayed	repeat	MBG
18	Hybrid Tea	St. Patrick	yellow blend	sprayed	repeat	MBG
19	Hybrid Tea	Tahitian Sunset	apricot blend	no spray	repeat	VMRG
20	Hybrid Tea	The McCartney Rose	medium pink	sprayed	repeat	MBG
21	Hybrid Tea	Paradise	mauve	sprayed	repeat	SMBES
22	Hybrid Tea	Pat's Choice	orange red	sprayed	repeat	SMBES
23	Hybrid Tea	Rio Samba	yellow blend	sprayed	repeat	SMBES

#	CLASS	CULTIVAR	BLOOM COLOR	SPRAYED/ NO SPRAY	BLOOM CYCLE	SITE
24	Hybrid Tea	Tanchored blend	sprayed	repeat	SMBES	
25	Polyantha	Perle d'Or	yellow blend	no spray	repeat	VMRG
26	Polyantha	The Fairy	light pink	sprayed	repeat	MBG
27	Hybrid Musk	Ballerina	medium pink	sprayed	repeat	MBG
28	Hybrid Musk	Buff Beauty	apricot blend	no spray	repeat	VMRG
29	Floribunda	Europeana	dark red	sprayed	repeat	MBG
30	Floribunda	First Kiss	pink blend	sprayed	repeat	SMBES
31	Floribunda	Miss Ada	light pink	sprayed	repeat	SMBES
32	Floribunda	Our Lady of Guadalupe	pink blend	sprayed	repeat	SMBES
33	Grandiflora	Candelabra	orange	sprayed	repeat	SMBES
34	Grandiflora	Melody Parfumée	mauve	no spray	repeat	VMRG
35	Grandiflora	Queen Elizabeth	medium pink	sprayed	repeat	MBG
36	Shrub	Carefree Marvel	deep pink	no spray	continuous	VMRG
37	Shrub	Carefree Spirit	red blend	no spray	continuous	VMRG
38	Shrub	Home Run	medium red	no spray	continuous	VMRG
39	Shrub	Pink Home Run	deep pink	no spray	continuous	VMRG
40	Shrub	Knockout	red blend	sprayed/no spray	continuous	MBG VMRG TCBS
41	Shrub	Double Knockout	medium red	sprayed	continuous	MBG
42	Shrub	Blushing Knockout	light pink	sprayed	continuous	MBG
43	Shrub	Double Pink Knockout	medium pink	sprayed/no spray	continuous	MBG VMRG
44	Shrub	Lady Elsie May	orange/pink	no spray	repeat	VMRG
45	Shrub	Coral Drift	orange/pink blend	sprayed	continuous	MBG
46	Shrub	Peach Drift	apricot blend	sprayed	continuous	MBG
47	Shrub	Pink Drift	deep pink	no spray	continuous	VMRG
48	Shrub	Red Drift	medium red	no spray	continuous	VMRG
49	Shrub	Sweet Drift	light pink	sprayed	continuous	MBG
50	Large-flowering Climber	White Dawn	white	no spray	repeat	VMRG
51	Hybrid Multiflora (Found)	Peggy Martin	medium pink	no spray	continuous	VMRG
52	Miniature (Found)	Highway 290 Pink Buttons	medium pink	no spray	continuous	VMRG
53	Miniature Red Cascade	red	no spray	continuous	SMBES	

Roses in the Landscape

A few words about design

Roses have been grown in gardens and landscapes for all kinds of reasons throughout history. They have been found in herb gardens, medicinal gardens, monasteries, estate gardens, public gardens, dooryards, courtyards, cutting gardens, in both formal and landscape designs…wherever their color, form, and fragrance is needed. They fit well in all design styles, from traditional to contemporary. Roses are like an all-around utility player. They can play nearly any role in the garden, with the possible exception of foundation plantings.





Hybrid tea roses have been the most recognized rose type for much of the past century. The form of the shrub and the flowers has made this the ideal rose for formal garden design. On the other hand, Floribunda, Polyantha, and shrub roses, with their continuous cycles of heavy flowering, are well suited for mass color display. These come in numerous colors, forms, and sizes, from large shrubs to minifloras and groundcovers. Many of the newest cultivars are great for beds at the base of hedges and shrubbery borders, and they are now used in commercial plantings at shopping centers and gas stations. The best selections are sufficiently disease-resistant to be grown without regular spraying.

Old garden roses are making a real comeback in popularity. Many gardeners are enchanted with the old rose forms, the fragrance, and the elegant growth habits of the best selections. These play well next to traditional architecture and warm brick facades. Besides, in the right place, the old roses can thrive with little effort and little or no spraying. Many of the climbing cultivars are suitable for vertical or horizontal training on supports such as posts, trellises, fences, or walls. The old garden roses have a softness that the modern roses have lost. On the other hand, the clear colors and bold forms of modern shrubs and climbers may provide bright accents that stand up to contemporary architecture.

Location, location, location

Some cultural tips are in order when planning where to place roses. A few old roses will tolerate a little shade, but all roses really prefer full sun to grow and flower their best. Roses require at least 6 hours of sun daily but prefer 8 to 10 hours. Morning sun is best if there will be some daily shade from trees or buildings. Light shade during early afternoon is certainly not required, but if you have such a location, it can provide a little relief from summer heat.

Healthy plants need plenty of air circulation, but they should be sheltered from blasts of cold winter wind, especially if they are tender. A nearby hedge or fence is useful, but it should not be close enough to shade the shrubs or reduce root space. Roses have historically been grown in protected sites, such as walled gardens and courtyards. But they need adequate space to develop without being crowded by structures or other plants. Low-lying parts of the garden, where frost collects during the winter, are not good locations for roses. Such sites can also be wet if not well-drained, and most roses prefer good- quality, well-drained soils.

Roses grown primarily for cutting should be generously spaced out in an open location with plenty of sun and air circulation to keep disease pressure down. Easy access is especially important if the roses will need regular spraying and pruning. Design the garden or beds so that water is easily available. Dedicated water lines or faucets allow for the flexibility of drip lines on timers to reduce the work of watering. Careful selection of highly disease-resistant, low-maintenance roses is critical if they will be located out in the larger landscape where regular grooming is impractical. Consider the time and effort to keep your roses looking great. A few great-looking roses in a manageable landscape will be much more rewarding than a field of roses that wear out the gardener trying to keep them alive.

A few words about spacing rose plants

Space roses according to how large they will grow at maturity. Some roses can become very large, especially landscape roses, such as shrub roses, some of the old garden roses, and climbers. Some roses do not tolerate heavy pruning and should be spaced accordingly. Large roses may need to be spaced 6 to 15 feet apart. Give roses adequate room to reduce pest and disease spread, and to provide access for pruning or spraying activities, especially if you plan to highly groom your roses for close-up display, cutting, or exhibition competition. Specific recommendations are highly variable.

SPACING ROSES

- Large shrubs – 6–15 feet
- Hybrid tea garden – 5–6 feet
- Massed roses – 3–4 feet or more, depending on mature size
- Miniature roses – 12–18 inches

So, are you ready to plant some roses? Let's start at the beginning.

Buy good roses.

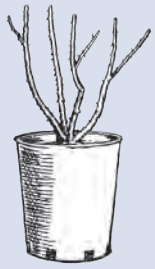
Buy your roses from reputable dealers. Local nurseries and garden centers are good sources. Mail-order companies will send you colorful catalogs listing the plants they sell. Or go online and spend some time looking at the leading plant websites. The diversity of companies and products can be overwhelming. Be sure that you look around long enough to know that you are getting what you want and that the site is secure. You can find everything from the latest introductions to the rarest of old garden rose cultivars. Place orders early to get the best and freshest plants.

Roses can be purchased as bare-root or container-grown plants. Each has its advantages and disadvantages. Bare-root roses may be a little less expensive because the grower is not shipping the weight of potting soil and pots. But bare-root roses must be planted or potted as soon as they arrive. Container-grown roses are easier to time, as the roots are protected by potting media. They can arrive still dormant, or they may already be leafed out. Roses in leaf need to be protected until after the last frost date. Container-grown roses are usually placed out for sale later in spring than bare-root roses.



Bare-root rose (packaged in foil) as received from nursery

Bare-root roses appear at nurseries, garden centers, and big-box stores in late winter to early spring about the same time as other bare-root nursery stock. Planting bare-root roses directly into the garden can be very successful if the roses are fresh and the planting site is ready. The roots should look plump and fresh, and the top of the plant should still be dormant. Avoid dried-out plants that have been in unprotected locations for days with extreme temperature changes. Fresh is best: do not delay planting.



Container-grown rose as received from nursery

Container-grown roses may be planted successfully anytime of the year. Avoid the heat of late summer if possible. Fall is a good time to plant if plants are available at the nursery and ready to be planted. Roses completely grown in pots can be ready anytime, but often roses are dug bare-root, shipped to nurseries or garden centers, potted, and grown before being placed out for sale in spring. Check carefully before purchasing, as some of these roses may not be ready to plant when sold.

Take time to plant roses correctly.

Sometimes roses die or fail to thrive because they are not planted well. Remember the old adage to put a 50-cent plant in a dollar hole. That does not mean to plant a cheap plant. It means to prepare a great planting hole for the plant that is to go into it. There is more to planting roses than just digging a hole and putting it in.

Roses can be planted one rose at a time in a landscape setting, or they can be planted in beds. The process is similar, but the planting site can have very different soil characteristics depending on how the site is prepared.

Can I grow roses in my soil?

Soil conditions can determine if a rose will struggle or thrive. Some rose cultivars can handle poor soils, so do some research if you have poor soils that cannot be corrected. Peter Beales's *Classic Roses* and *Roses* are two good resources to use. In these cases, cultivar choices become critical for success. Soils with lots of clay, poor texture, and internal drainage can be very difficult to improve. The same can be said for soils with high lime content or soils that are poorly drained, waterlogged, or acidic. Under extreme soil conditions, consider adapted species other than roses.

Most roses prefer a medium-textured to sandy loam soil with good internal drainage that is rich in organic matter and nutrients. Roses will grow well in a slightly acidic range of pH 5.8 to 7. Acid or alkaline conditions outside this range will benefit from adding sulfur or lime if the soil type is capable of adjustment. Roses that are placed out in the landscape should be planted the same way as any landscape plant. Use the soil that comes out of the hole rather than backfilling with amended soil. This encourages the roots to grow outside the hole rather than circle around within the porous, organic backfill or drown from water that cannot drain away inside the planting hole.

For more information on soil pH, see MSU Extension Publication 2831 *Adjusting Soil pH in Mississippi Landscapes*

QUICK TIPS ON BED PREPARATION

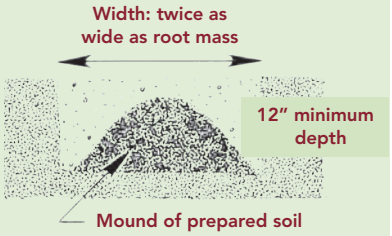
- Get a soil test.
- Prepare bed in fall.
- Till or spade 6–12 inches deep.
- Till or spade in 2–3 inches of organic matter.
- Adjust pH if soil test recommends.
- Cover with 2–3 inches of mulch.
- Plant in early spring.

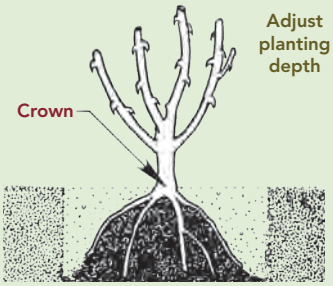
Prepare your bed for roses.

Planting beds intended for multiple roses or mixed ornamentals benefit from bed preparation prior to mass planting, especially if the soil has problems. Bed preparation allows you to loosen the soil and add organic amendments to improve texture and drainage. This technique works equally well whether the bed is part of the overall landscape design or segregated into a boxed bed, such as in a cutting garden plot. Beds raised above the existing soil may be the only solution if the soil is too difficult to correct.

Conduct a soil test before starting to dig. Kits and instructions for soil tests can be obtained at your county MSU Extension office, or find them online at extension.msstate.edu/lawn-and-garden/soil-testing. The report will tell you the soil pH and list nutrients the soil needs over the next year. It will also tell how to correct soil pH or soil deficiencies at the time you prepare the bed. To start, till or spade the soil 6 to 12 inches deep.

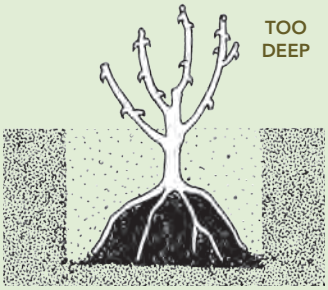
Spread 2 to 3 inches of organic amendment over the surface, and till or spade it into the loosened soil. Organic material can be well-composted leaves or sawdust, peat moss, or composted fine pine bark amendment. Early to mid-fall is an excellent time to prepare fresh beds, after a few rains make the soil easy to dig but before winter turns the soil to mud. Cooler weather is easier on the gardener, and the fall timing allows amendments such as lime or sulfur several months to take effect before spring planting. Cover the finished bed with 2 to 3 inches of mulch and allow the ingredients to rest until the roses become available for purchase in the spring. The finished bed will be somewhat raised above the surrounding area, which helps with drainage. With good care, this effect will remain for years.

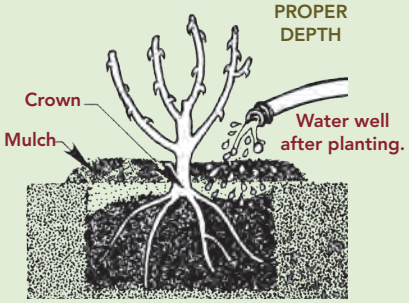




Spread roots over a mound of soil to assure proper drainage.







Apply water when filling soil around mound.

Now, let's plant!

The process of planting a bare-root rose is the same whether the rose is in an individual hole or within a prepared bed. Dig the hole to be at least twice the width of the root mass and approximately 12 inches deep. Make a small mound of soil in the planting hole as shown in the drawing. Spread the roots over the mound and set the plant to the same depth as it was grown. Crumble and place soil gently back into the planting hole around the roots, and firm with hand pressure only.

Place 2 to 3 inches of mulch around the newly planted rose. Do not pile mulch against the stems or canes. Water the soil thoroughly immediately after planting. The roots and the soil around them should be evenly moist and settled. Avoid planting too high or too deep.

Planting containerized roses is very similar to planting bare-root roses. The hole should be as wide as described above, but the finished depth of the hole should be no deeper than the height of the container so that the soil ball sits on firm soil and will not sink into the hole after watering. Loosen the soil ball from the sides of the pot by rolling the container on its sides and gently compressing the soil ball. Ease the plant out without damaging the main stem or canes or stretching the stems and roots apart. If the plant is root-bound, you may need to cut the pot to remove the soil ball. Inspect the soil ball for root health before planting. Ideally, the soil ball should have a network of healthy roots showing on the surface and holding the soil mass together. Blackened, dead roots or rotting, saturated potting media are not indicators of good plant viability. Roses with masses of circling roots may have trouble getting established. You may be able to correct the problem by unwrapping or cutting away at least the surface roots before planting. This may seem drastic, but do not be afraid to do it. Roots will grow back if they are healthy. Loosen or rough up the outer surface of the soil ball to be sure that the roots come in good contact with the soil. Place in the hole so that the top of the soil ball is slightly higher than the surrounding soil level, then backfill until the soil ball is completely covered, firming the soil with hand pressure only. Mulch exposed soil and water thoroughly as described above so that the backfilled soil and soil ball are evenly moist and settled.

Mulches can be a real help.

Roses establish better when the soil surface is covered with mulch. Mulches keep the soil surface from drying out, insulate the ground from temperature fluctuations, and reduce weeds. Mulches may be organic or inorganic. Pine straw, shredded hardwood, or pine bark mulches are commonly available and work well with roses. Maintain a depth of 2 to 3 inches, and do not pile mulch up around the base of the plant.

FERTILIZING QUICK TIPS

- Get a soil test.
- Keep a garden journal.
- Watch for deficiency signs.
- Fertilize during growth, approximately 6–8 weeks apart.
- 1 pound nitrogen per 1,000 square feet per application.
- Start mid-March.
- End mid-August/early September.
- Water fertilizers in.
- Adapt applications according to type of fertilizer.
- Read labels before use.

Water your roses regularly just after planting.

Roses need evenly moist soil, especially when first planted. Roses generally need 1 inch of water a week if it does not rain. They should be able to handle a little less water after the plant becomes well established, but watch for stress under drought conditions. Water deeply so the root zone gets completely moist. A drip system can be a real time- and water-saver if you put it on a timer. A drip system also keeps the foliage dry, which helps reduce disease levels. Water rose shrubs in the morning so the foliage can dry before evening if you water by hand or by overhead sprayers.

There are so many fertilizers. What do I do?

Decisions about fertilizing are easier if you continue to take a soil test every year or two, preferably in the fall. Then you can make a fertility plan based on real data that you track over the years. The reports tell you what fertilizers or amendments are needed and when to apply. Their recommendations list commonly available fertilizers that you can use as a baseline. There are many different fertilizers on the market, some formulated just for roses. There are also specialty products that correct specific deficits, such as iron or micronutrients. Costs can be very different from one product to another. Read the labels carefully. For more information on soil tests, see extension.msstate.edu/lawn-and-garden/soil-testing.

Consider if you want a fast-action fertilizer or a slow-release fertilizer. You can get complete fertilizers that contain nitrogen, phosphorus, and potassium, or you can get single-nutrient formulas if your soil needs only one nutrient.

There is also the option of using organic fertilizers. These come in many forms, but they often are used for reasons other than fertility. Nutrient levels in organic fertilizers are not as predictable as those in standard fertilizers. They may be available locally in bulk forms, such as composted manures or municipal composts, for a small cost or free. Some organic fertilizers have desirable soil-building properties.

Fertilizer sources and amounts depend ultimately on the condition of the soil and your objectives in growing roses. You have met your basic goals if the plants are healthy. Overfertilizing can lead to pests, diseases, poor bloom, and environmental problems.

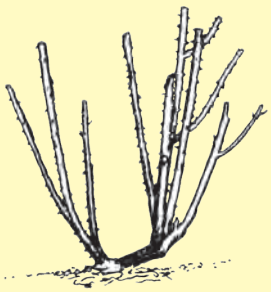
Fertilization recommendations vary by the type of fertilizer used, the method of application, the condition and type of roses, and the objectives of the gardener. Fast-release or liquid fertilizers may need to be applied in small amounts on a more frequent schedule. Slow-release fertilizers may be applied only a couple of times per year. Established landscape roses may need little to no fertilizer if the soil is in good condition. Roses in containers where leaching is high and roses grown under strict regimes for maximum bloom production may need much more fertilizer per year than average conditions.

Sometimes roses are said to be heavy feeders, but that may be due to how they are being grown if high-quality, maximum bloom is the objective. General recommendations for shrubs are to fertilize every 6 to 8 weeks with 1 pound of nitrogen per 1,000 square feet per application.

Composts and organic fertilizers release nutrients slowly, so they can be applied just before leafing-out. In general, fertilize after plants initiate growth. Fertilizing in early spring while the plant is still dormant wastes nutrients that simply leach through unresponsive roots. To avoid frost-prone late-season growth, do not fertilize plants after early September. Apply fertilizers to moist soil of unstressed roses; water if necessary before applying. Fertilizers should be watered into the soil immediately after they are applied.



Rose bush before pruning.



Same bush after pruning; all dead wood and weak growth removed, and canes cut to a uniform height.

For more information on fertility issues, visit extension.msstate.edu and search for **A Quick Guide to Fertilizing Mississippi Landscapes, Fertilizing Ornamental Trees and Shrubs**, and **Diagnosing Nutrient Deficiencies in Ornamental Plants**.

PRUNING QUICK TIPS

- Identify the type of pruning best for the rose class. Get a game plan in mind.
- Do heavy pruning mid-February to mid-March for repeat bloomers. Prune after bloom for spring bloomers.
- Use sharp, clean tools and disinfect between cuts and plants.
- Wear protective clothing/gloves.
- Prune out dead/diseased wood.
- Prune to open plant up for air circulation, fit space, and reduce disease.
- Deadhead, shape, and clean most roses to promote flowering and reduce disease.

To prune or not to prune? That is the question.

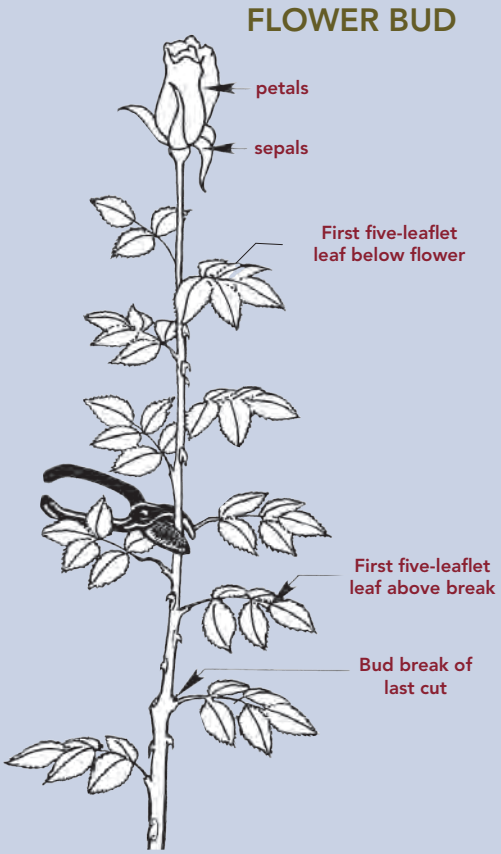
Most garden roses need some pruning to perform their best in gardens and landscapes. The need to prune varies greatly from class to class. Some old garden roses, like China roses, respond poorly to heavy pruning, while hybrid tea bushes need moderate to severe annual spring pruning.

Most roses come ready to plant and do not need to be pruned much. Examine the canes carefully for breakage or any signs of disease, which should be trimmed out at the time of planting. Canes should be cut at an angle approximately one-fourth inch above an outward-facing node. To prevent a delay in flowering, do not cut canes shorter than 10 inches.

The major annual pruning for most repeat-blooming cultivars should occur each year between mid-February and mid-March, when the roses are still dormant but winter's worst weather is past. Pruning roses is not difficult, but it does require clean, sharp tools and protective gloves and clothing. Wipe your tools with a disinfectant, such as a 10 percent bleach solution, bleach wipes, or alcohol, between diseased cuts and especially between plants. Spring pruning allows you to evaluate the condition, shape, and size of a rose bush and prepare it to serve the purpose for which it was planted. The degree of pruning depends on your goals for that plant and its physical condition. The objective at the end of pruning is to have a shrub free of dead, diseased, and weak growth, leaving healthy canes and an open, pleasing form prepared to support vigorous new growth.

For more information on disinfectants, visit extension.msstate.edu and search for **Choosing a Disinfectant for Tools and Surfaces in Horticultural Operations**.

Hybrid teas, Grandifloras, and many larger Floribundas respond positively to heavy annual pruning and are pruned similarly. First, remove all dead or diseased-looking wood. Then, cut out all the weak canes and any branches that are growing toward the center of the bush. For hybrid teas and Grandifloras, select three to six strong canes and cut them back to a height of 12 to 18 inches. Roses grafted to *R. x fortuniana* rootstock are normally larger shrubs and should be pruned less, leaving more canes and keeping the final height to about 30 inches. Leave more than six canes on bushy Floribundas, and leave them at a height of 24 to 30 inches, depending on their mature size, location, and purpose in the landscape. For a video demonstration on pruning hybrid tea roses, visit extension.msstate.edu/extension-stories/video/2017/how-prune-hybrid-t-roses.



Modern shrub roses and English roses should be cleaned as described above. Reduce their overall size by approximately one-third. Retain the natural shape of the shrub unless the plant is being trained to a trellis or fence. In general, old garden roses should not be pruned much. Clean out dead or diseased wood, but maintain their natural form.

Trim roses that bloom only in spring after the flowering has ended because they produce their flowers on wood of last season's growth. In general, pruning spring-bloomers and climbing roses usually involves cleaning the plants of dead or diseased growth and shaping the plants to their natural or desired growth pattern. Some climbing roses can be rejuvenated every year by cutting out one or two of the oldest canes that no longer bloom well. Roses that are trained to grow vertically may tend to bloom only at the top of the main stems. Reducing the top of the main stem slightly and encouraging growth of horizontal side stems will promote better bloom throughout the column of the plant.

How should I cut blooms?

Many gardeners grow roses to cut flowers for home and friends. The long, single-stem blooms of hybrid tea roses are perfect for cut flowers. Use hand pruners that cut like scissors to make the cut at a five-leaflet leaf (see illustration). Cuts in this area ensure strong vegetative breaks and encourage a bushy plant. Rose exhibitors often want to produce the biggest, boldest, best bloom they can for flower shows. They achieve this by disbudding a stem. Disbudding is the process of removing all side buds except the terminal bud at the tip of the stem when the buds are small. All the growing energy is, therefore, concentrated into the terminal flower.

What is deadheading and why is it important?

Most roses respond well to the removal of blooms that are past their prime. Some of this occurs as you cut flowers for arrangements. Flowers that do not get cut for those purposes should also be trimmed off the shrub to encourage new vegetative growth that will bloom again. Cut off less foliage if the plant is young or under stress. Cut farther down the stem if the plant is actively growing and the canes become top-heavy. Lightly reshaping the shrub about midway through the growing season is often referred to as summer pruning.

Stop pruning in early fall so that the shrub does not go into winter with tender new growth. Deadheading and summer pruning are good times to groom the shrub and remove unsightly dead blooms, diseased foliage, and fallen leaves.

Roses that bloom in sprays also benefit from deadheading. Wait until the entire spray is mostly finished, and then remove the whole group of spent flowers at one time.

Not all roses need this much attention. There are many cultivars whose blooms are simple and self-cleaning. These cultivars make good landscape shrubs, although they may not be the best choice for exhibition flowers. They make up for the lack of fancy flowers by producing masses of flower color all season long.

Can I propagate my roses?

It is best to buy named, healthy, vigorous, 2-year-old plants from a reliable nursery where propagation and production conditions are well controlled. Propagation of patented plants is not legal unless the breeder gives permission. Many of these roses are grafted onto rootstocks because they are not strong enough to grow on their own roots, or they require a long establishment time if grown without grafting. A common rootstock used on grafted roses throughout the United States is 'Dr. Huey'. 'Dr. Huey' is a red-blooming rose with long, arching canes. This growth habit and bloom color appear when the scion (the top part of a grafted rose) dies or is overgrown by the rootstock. *R. x fortuniana* rootstock can be found on grafted roses where rose exhibitors and gardeners seek more robust growth. This rootstock is not quite as cold-hardy as 'Dr. Huey' but is an exceptional rootstock in the Deep South. It grows naturally as a large climber with small, white blooms.

Old garden roses and non-patented roses are legal to propagate, and many can be grown on their own roots. That is how some old family roses get passed down through generations, losing their identity but still making good memories. Roses can be shared in this manner by rooting hardwood or softwood cuttings or potting up root suckers. Some roses are easier to root than others.



Thrips enlarged 21 times



Spider mite enlarged 20 times

Insect and Disease Pests of Roses

There are many diseases, insects, and mites that attack and damage roses. Some of these are minor pests, while others can cause serious damage if not detected and treated early. Although rose growers can use many non-pesticide methods to reduce the potential for pest outbreaks, sometimes pesticide applications are required to protect roses from diseases, insects, or mites. Check your rose plants regularly so you can detect and treat problems before they cause serious damage.

When multiple pests require treatment, it is often practical to combine recommended insecticides, miticides, or fungicides into one spray, but read the labels of all involved products carefully before tank mixing. When spraying your roses, keep in mind that pesticides do not work unless they reach the target pest, so take care to spray thoroughly. Directing sprays to the undersides of leaves is especially important when attempting to control spider mites, diseases, and certain other pests.



Aphids feeding on rosebuds



Rose scales

Caution: Mix only the amount you will need for one application. Do not store pesticides after they are mixed with water. For safe and effective pesticide use, always read and follow label directions.

Insects

Some of the more common or important rose pests are briefly discussed in the following paragraphs. See Extension Publication 2472 **Insect Pests of Roses** for more specific information on the insect and mite pests of roses and how to manage and control these pests.

Thrips: Thrips are tiny, spindle-shaped insects that damage blooms by feeding on the petals of developing buds, causing petals to be distorted and discolored. Light-colored blooms are generally more susceptible, but thrips will injure dark-colored blooms, as well, especially when numbers are high. Infestations are heaviest in spring and early summer, when adult thrips are migrating from maturing spring weeds, clovers, and winter grain crops.

Chilli thrips: Rose growers need to be alert for this nonnative species of thrips that threatens to become established in the state. Unlike other thrips, chilli thrips feed primarily on foliage, causing leaves to be distorted and discolored, but they will also damage blooms. Damage by chilli thrips is sometimes mistaken for herbicide injury. Use a hand lens to check the undersides of symptomatic leaves for the presence of thrips. Heavy infestations can cause severe damage and can even result in complete defoliation.



Leaf damage caused by leaf-cutter bees

Leaf-cutter bees: Leaf-cutter bees are solitary bees that sometimes cause minor, but rather obvious, damage to rose leaves by cutting circular discs of leaf material to use in their nests. Nests are built in hollow, tube-shaped holes that are approximately the diameter of a pencil. Occasionally an especially industrious bee, or group of bees, will create enough leaf damage on an individual plant or group of plants to cause concern, but this defoliation is usually not severe enough to cause long-term adverse effects.

Aphids: These small, soft-bodied insects cause damage by sucking the sap from leaves, flower buds, and tender stems. Heavy infestations cause distorted and stunted growth. Aphids also produce large amounts of honeydew, which causes plants to be sticky. It also supports the growth of sooty mold fungi, which produces an unsightly black growth on the leaves of affected plants.

Rose scales: Rose scales and other armored scales are immobile, somewhat oyster-shaped insects that damage roses by feeding on the canes with their long, thread-like mouthparts. Rose scales do not produce honeydew, and infestations are easy to overlook because they adhere closely to the stem and are often mistaken for bark or debris. Heavy infestations cause plants to be unthrifty and can even cause death of whole canes.



Beetles (sizes vary)

Japanese beetles: Fortunately, these nonnative insects do not occur statewide, but Japanese beetles are serious pests of roses wherever they occur. Damage is caused by the adults, which feed directly on the blooms, causing unsightly damage. Light-colored blooms are more favored, but all colors are subject to damage. They will also feed on leaves. Currently, the heaviest Japanese beetle populations occur in the northern part of the state, but infestations are spreading. Japanese beetles are relatively easy to identify by their bronze and green color and the small tufts of white hair that appear along the edges of their wing covers.

Spider mites: These tiny arthropods are some of the most common and most damaging pests of roses. They feed on the undersides of leaves, sucking sap from individual plant cells. Damage initially appears as a light-colored stippling of the leaves, usually beginning along the mid-vein. Use a hand lens to check the undersides of such leaves for mites. Heavier infestations cause leaves to have a bleached or bronze-colored appearance and to turn brown eventually and drop from the plant. Spider mites are often kept in check by natural predators, so one important way to manage spider mites is to avoid unnecessary insecticide treatments. Many of the insecticides recommended for control of other rose pests have a tendency to trigger spider mite outbreaks. Although it is sometimes necessary to use these products, you do not want to do so unless you really have to. Hot, dry, dusty conditions also favor mite outbreaks. Choose spider mite treatments carefully; spraying spider mite infestations with ineffective products will cause the infestation to become worse!



Rose midge enlarged 10 times

Rose midges: Although rose midges are not common in the state, rose growers need to be aware of this insect and the damage it causes. Actually, you are not likely to see the insects themselves because they are tiny, mosquito-like flies. Heavy rose midge injury is hard to overlook, but it is often not recognized as insect injury. Rose midge larvae feed in developing shoot tips and flower buds, causing them to be blackened and distorted, resulting in death of the shoot tip and reduced bloom production. Heavily infested plants will produce few blooms. This insect produces many generations per growing season.

Fire ants: Fire ants rarely damage roses directly, but their mounds are unsightly in the rose garden and surrounding landscape, and their stings are painful and annoying. It is difficult to fully enjoy a rose garden or landscape that is heavily infested with fire ants. Fortunately, there are effective treatments that can be used to control fire ants; long-term success requires ongoing effort. See Extension Publication 2429 **Control Fire Ants in Your Yard** for information on how to best control these vexing and persistent pests.

Diseases

Rose cultivars differ in their susceptibility to various diseases, but, because of our diverse climate and soils, most roses will eventually have a problem with one disease or another. Knowing something about common rose diseases and when a preventive disease control program might be necessary can help you be a successful rose grower.



Black spot disease on rose leaflets. This is the most common disease of roses. As spots increase in size, they often run together and cover the entire leaflet. Severely infected leaves fall from the plant. When unchecked, black spot can completely defoliate the rose plant.

A preventive disease program requires that you know what a healthy plant looks like and that you check your roses' health once every 2 weeks. If the weather favors a disease, start a preventive management program. If you suspect a disease and can identify it, you should apply recommended products. If you do not know what the problem is or cannot identify it, send a sample of the problem and receive a diagnosis and recommendation. Send the sample to:

Extension Plant Pathology Lab
190 Bost North, Rm. 9
Mississippi State, MS 39762-9612
(662) 325-2146
(662) 325-8336 (fax)

Please contact your county MSU Extension office or visit extension.msstate.edu/lab for a current list of sample fees.

The most common diseases that infect roses are caused by fungi or viruses. One is caused by a bacterium. Black spot, powdery mildew, and stem cankers, the three most prevalent and most costly diseases of roses in Mississippi, are caused by fungi.

Always pay attention to weather conditions and take preventive action before a disease gets out of control. Management and fungicides work best when used preventively.

Black spot *(Diplocarpon rosae):* Black spot is the most common disease of roses in the United States. It affects the aboveground portion of the plant and defoliates leaves and causes cane blotches. While black spot can be found on all roses, it is most severe on some types of hybrid tea roses, especially those bred for their showy flowers. A regular preventive program should be employed for these roses.

The most prominent symptom of this disease is a black spot, which may occur on either side of the leaf. A number of other diseases cause dark spots on the leaves, but you can distinguish black spot by the darker color and the border of the spots, which appear to be fringed, hairy, or feathery. Black spot also infects the stems or canes. Cane lesions may not have the fringed border.

The first symptom will be a small, pin-head sized lesion. Depending upon the genetics of both the rose and the fungus, the plant may hold its leaves until the black spot grows to the size of a dime, or the leaves may fall soon after infection, before you notice the black spots. Premature defoliation is a symptom of the disease.

Depending on the susceptibility of the plant to black spot, you may see a little to a lot of chlorosis, or yellowing, around the black spot lesion. In general, the more chlorosis, the more quickly the leaf is likely to fall from the plant.

When unchecked, black spot can completely defoliate the rose plant. Repeated defoliations weaken the plant and make it more prone to dying from other causes. The fallen leaves harbor the fungus, and it moves from them to infect the new leaves the following spring.

Control. The first step toward controlling black spot is sanitation. If only a few leaves show symptoms of black spot on a plant, remove and destroy them. Remove all diseased leaves from around the plants, particularly at the end of the growing season. The fungus overwinters in diseased leaves and in the canes. It is sometimes wise to prune canes drastically, without cutting too close to the graft, before new growth begins in the spring. Before new foliage occurs, remove and burn all old mulch. Replace with new mulch.

An effective spray program depends upon understanding the life cycle of the fungus that causes black spot, Diplocarpon rosae. The fungus depends upon little "seed-like" structures, called spores, to move to new infection sites. Most commonly, the spores move from infested leaf residue at the base of the plant or from fruiting stem lesions. They may also be borne by the wind to the rose.

Once on the plant, the spores require water and high humidity to germinate. The longer free water (dew, rain, and irrigation water) is present, the lower the humidity can be. The higher the humidity is, the shorter time free water needs to be present. The fungus can germinate and infect the plant from 32ºF to almost 92ºF, but at the lower and higher temperatures, the infections will not express until more favorable temperatures are reached. The most favorable temperatures for disease development range from 64ºF to 75ºF.

Because of this life cycle, fungicide applications should start as soon as any leaves appear on the canes, including during January and February "warm periods." A study has shown that black spot-susceptible rose plants that were sprayed appropriately during the winter had better health in the spring and summer. Fungicides used for these sprays should not include the class of fungicides called the triazoles (propiconazole, tebuconazole, metconazole, and myclobutanil) as they can interfere with leaf emergence the following spring.

A spray program should require no more than 15 minutes every 2 weeks if you have 10 or fewer rose plants, but it should be done regularly. The protective sprays should continue throughout the spring, summer, and fall. Triazole-type fungicides can be used once the plants are leafed out, in the spring through fall. These fungicides are active enough that sprays every 2 weeks should suffice.



Stem cankers

For specific spray recommendations, please see **The Plant Doctor: Black Spot, Cercospora Leaf Spot, and Powdery Mildew of Roses** (Publication 2827) and **The Plant Doctor: How to Spray Fungicides to Protect Your Home Landscape, Garden, and Turf** (Publication 2705).

Cercospora leaf spot *(Cercospora sp.):* This leaf spot can also defoliate roses, including some types that are not especially susceptible to black spot. Symptoms start as a light pink to purplish spot. As the spot enlarges, the center turns gray, but the margin of the spot remains purplish. The lesion is circular.

Management. Use the same management procedures as recommended for black spot.

Stem cankers and die-back: These are among some of the most serious diseases of roses in the South. Caused by a number of fungi, these diseases work similarly in that they infect the rose canes and block the flow of water and nutrients to the upper part of the cane, which dies.

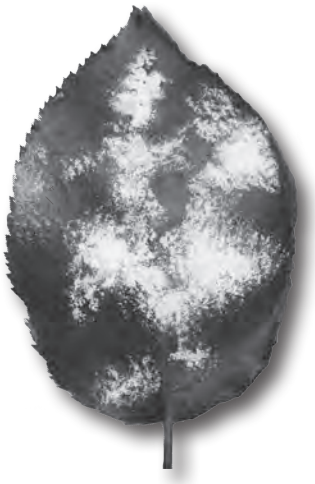
Stem cankers start as a brownish to black stem lesion that may lengthen fairly rapidly. The lesion may stay on a single side of the stem, or it may girdle it. Girdling will cause the cane above the lesion to completely die back.

The first line of protection against these diseases is to select only disease-free plants for your garden. Practicing good sanitation, such as removing fallen leaves and decaying blooms each dormant season, is also helpful.

Thirdly, it is important to prune the canker out as soon as you see it. Cut well below the canker (about 5 inches), and carefully inspect the cut wood to ensure there is no discoloration inside of the cane. Discoloration of the interior of the cane would indicate the disease has moved lower in the stem than you have cut. Clean and disinfect your pruners and recut lower down. Remove and destroy the cane.

If your roses are grafted, do not allow the cankers to enter the graft. You will probably lose the rose if a canker disease enters the graft area. Roses on their own root stock may or may not survive pruning near the crown area of the plant.

After pruning cankers, remove and destroy the diseased tissue. Use a fungicidal spray containing a topical active ingredient, such as mancozeb or chlorothalonil.



Powdery mildew

Canker diseases are more prevalent on plants weakened by other problems, such as those defoliated by black spot. Stem canker outbreaks also seem to be worse in springs following winters that had frequent and large temperature swings. Thus, it is important to maintain the health of your rose plants so they can better fight off an infecting canker. The fungicide chosen may depend upon the type of canker.

Powdery mildew *(Sphaerotheca pannosa):* A white, powdery fungus growth on the surface of leaves, buds, or stems of roses usually indicates powdery mildew. Infection on young leaves may cause curling and leaf distortion. A reddish to purplish coloration may be present. Badly infected flower buds do not open. In some situations, young canes may be killed.

The disease is more common on older rose types, especially some climbers and bushes. The disease is more likely to infect these plants when they are grown in shady areas.

Management. Most of the sanitation and management procedures for black spot are also valuable in controlling powdery mildew. During the growing season, you can hold mildew in check by spraying with various fungicides. If the plant is only somewhat susceptible to powdery mildew, the Cornell rose formula may be effective. Please see **The Plant Doctor: Black Spot, Cercospora Leaf Spot, and Powdery Mildew of Roses** (Publication 2827). During late winter, a spray of dormant plants with a commercial lime-sulfur 1:15 solution can be effective.

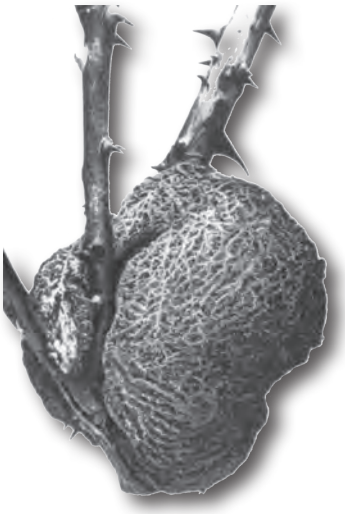
Gray mold *(Botrytis cinerea):* Gray mold is a common infection of old buds and blossoms. In the right conditions, it will also infect canes.

Gray mold infection starts as a grayish-black lesion on the infected terminal and will extend down the stem of the infected cane. Infected buds may appear blasted and will droop over at or near the lesion. During warm, humid weather, a gray fungus may cover the infected parts. When you examine the affected area, you may find a powdery gray to black mold.

Management. Prune out and destroy all infected parts as soon as they appear. Prune the infected parts at least 2 inches below the last sign of infection. Usually these infections will run their course in a week or two, but, if they continue, fungicide applications may be needed.

Water molds—Pythium and downy mildew *(Pythium and Peronospora sparsa):* Two costly diseases to which all roses are susceptible are rots caused by water molds. As their name implies, water molds are favored by wet or damp environments. When the environment stays moist for some time, the water molds infect and rot the plant tissue.

The most common water mold disease is Pythium root rot. It is the reason you should plant roses in well-drained soil. Good drainage is important to growing roses. Roots that stay wet for too long get infected by Pythium, and root rot sets in. The roots start to slough off, reducing the flow of water to the leaves. The edges of the leaves brown, and, as root rot continues, the lower leaves turn yellow, then drop from the plant. The process proceeds up the plant. Symptoms of nutrient deficiency may be apparent, and the plant dies.



Crown gall

Downy mildew is another water mold disease. It comes into the state on roses grown in cool, moist areas, such as the Pacific Northwest and Northern California. Most roses will suffer from the disease only their first winter in the state, but others become permanently infected.

When the weather becomes cool and damp during the late fall, winter, and early spring, the disease starts to emerge from the cane. Small, red lesions form on the cane and, a day or so later, spores emerge. The spores will infect other plants, primarily leaves. Dark lesions will form between the veins of the leaves and enlarge. The leaf may take on a chevron-like appearance. Infected leaves will fall from the plant. If possible, do not allow water to contact the leaves. Water allows the spores to germinate and infect the leaves. If your roses are in a greenhouse, keep the heat above 65ºF.

Most fungicides will not work against water molds. Those that do are expensive, and repeated applications will be needed.

Crown gall *(Agrobacterium tumefaciens):* Crown gall is a bacterial disease. It is very easily spread by infected wood or infested gardening equipment, especially pruners. It is important to clean and disinfect all equipment that comes into contact with this disease.

Symptoms are gall-like growths that usually occur at or near the soil line and may be fairly large. Galls of another type of crown gall may also be found on the upper stems or on the roots, but these are usually smaller, bead-like galls. Infected plants become stunted, and the blossoms and foliage are of low quality.

Chemical control is not an option for controlling crown gall. This means that the best management technique is to remove and burn all infected plants. The crown gall bacteria can remain viable in the soil for several years, so replanting in the same area is risky. It is best to move new plantings to a new location in the landscape.

If you want to replant in the same area, try a biological protectant, such as Galltrol. Galltrol is a living culture of a close relative of the crown gall organism (*Agrobacterium radiobacter*). Unlike crown gall, it does not attack plants but sticks to the plant parts and prevents the crown gall bacteria from entering. To use Galltrol, you mix the bacteria in a bucket of water, then dip the host plants into the mixture immediately before transplanting. Galltrol can also be used as a spray or soil- drench treatment for crown gall prevention.

Viruses

Once a plant is infected with a virus, it cannot be cured. Most rose viruses do not do a great deal of harm to the plant but can weaken them so they are more likely to die in a severe winter. The exception to this is rose rosette virus.

Rose rosette: Rose rosette virus causes a severe disease in most rose types and is often fatal, especially in *R. multiflora.* In recent years, it has been a severe problem in Knock Out roses, especially along the I-40 corridor.

The virus is moved from plant to plant by grafting or by a very small (eriophyid) mite, *Phylocoptes fructiphylus*. The mite sails on the wind on thin threads of silk, moving among plants and moving the virus with it.

Symptoms of rose rosette virus differ depending upon the rose species or even rose cultivar infected. This variability makes diagnosis difficult, and laboratory testing is somewhat difficult.

Diagnostic symptoms of rose rosette include some reddening of the leaves and the development of closely spaced internodes that cause dense branching, also known as a witch's broom. The witch's broom may be an off-color green. Leaves inside the witch's broom are often distorted and have a red cast. Flowers may abort or be converted to leaf-like form; if flowers are formed, they may have fewer petals, less color, or a mottled color.

Canes of infected roses may also show diverse symptoms. Infected canes may be thicker than the older cane beneath; they may twist or be otherwise distorted. Many infected roses develop dense spines that are usually flexible. You can push them from side to side with your finger.

Many of the above symptoms can also be the result of an exposure of glyphosphate herbicide (sold under many names, including RoundUp), so careful checking on your own or your neighbors' herbicide use is a good idea. Imazaquin has also been reported to cause herbicide damage on roses. Always read the label of any herbicide before using on roses, and apply only if it specifically is labeled for use on roses. This is true for any chemical application to roses.

The only remedy for rose rosette virus is to remove infected plants upon diagnosis, especially if you want to retain your other rose plantings.

Other rose viruses: A number of virus diseases attack roses, resulting in a multitude of symptoms such as leaf patterns, yellowing, streaking, ring spots, puckering, and curling of new leaves. Most of these viruses are transmitted by grafting. The two most common rose viruses are Prunus necrotic ringspot virus and apple mosaic virus. The most common symptoms of infection are leaf patterns and ring spots.

Control. The best method of control is to buy virus-free plants from a reputable dealer. Most rose viruses, with the exception of rose rosette, are spread by grafting, so your other plants will most likely be safe. So when you notice infected plants, you may wish to keep them, but many rose enthusiasts remove and destroy them.

If you encounter other diseases, consult your county MSU Extension office.



Viruses

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M1194

Mississippi's 10 Worst Invasive Weeds

Mississippi is being silently invaded by exotic plant species. These weeds are not just garden nuisances; they are changing the way natural areas function, and they are costing all of us money. Your tax dollars pay to fight the disruptive spread of these plants. Also, tax revenues are lost when plants such as kudzu invade forested timberlands.

This invasion has gained momentum since the last century when many of these plants were first imported or accidentally introduced. It is estimated that millions of acres in the United States are already affected by invasive exotic plants. This acreage increases annually by an area twice the size of Delaware. Almost 20 percent of the plant species in Mississippi forests, parks, refuges, and other open spaces are not native to our state. Some of these exotic plants have few natural constraints and can soon dominate a landscape.

The 10 weeds described here are biological pollutants that crowd out native plants, degrade wildlife habitat, and threaten many endangered species. Many of these plants are familiar sights in our landscapes. All of them threaten Mississippi's biological diversity.

Jio

(*Commelina benghalensis*)

Also called Benghal dayflower or tropical dayflower, this perennial plant is native to Africa and tropical Asia.

Jio appeared in Florida in 1928 and in Mississippi in 2006. It is becoming a serious pest in south Mississippi, where it invades cultivated, fertile fields planted to cotton, peanuts, corn, soybeans, and vegetables. This weed flowers above- and belowground. Red hairs at the base of the leaf stem are important for identification.



Chinese Tallow

(*Triadica sebifera*)

Chinese tallow is frequently called popcorn tree. Native to eastern Asia, it was imported to South Carolina in the late 1700s by Benjamin Franklin for soap tallow.

The colorful fall foliage and rapid growth of Chinese tallow make it popular as a landscape tree. It reproduces easily, spreads quickly, and is difficult to control because of its long taproot. It is a popular nectar source for honeybee producers. For more information, see MSU Extension Publication 3189.





Kariba Weed

(*Salvinia molesta*)

Kariba weed is also called giant salvinia. Native to southern Brazil, it is believed to have been introduced to the U.S. for the ornamental trade.

Kariba weed is a free-floating aquatic plant that forms dense mats on the surface of lakes, ponds, and rivers. Kariba weed will not survive in terrestrial habitats. This plant is easily distinguished from related species of salvinia by the eggbeater-shaped hairs found on the upper surfaces of its foliage.





Waterthyme

(*Hydrilla verticillata*)

Also called hydrilla, this perennial aquatic plant is native to warm regions of Asia. It was most likely introduced into the U.S. in conjunction with the tropical fish trade.

Classified as a federal noxious weed in 1974, this completely submersed plant takes root in sediment in ponds, lakes, and rivers. The most frequently observed form of spread is as a contaminant on boats and boat trailers. Native aquatic plants that are vital for fish and other marine life habitat are completely displaced once waterthyme invades.





Cogongrass

(*Imperata cylindrica*)

Native to Southeast Asia, cogongrass arrived accidentally as packing material into Mobile Bay, Alabama, in the early 1900s. It was later promoted as a forage grass, as an ornamental, and for soil stabilization.

Classified as the seventh worst weed in the world, cogongrass is hardy and tolerant of shade, high salinity, and drought. It forms dense mats that crowd out native vegetation and forage plants and displace ground-nesting species, such as turkeys, bobwhite quail, and the gopher tortoise. It can alter the natural fire regime by causing hotter and more frequent fires. For more information, see MSU Extension Publication 3190.





Brazilian Satintail

(*Imperata brasiliensis*)

Brazilian satintail is native to Mexico, Brazil, and Argentina. It is not known to be in the U.S. outside of southern Florida.

Brazilian satintail can be distinguished from cogongrass only while plants are in the early stages of flowering when anthers are exposed and visible (anthesis). Cogongrass florets have two stamens (anthers with filaments), while Brazilian satintail florets have only one. All other morphological features of Brazilian satintail and cogongrass are identical.



Kudzu

(*Pueraria montana*)

Native to Japan and Asia, kudzu was showcased as an ornamental at the Philadelphia Centennial Exposition in 1876. In Mississippi, it was planted as forage and to control soil erosion in the last half of the 19th century and the first half of the 20th century.

No list of Mississippi weeds would be complete without the “plant that ate the South.” During summers, kudzu grows up to a foot a day, covering trees, buildings, fences, and anything stationary. Kudzu damages structures and eventually kills trees and understory growth. This vine has caused more than $100 million in damages. For more information, see MSU Extension Publication 3187.



Tropical Soda Apple

(*Solanum viarum*)

Tropical soda apple is native to Brazil and Argentina and was first recorded in the U.S. in Glades County, Florida, in 1988.

Within 7 years of its arrival, tropical soda apple invaded an estimated 1 million acres in five southern states and Puerto Rico. It spreads by interstate movement of cattle, hay, and composted manure from infested areas. This prickly plant replaces edible forage plants and hampers livestock and wildlife movement. It is a serious threat for vegetable growers, livestock producers, and land managers. For more information, see MSU Extension Publication 3200.





Itchgrass

(*Rottboellia cochinchinensis*)

Introduced from India, this annual grass can reach 13 feet in height. It invades cultivated and noncultivated sites that get adequate sunlight. Itchgrass prefers heavier rather than sandy soils.

Itchgrass leaves and leaf sheaths (pictured) are densely covered with short, stiff hairs that can penetrate the skin and cause irritation. It produces abundant seeds that shatter at maturity onto soil and mowing and harvesting equipment, which facilitates dispersal. Previous research seems to indicate both dormant and nondormant seeds are produced on itchgrass plants, making control more difficult. For more information, see MSU Extension Publication 3186.





Torpedograss

(*Panicum repens*)

Torpedograss is an erect perennial grass that spreads primarily by rhizomes. It prefers well-drained, sandy soils but can tolerate drought as well as standing water. It is relatively short at a reported maximum height of less than 3 feet.

The rhizomes may extend more than 20 feet from the mother plant and can persist through extended periods of drought. Torpedograss tolerates close mowing and is often found in improved and unimproved turfgrass as well as other perennial crops, but not cultivated sites. It has been used as forage in developing countries, but its quality is very low. For more information, see MSU Extension Publication 3193.



You can help stop the invasion!

- Don’t plant Mississippi’s “10 worst weeds.” Appealing as some may be, these plants are all notorious for invading outlying areas.

- Use nursery-raised native plants. Ask your local nursery staff for suggestions, or check out native gardening books from your local library or bookstore.
- Remove these plants from your property. If needed, contact your county Extension agent for recommended chemical control methods. Use herbicides carefully. Many herbicides are not selective and will kill all surrounding vegetation or may harm aquatic systems.
- Help control exotic plants on nearby public lands. This can be an educational and productive activity for Master
- Gardeners, scouts, 4-H clubs, and other service groups. Check with your local forest, refuge, or park for exotic plant removal projects.

More information on invasive weeds is available at these and other websites:

Mississippi State University Extension Service

The Nature Conservancy

U.S. Bureau of Land Management

USDA Plants Database

The Global Invasive Species Team

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Waterthyme: Main photo by Wilfredo Robles. Inset photo by Kenneth Calcote, MDAC-BPI.

Cogongrass: Inset photo by Steve Compton, Clemson University.

Tropical soda apple: Photos by Charles Bryson.

Torpedograss: Photo by Rebekah D. Wallace, University of Georgia, Bugwood.org.

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Horticulture News
By: Scott Eckert, Harvey County Extension Agent, Horticulture
Current Date: 6/1/22
Release Date: as soon as possible

One thing about plants is we never seem to run out of possibilities when it comes to our landscapes! Caladiums add spectacular tropical color to shade gardens. Grown for their shapely, colorful foliage, they withstand intense summer heat and make excellent borders, containers and garden specimen plants. The flowers are small and insignificant in appearance.

Caladiums are divided into two types: fancy-leafed and lance, or strap-leafed, varieties. The fancy-leafed are large, broad, heart-shaped leaves on long petioles with a defined depression (ear) where the petiole joins the leaf. The lance types are smaller leafed (earless) and short stemmed. The newer varieties of the lance-leafed are more tolerant of rain, wind and sun than fancy-leafed types.

Caladiums prefer shade or early morning sun. Caladiums are grown from round tubers that range from 1 to 2 inches in diameter. Caladiums are sensitive to cold. They should not be planted in the ground until June. Start caladiums indoors in April in flats or pots. Plant the tuber, bumpy side up, 2 inches deep in a peat moss-based soil. Keeping the soil warm and wet is important. The soil needs to be moist, but if it is too wet, roots can die from lack of oxygen. The soil temperature needs to be above 70°F for growth. If the temperature is cooler than 70°F, growth will stall, and it may take months for the tuber to recover. Get a jump start by soaking the tubers in warm water (120°F) for an hour before planting.

After the roots emerge in 2 to 3 weeks, fertilize weekly with a liquid, 1-1-1, slow-release fertilizer. The caladiums can be grown in pots until the outdoor soil temperature is above 70°F. When planting caladium bulbs directly outdoors, wait until the soil temperature rises around the first part of June. Soak the bulb in warm water for about one hour and plant the bulbs bumpy side up, 2 inches deep into the garden. Amend the soil using a 1- to-1 ratio of soil and peatmoss and keep the location moist. Do not allow the soil to dry. Be patient – it takes several weeks for the caladiums to emerge.

On larger caladium tubers, (2 to 3 inches in diameter) there is a dominant bud. The large bud surrounded by smaller buds, may be “de-eyed” to produce more, but smaller leaves. This is done by inserting the tip of a small sterile knife 1/4-inch deep into the dominate bud. By destroying this bud, the smaller buds are stimulated to grow. A tuber that is not de-eyed would be 12 inches tall with 10 to 12 leaves. The de-eyed tuber will be 2 inches shorter and produce around 20 leaves that are somewhat smaller.

In the autumn when nights are cool, caladiums will fade. Withhold water until foliage dies. After foliage is dead, the tuber may be dug and stored to be replanted in the spring. Store the resting bulbs in a well ventilated mesh bag filled with peatmoss or cottonseed hulls. The key is to keep the bulbs from rotting and prevent dehydration. Store the bulbs above 55°F and mist occasionally. The bulbs, which actually only rest and do not go completely dormant, need to be stored for at least eight weeks before the buds will produce new foliage.

FLOWERING BULBS
for Georgia Gardens

Paul A. Thomas and Bodie Pennisi
Extension Horticulturists



UNIVERSITY OF GEORGIA
EXTENSION

A wide variety of bulbs grow well in Georgia. Most are grown for their flowers and some for their foliage. They are grown as pot plants, in shrub borders, naturalistic plantings and in mass displays. Bulbs offer a certain magic to the landscape virtually unrivaled by other plants.

What Is a Bulb?

The term "bulb" is used in this publication to refer to true bulbs and other bulb-like structures such as corms, tubers, rhizomes and tuberous roots and stems (Figure 1). The primary function of these modified plant parts is food storage to ensure the plant's survival during adverse weather conditions. Distinguishing among these structures is important, since each is handled differently with respect to culture, propagation and care.

A **bulb** is a specialized underground organ consisting of a short, fleshy, usually vertical stem axis (basal plate) bearing at the top a growing point or a flower bud enclosed by thick, fleshy scales. There are two types of bulbs: the tunicate or laminate type represented by the daffodil and tulip, and the non-tunicate or scaly type represented by the lily. Small bulbs called *bulblets* form at the base of the mother bulb and, with some lilies, along the underground stem. Some plants also produce aerial bulbs called *bulbils*.

A **corm** is the swollen base of a stem axis enclosed by dry, scale-like leaves. Examples include crocus and gladiolus. In contrast to a true bulb, a corm is a solid stem structure with distinct nodes and internodes. Small corms produced around the base of the old corm are called *cormels*.

A **tuber** is a modified stem structure that develops on underground stems. Examples include Irish potato and caladium. A few plants produce small aerial tubers known as *tubercles*.

Some sources make a further distinction among tubers, referring to structures that arise primarily from enlarged stem tissue as *tuberous stems*. These structures, in tuberous begonia and gloxinia, for example, develop at the soil surface.

Certain species of herbaceous perennials such as sweet potato and dahlia produce thickened underground roots. These structures are called **tuberous roots** (fat roots or fleshy roots) and have the same external and internal structure as normal roots.

A **rhizome** is a specialized stem structure in which the main stem of the plant grows horizontally at or just below the soil surface. Examples include iris, canna, and lily-of-the-valley. Rhizomes bear the same internal and external structure as true stems.

Terminology

Bulbs are often categorized according to their hardiness, time of bloom and size.

Under normal conditions, **hardy** bulbs are those that survive cold climates. **Semi-hardy** bulbs are those that are hardy in milder climates but not reliable in colder climates without protection. **Tender** bulbs do not tolerate freezing and can be left in the ground only in warm climates. Georgia has three district USDA hardiness zones (Figure 2). Your location will determine which bulbs are hardy in your given area and will influence time of bloom. Bulbs will flower two or more weeks earlier in Zone 9 than in Zone 7.

Spring-flowering bulbs consist largely of the so-called Dutch bulbs. Planted in the fall, they bloom the following spring; most spring-flowering bulbs are completely hardy in Georgia. **Summer-flowering** bulbs include hardy to tender bulbs that flower in summer; some summer-flowering bulbs continue to flower until frost. **Fall-flowering** bulbs, consisting largely of a few hardy bulbs, flower in late summer or early fall. The term **winter-flowering** generally refers to tender bulbs simply forced to bloom out-of-season indoors. A few bulbs bloom outdoors in very early spring and are sometimes called winter-flowering.

So-called **minor** bulbs are small in stature compared to the larger, showier bulbs. They can be used to great advantage in the landscape. Many, such as crocus, are especially valued because of their early flowering habit.

Site Selection

Most spring-flowering bulbs prefer light shade to full sunshine. Try to select a site that provides at least 6 to 10 hours of direct light per day. This need not restrict their planting to areas that are in full sun year-round. Because many spring-flowering bulbs bloom and produce foliage well before most deciduous trees leaf out, they get plenty of sun under the canopy of such trees, which offer dense shade later in the season. Light requirements for other bulbs, especially the summer bulbs, are more variable. Select a spot where they will receive the recommended amount of light. Insufficient

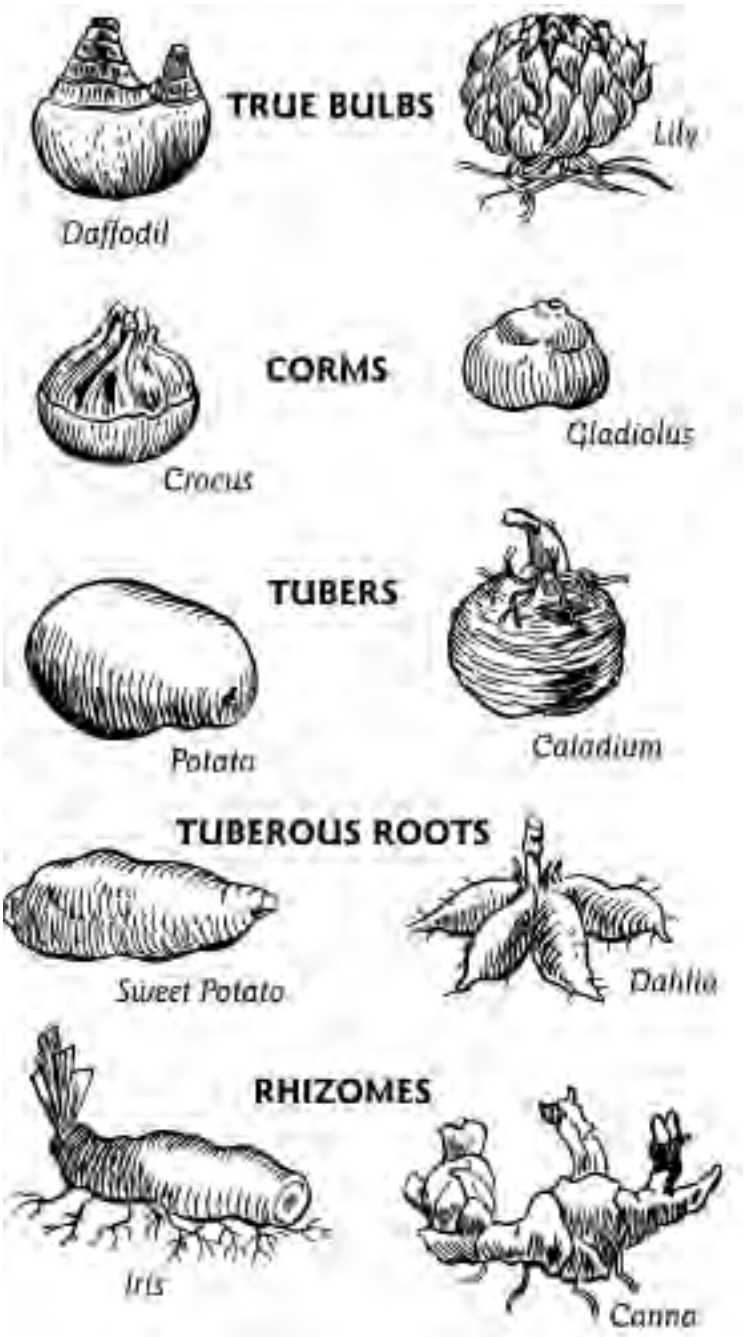


Figure 1. Specialized storage organs, often referred to as bulbs.

light usually results in poor flowering, but too much light will bleach the flowers and foliage of some species.

Also consider locating beds and plants where they will be aesthetically pleasing and effectively arranged in the landscape.

Bed Preparation

The majority of bulbous plants are actually less particular about soil than many other cultivated plants. Most, however, prefer a moist, well-drained medium sandy loam that does not remain wet and sticky after

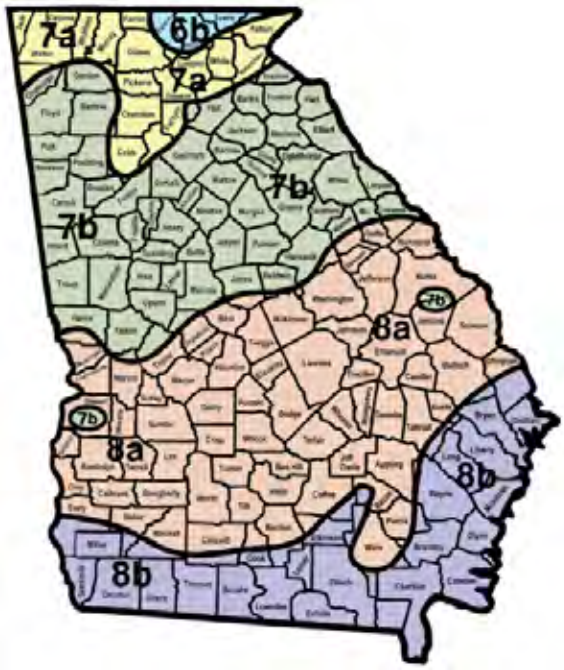


Figure 2. USDA plant hardiness zones for Georgia.

heavy rain or dry out too quickly. Good drainage is essential. If in doubt, test for drainage before planting. Dig a hole about a foot deep and fill it with water. The next day fill the hole with water again and see how long it remains. If the water drains away in 8 to 10 hours, the soil is sufficiently well drained to grow most bulbs.

If drainage is a problem or if the soil is too sandy or a heavy clay, you may need to use a soil amendment. Peat moss, bark, rotted sawdust, compost, perlite, vermiculite, coarse sand and many other materials have been used successfully. The type of amendment needed depends on the structure and texture of the existing soil, drainage and the type of bulbs to be grown. Spread several inches of material on the soil surface and thoroughly incorporate it. In extreme cases, you may need to install drainage lines or construct raised beds to ensure good drainage.

A pH of 6.0 to 6.8 is best for most bulbs. Incorporate lime if a soil test indicates a need for it. In the absence of a soil test, add 1 to 2 pounds of 5-10-10, 10-10-10 or 8-8-8 fertilizer per 100 square feet of bed space. Organic fertilizers such as bonemeal are often recommended for bulbs, but they are probably no better than inorganic sources used at the proper rates. Incorporate lime, fertilizer and any soil amendments thoroughly and deeply, to at least 12 inches. Do not attempt to work the soil when it is too wet. If you can crumble the soil between your fingers, it is dry enough for digging and planting.



Bodie Pennisi

Selecting Bulbs

Bulbs are sold in a variety of retail outlets. Always buy from a reputable dealer. Avoid bulbs that are soft or look molded or discolored. Bulbs should be firm and have unblemished skin. There is a direct correlation between the quality of the bulb and the quality of the flower produced; *bargain* bulbs are no bargain! Spring-flowering bulbs purchased in the spring are simply leftovers from the previous fall and are virtually worthless.

Bulbs are generally graded and sold according to size, usually circumference. Large bulbs produce larger and/or multiple flowers. The largest bulbs are not necessary for good landscape effect. In most cases, medium grades are entirely satisfactory.

Planting

Plant spring-flowering bulbs in the fall. In Georgia, spring-flowering bulbs can be planted from October through late December in most areas. If you cannot plant the bulbs right away, store them in a dry area at around 60-65° F. Temperatures above 70° F may damage the flower buds. In areas of the state with extremely mild winter climates, it may be desirable to pre-cool some bulbs. Most spring-flowering bulbs require a 12- to 16-week cold period in ventilated packages in the bottom of your refrigerator at 40-50° F before planting. Check with your bulb supplier to determine whether the bulbs you purchased have been pre-cooled or whether you may need to give them a cold treatment.

Summer-flowering bulbs are planted in spring after the danger of frost has passed.

Planting depth and spacing are very important to the success of bulbs. A general rule of thumb for planting depth (from top of bulb to soil surface) is two to three

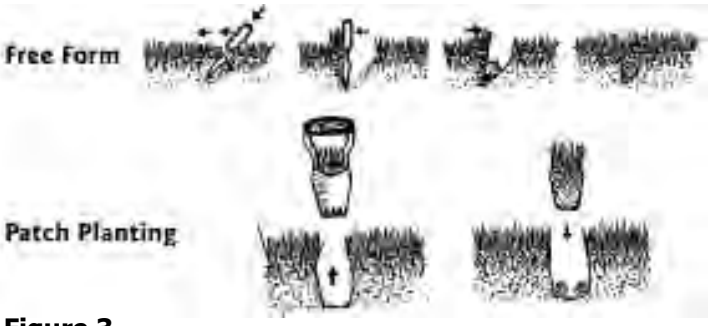


Figure 3.

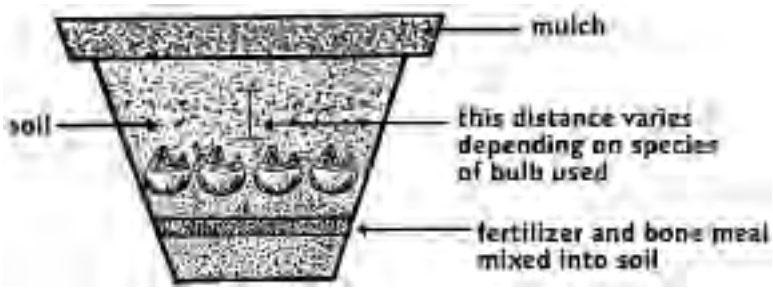


Figure 4.

times the greatest diameter for bulbs 2 inches or more in diameter and three to four times the greatest diameter for smaller bulbs.

Spacing will vary from 1 to 2 inches to as much as several feet. When spacing bulbs, consider not only how much space each plant needs, but also how frequently it will be dug and divided. Also, consider the landscape effect. Avoid spotty or line-out arrangements. It is sometimes suggested that bulbs be broadcast over the area to be planted in order to achieve a naturalistic look; this is unadvisable, however, because dropping or throwing the bulbs may bruise or injure them.

Plant the bulbs upright (rhizomes and tuberous roots are usually planted on their sides), and press the soil firmly around them. Water the beds thoroughly to help settle the soil.

Care and Maintenance

Mulches or ground covers may be necessary to ensure winter survival of some bulbs. They not only minimize winter injury, but also provide a background against which little bulbs show to better advantage. Mulch also prevents mud-spattering from heavy rains that frequently spoil the flowers. Pine straw, bark, fall leaves and many other organic materials make satisfactory mulches for bulbs.

Mechanical protection may be required to prevent wind damage. Wind breaks or staking may be nec-

essary for tall plants like lilies. There is no effective means of providing cold protection once the plant is in bloom. While late or severe cold waves occasionally spoil spring-flowering bulbs, the bulbs are amazingly resilient and many withstand severe cold.

A well-prepared bed should require little cultivation except periodic weeding. Many spring-flowering bulbs are "overplanted" with other plants, frequently annuals. Be sure not to dig so deeply as to damage the bulbs. When the bulbs flower, fertilize them again using the fertilizers and rates previously mentioned. When the flowers fade, cut them off to prevent seed formation. It is best not to cut or remove the foliage until it dies naturally. Most spring-flowering bulbs produce foliage in fall or early spring that dies by late spring or early summer. Summer-flowering bulbs produce their foliage in spring; it usually remains until cold weather kills it in the fall. Most of the fall-flowering bulbs produce foliage when the spring-flowering bulbs do; they simply flower at a different time.

Normal rainfall usually provides enough moisture for spring-flowering bulbs but not for summer-flowering bulbs. During dry weather, provide supplemental irrigation at weekly intervals. Soak the ground thoroughly. Bulbs have a much higher water requirement when actively growing than when dormant.

Eventually, almost all bulbs become overcrowded and must be divided and replanted for best effect. The length of time depends largely on the bulb's ability to produce bulblets. Some may remain undisturbed for many years while others may require dividing every two to three years. Do not dig bulbs until the foliage has turned yellow and withered. Be cautious when digging so as not to damage the bulbs.

Bulbs and corms can be gently pulled apart. Tubers and rhizomes may be cut into pieces, each division containing at least one eye. Tuberous roots can be split apart. Some tuberous roots, like dahlia, also require that a small piece of crown tissue remain attached.

Wash off any soil that clings to the bulb. The bulbs can be replanted immediately or stored for later planting. Store in a dry place away from sunlight, preferably at 60-65° F. Be sure to provide good air circulation. Discard any bulbs that appear diseased.

Remember that tender bulbs will need to be dug in early fall and stored over winter for replanting the following spring.

Naturalizing Bulbs

You can use several methods to naturalize bulbs in the landscape. The first is to randomly scatter self-establishing bulbs such as daffodil and crocus on the ground before leaf drop in the fall. These bulbs will root and establish themselves under the leaves by spring. Another method is simply to dig several shallow pits in the soil under wooded areas and lay the bulbs right side up and replace the soil. The third method involves inserting crocus bulbs under the thatch of your lawn, so the crocus will fill your lawn with color prior to the greening of the grass. Crocus finish most of their food storage activities prior to the first mowing of the grass, so this combination works out very well. However, application of herbicides can affect crocus bulbs adversely, so consult your county agent if you have any doubts. Naturalized bulbs all need to be fertilized in the fall and just after flowering to maintain full vigor. In many areas of the country, failure to fertilize will result in gradually declining bulb populations.

Forcing Bulbs

You can force bulbs to bloom indoors earlier than they normally would outdoors. Crocus, galanthus, hyacinth, narcissus, daffodil, scilla and tulip are easier to force than most.

Pot the bulbs in October or November using a well-drained soil. The number of bulbs per pot will vary according to pot and bulb size. Keep them in darkness at about 40° F for 8 to 12 weeks in a cold frame outdoors, in an unheated garage or basement, or in your refrigerator. (The bulbs must not be allowed to freeze.) Do not allow the soil in the pots to dry out.

After 8 to 12 weeks, the root system should be extensively developed and the shoots emerging from the bulbs. Move the pots to a cool, well-lighted spot for continued growth. They will bloom in about one month. Avoid high temperatures and/or poor light because they will cause stretching and weak stems.

Crocus, hyacinth, narcissus and tulip bulbs can be refrigerated at 40° F for two months prior to planting, then potted and forced as above. The results are not usually as satisfactory since less time exists for the root system to develop.

Discard bulbs that have been forced. They seldom grow and flower well when replanted in the garden.

Disease and Insect Control

Good cultural conditions eliminate many disease problems. Discard any diseased bulbs at planting. Aphids, thrips, Japanese beetles, slugs, stem and bulb nematodes, narcissus bulb fly larvae, wireworms, bulb mites, mosaic virus, botrytis and various bacterial and fungal rots can sometimes be problems. Because the recommendations for control of these pests are constantly changing, you should contact your Extension agent for current recommendations.

Recommended Bulbs

The following table and alphabetical list provide basic information on how to select and handle the more commonly grown bulbs suitable for Georgia. This is by no means an inclusive list, as many other less common species can also be grown. Commercial bulb catalogs are excellent sources of information on colors and varieties.

ACHIMENES. Achimenes are widely grown indoors, but are suitable for outdoor pots on shaded porches or patios when night temperatures remain above 60° F. They are drought-sensitive and should not be planted in dry areas or in full sun. Most plants grown today are hybrids; numerous varieties and colors are available. They are propagated from seeds or rhizomes.

AGAPANTHUS. Several species, hybrids and varieties are cultivated. Leafless flower clusters bear 12 to 30 blue or white flowers. Often grown as tub plants, they are hardy outdoors only in Zone 9. Plant shallowly outdoors. In containers, leave the nose of the bulb protruding above the soil surface. They prefer high organic soils.

ALLIUM. Lilac-pink flower clusters are 5 to 6 inches in diameter. A very showy plant in the landscape, it is usually used in the background of borders. The *Allium* (onion) genus is best known for its edible members — onions, garlic, chives, shallots and leeks — but many ornamental species are also cultivated.

ANEMONE. Blue, red, white and pink cultivars of *A. blanda* are available. Plants form small compact mounds of flowers, and are frequently used with early tulips. *A. coronaria* (Poppy anemone) blooms later and has larger flowers but is less hardy than *A. blanda*. Soak tubers overnight before planting.

BEGONIA. Almost all colors of tuberous begonias are available in upright or trailing types with several distinctly different flower forms. Grown as a pot plant, in window boxes or as a bedding plant in shaded areas outdoors, it is a handsome plant in bloom. Plants are somewhat brittle. Well-drained soils are essential. Presprout tubers indoors to increase the length of the growing season outdoors. Plant shallowly so the top of the tuber is slightly above the soil surface.


Bodie Pennisi

Caladium

CALADIUM. Caladiums are grown for their foliage, the flowers being rather insignificant. Individual leaves are 6 to 24 inches long and come in an endless combination of red, pink, white, silver and green. Caladiums should be dug and stored over winter. They may be presprouted indoors to extend the growing season. They should be grown in shade and are well adapted to pot culture.


Bodie Pennisi

Canna

CANNA. Canna is a favorite summer blooming plant because of its long bloom time and because it thrives in hot weather. Numerous varieties and colors are available, ranging from dwarf to very tall. The rhizomes are generally hardy in Zones 8 and 9 but should be lifted and stored during winter at 45-50° F in Zone 7.

CHIONODOXA. Blue and white varieties are available. The flowers are small, thus masses are usually necessary for a good display. Chionodoxa is an excellent bulb for naturalizing and will increase by bulblets and self-seeding. Mowing too soon after bloom can cause decline.

COLCHICUM. Colchicums are one of the few fall-blooming bulbs. Bright flowers, usually white or lilac, appear suddenly, rising from the soil without foliage. The flowers look much like crocus and are often confused with true autumn crocus. Plant colchicums immediately upon receipt, as they will bloom without being planted.

CONVALLARIA. Usually grown for its fragrant bell-shaped flowers, Lily-of-the-Valley is also an excellent ground cover for shady locations. It is best propa-

gated in the fall by dividing the pips (shoots that appear on the rhizome) when the foliage has developed fully and begun to yellow. Double-flowered and pink varieties are also available. Lily-of-the-Valley need moisture. Do not plant in dry areas.

CRINUM. Crinums thrive in the South with little care. The plant is grown primarily for its long flower stalks, which bear umbels of as many as 30 lily-like white, pink or rose-red blooms. Several species and varieties are cultivated; the variegated pink and white is more common. The bulbs are very large, sometimes exceeding 6 inches in diameter. Full sun required.


Bodie Pennisi
Crinum

CROCUS. Numerous crocus species, hybrids and varieties are cultivated. The large-flowered Dutch crocus are largely hybrids derived from *C. vernus*. Many colors are available. The fall, winter and early spring flowering varieties are particularly valued for their time of bloom. Many species naturalize freely from cormels and by self-seeding.

CYCLAMEN. Miniature relatives of the florists' cyclamen, hardy cyclamen are excellent for naturalizing in shady areas. Colors range from white to crimson. Tubers may go dormant in mid-summer under high temperatures and low moisture. *C. purpurascens*, *C. hederifolium*, *C. cilicium*, and *C. repandum* are readily available.

DAHLIA. Dahlias are grown primarily as bedding plants or for cut flowers; some of the dwarf varieties are suitable for tub culture. Most bedding types are seed-grown, while most cut types are propagated by division of tuberous roots. Many colors and varieties are available with many flower types. Dahlias are not reliably winter-hardy outside Zone 9, unless heavily mulched, and should be dug and stored under dry, cool conditions. Tall varieties require staking.

ENDYMION. Sometimes confused with Siberian Squill, Spanish Bluebell bears much taller flower spikes and blooms much later. Blue, pink and white varieties are available. It is an excellent choice for naturalizing in wooded areas.

ERANTHIS. Winter Aconite is valued for its very early flowering habit. The bright yellow flowers cover the ground even when ice and snow are still present. A good naturalizing plant, it will self-seed. Soak tubers 24 hours before planting.

FRITILLARIA. This is one of the showiest spring-flowering bulbs. The flower stalk is topped by a crest of leaves beneath which hang large clusters of 2-inch reddish-orange, bronze, red or yellow flowers. *F. meleagris* is also cultivated and produces unusual purple and white checkered flowers.

GALANTHUS. Snowdrops are among the first flowers to bloom in spring. They grow well under deciduous trees and are good for naturalizing and random planting. The drooping white flowers have a green splotch around the inner segments. *G. elwesii* (Giant Snowdrop) is larger and flowers slightly later.

GLADIOLUS. Gladiolus is best grown as a cut flower. Because the lower florets wither well before the upper ones open, it is generally not an attractive plant in the landscape. You should make successive plantings to ensure flowers for continuous cutting. Numerous varieties and colors are available. The corms are not reliably winter hardy in Zone 7 and should be lifted and stored at 35-40° F. Mounding the soil around the base of the plants will help prevent them toppling over.

HIPPEASTRUM. A spectacular plant in bloom, amaryllis have long been cultivated indoors. They can be grown outdoors as summer-blooming bulbs. Some hybrids and species are hardy outdoors in Zone 9. When planted outdoors, the nose of the bulbs should be just at the soil surface. In pots, leave about half the bulb above the soil surface.


Bodie Pennisi
Amaryllis

HYACINTHUS. Few flowers can boast the extensive color range and fragrance of hyacinths. *H. orientalis* is hardy but not notably persistent; the bulbs eventually decline, becoming too small to flower. *H. orientalis albulus* (French-Roman Hyacinth) has smaller flowers but is said to be more persistent.

HYMENOCALLIS. It produces fragrant 3- to 4-inch intricately arranged white flowers in mid-summer on tall, leafless stalks. Several varieties are available, one with yellow flowers. The plant is not reliably winter hardy outside Zone 9 and should be lifted and stored at 65-70° F.

IPHEION. Starflower produces abundant bluish-white flowers. It is excellent for naturalizing and multiplies rapidly. It is sometimes used in lawns, which

can be a problem since the grass usually needs cutting before the plant's foliage matures.

IRIS. The Iris genus is extremely diverse and many species and hybrids are cultivated. Several classification schemes exist. They are loosely divided into bulbous iris and rhizomatous iris. The bulbous iris, e.g. *I. danfordiae* (Danford Iris) and *I. reticulata* (netted Iris), are small and generally bloom very early. The rhizomatuous iris, e.g. *I. hybrids* (Bearded Iris), *I. siberica* (Siberian Iris) and *I. kaempferi* (Japanese Iris), are taller (up to 3 feet) and bloom from mid-spring to early summer. The cultural requirements and differences are too diverse to discuss here.

LEUCOJUM. Small white bell-shaped flowers tipped with green are borne on each stem. They are good for naturalizing and random planting in shrub borders. *L. aestivum* (Summer Snowflake) is taller and blooms later. *L. autumnale* (Autumn Snowflake) is fall blooming.

LILIUM. Numerous lily species and cultivars are available. Bloom times range from May to September. All colors are available except blue. Various flower forms exist. It is an excellent border plant and cut flower. The larger hybrids are effective as single specimens; the species are more often used en masse. Tall varieties should be staked.



Bodie Pennisi

Asiatic Lily

LYCORIS. In late July or early August, *I. squamigera* suddenly appears, hence the name "Surprise Lily." Long leafless flower stalks bear 4 to 12 lilac-pink, lily-like flowers. The foliage appears in early spring and dies back to the ground by early summer. *L. radiata* (Red Spider Lily) and *L. aurea* (Yellow Spider Lily) are also members of this genus. Both bloom later. *L. aurea* is less hardy.

MUSCARI. The tiny purple flower clusters resemble clusters of grapes. Common Grape Hyacinth is easy to grow, and naturalizes quickly. It is frequently interplanted with other spring bulbs. A white variety is also available. *M. armeniacum* (Armenian Grape Hyacinth) is larger and more robust; several blue and doubleflowered varieties are available.

NARCISSUS. There are 11 major divisions of the genus *Narcissus*. Confusion often arises because the generic name *Narcissus* is also used as a common name. Daffodils, like jonquils, are but one type of narcissus. Hundreds of varieties are available. The cultural requirements for all divisions are essentially identical, but the size, color, time of bloom, etc., vary and are too complex to discuss here.



Bodie Pennisi

Daffodil

POLIANTHES. This fragrant tuberose became so associated with funerals that its popularity declined. It is a superb cut flower, however, and grows well in Georgia. It is usually treated as a tender bulb. Large-size bulbs have a tendency to split into smaller bulbs, which may require an additional year or two to reach flowering size.

SCILLA. Siberian Squill is valued for its early bright blue flowers. It is excellent for naturalizing, especially in wooded areas. Several varieties are available, including one with white flowers.

STERNBERGIA. An underused bulb, Sternbergia is valued for its fall-flowering habit. It is frequently mistaken for autumn crocus. The plant grows best in full sun and can remain undisturbed for years. Foliage is produced in the fall and remains green during winter.

TULIPA. Numerous tulip species and cultivars exist. The classification scheme for cultivated tulips lists 15 divisions based on time of bloom and parentage. More than 4,000 varieties are in existence. Virtually all colors are represented. Many consider the tulip the premier spring bulb. Most tulips also make excellent cut flowers. Many tulips are not notably persistent in the South and usually decline after the first year. Size, flower type, time of bloom, etc., are too complex to discuss here.

ZEPHYRANTHES. *Z. atamasco* (Atamasco Lily, Rain Lily, Fairy Lily) is often seen along the roadsides of Georgia, frequently along drainage ditches and wet meadows. Flowers often appear following a soaking rain. Other species and hybrids are also available. These native bulbs can be grown in shady, moist locations or in full sun if moisture is present.

Additional Bulbs to Try

Botanical Name	Common Name
Belamcanda chinensis	Blackberry Lily
Bletilla striata	Hardy Orchid
Camassis quamash	Common Camassis
*Clivia minita**	Kafir Lily
*Colocasis esculenta**	Elephant's Ear
Crocosmia x crocosmiiflora	Montbretia
Eremurus species & hybrids	Foxtail Lily
Erythronium dens-canis	Dog-Tooth Violet
*Eucharis grandiflora**	Amazon Lily
*Freesia x hybrida**	Freesia
Gloriosa superba	Climbing Lily
Ixia species*	African Corn Lily
*Nerine sarniensis**	Guernsey Lily
Ornithogalum nutans	Star-of-Bethlehem
*Ranuncalus asiaticus**	Persian Buttercup
Tritonia crocata	Montbretia
Zantedeschia species*	Calla Lily

* tender bulbs

Commonly Grown Bulbs Suitable for Georgia

Botanical Name	Common Name	Hardiness	Planting Time	Planting Depth	Spacing	Flowering Time	Height at Flowering
			[Spring Flowering]				
Allium giganteum	Giant Onion	H	F	4"	6-18"	late	3-5'
Anemone blanda	Greek Windflower	H	F	2"	3"	early	6"
Chionodoxa luciliae	Glory-of-the-Snow	H	F	2"	3"	early	5"
Convallaria majalis	Lily-of-the-Valley	H	F	1"	3-4"	late*	8"
Crocus species & hybrids	Crocus	H	F	2"	2-3"	very early to mid*	4"
Cyclamen species	Hardy Cyclamen	H	S	1-2"	6-8"	early-mid	4-5"
Endymion hispanicus	Spanish Bluebell	H	F	3"	3"	late	8"
Eranthus hyemalis	Winter Aconite	H	F	2"	3"	very early	4"
Fritillaria imperialis	Crown Imperial	H	F	6"	10"	mid	3'
Galanthus nivalis	Common Snowdrop	H	F	2"	2"	early*	6"
Hippeastrum hybrids	Amaryllis	T	S	see text	1'	late*	1-2'
Hyacinthus orientalis	Hyacinth	H	F	4"	5"	mid*	10"
Ipheion uniflorum	Spring Starflower	H	F	3"	6"	mid*	6"
Iris species & hybrids	Iris	H	see text	see text	see text	very early to late	see text
Leucojum vernum	Spring Snowflake	H	F	2"	3"	mid	9"
Muscari botryoides	Common Grape Hyacinth	H	F	3"	3"	early	5"
Narcissus species & hybrids	Narcissus, Daffodil, Jonquil	H	F	3-6"	3-6"	early-mid*	6-24"
Scilla siberica	Siberian Squill	H	F	3"	2"	early	4"
Tulipa species & hybrids	Tulip	H	F	4-6"	4-6"	early-late*	3-30"
Zephryanthes species & hybrids	Rain Lily	H	F	2"	3-6"	mid	6-8"
			[Summer Flowering]				
Achimenes hybrids	Widow's Tears	T	S	½-1"	3"	till frost	trailing vine
Agapanthus africanus	African Lily	S	S	see text	24"	till frost*	12-24"
Begonia x *tuberhybrida*	Tuberous Begonia	T	S	see text	12"	till frost*	12-18"
Caladium hortulanum	Caladium	T	S	1"	12"	—	1-2'
Canna x *generalis*	Canna	SH	S	4"	15-18"	till frost	1½-5'
Crinum bulbispermum	Milk-and-Wine Lily	H	S or F	6"	12-18"	mid	2-4'
Dahlia hybrids	Dahlia	SH	S	2-6"	12-36"	till frost	1-5'
Gladiolus x *hortulanus*	Gladiolus	SH	S	3-6"	6"	see text	1-5'
Hymenocallis narcissiflora	Peruvian Daffodil	SH	S	4"	12-15"	early*	18-24"
Lilium species & hybrids	Lily	H	early S or F	4-6"	9-18"	varies	2-6'
Lycoris squamigera	Magic Lily	H	F	5"	6"	mid	2'
Polianthes tuberosa	Tiberose	T	S	3"	6-8"	mid-late	1-4'
			[Fall Flowering]				
Colchicum autumnale	Autumn Crocus	H	F	4"	8"	early	8"
Crocus species	Autumn Crocus	H	F	2"	2-3"	early	4"
Cyclamen species	Hardy Cyclamen	H	S	1-2"	6-8"	early-late	4-5'
Lycoris radiata	Red Spider Lily	H	F	5"	6"	early	2'
Sternbergia lutea	Winter Daffodil	H	F	2"	3"	early	6"

Hardiness: T = Tender, S = Semi-hardy, H = Hardy; Planting Time: F = Fall, S = Spring
*May be flowered indoors out-of-season

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Planting and Care of Bulbs, Corms, Rhizomes, and Roots

Bulbous plants in the landscape can provide years of enjoyment if you follow the few steps listed below.

Tulips are among the most popular of the bulbous plants. But several other beautiful flowering plants come from true bulbs, corms, tubers, or rhizomes that provide color in the landscape. These include spring- and summer-flowering bulbs (daffodils, lilies, and hyacinths) and tubers (anemones), corms (gladiolus, crocus, and freesia), tuberous roots (ranunculus and dahlia), and rhizomes (cannas and callas). You can enjoy flowers throughout the spring and summer by using these different forms.

A true bulb is a miniaturized plant complete with flowers packed in its self-contained starter kit. Bulbs need several months for root growth to support the foliage and flower. *Note: For simplicity in this publication, the term "bulb" may include corms, rhizomes, or roots.*

Plant large masses of bulbs to appreciate the beauty. Before planting and to help determine your needs and keep the plants in harmony in your landscape, visualize what will be in leaf or bloom at the same time as the bulbs.

It is important when landscaping with bulbs to plant groups of 12 or more of the same variety. Massed flowers look better; avoid the polka-dot or soldier effect.

Plant tall bulbs (lilies, late tulips) in the background near landscape plants of a similar size. Some hardy bulbs grow and multiply for years when you plant them along with flowering annuals and shallow-rooted herbaceous perennials. Areas near shallow-rooted trees and woody ground covers (such as ivy and junipers) are not favorable for hardy bulbs.

When buying bulbs, always select ones that are firm and blemish-free. Remember, large bulbs produce large flowers.

Planting Time

Plant spring-flowering bulbs when the soil temperature is 40 to 45 °F. Bulb root growth occurs within this temperature range without the initiation and growth of the foliage. The ideal time for planting spring-flowering bulbs is mid October through November in north Mississippi and late December in south Mississippi. Plant summer-flowering bulbs after danger of spring frost.

Bed Preparation

If you are planting a large number of bulbs, prepare the beds 9 to 12 inches deep. Uniform bed preparation permits a uniform planting depth that helps ensure uniform flowering. Plant in well-drained soils.

Fertilization

Don't guess; soil test. Bulbs grow and flower well with a soil pH between 5.5 and 7.0. Phosphorus is important for proper root and flower development. Because phosphorus is not mobile in the soil, add it to the soil before planting. After planting, apply a complete fertilizer (such as 5-10-10 at 3 pounds per 100 square feet) in early spring before bloom for spring-flowering bulbs. For summer-flowering bulbs, apply 5-10-10 at 2 pounds per 100 square feet three times during the growing season at 6-week intervals.

If you plant bulbs with a bulb planter or trowel, apply one teaspoon of bone meal to the bottom of the planting hole 1 to 2 inches below the bulb.

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Spring-Flowering Bulbs

Tulips* (*Tulipa* sp.) – Treat large flowering tulips as annuals in most of Mississippi. You can leave them in the ground in plant hardiness zones 3 through 7, but performance usually decines after the first growing season. The largest flowers are produced the first spring after fall planting. Because the bulbs multiply, any later flowers are smaller. Plant the bulbs 5 to 8 inches deep (two and one-half times as deep as bulb is wide) and 4 to 6 inches apart. If you plant bulbs deeper, they tend to multiply less and produce large, beautiful flowers for years. Tulips require a cold rest period between seasons. If you dig the bulbs after the foliage dies, refrigerate them for 6 to 8 weeks at 40 to 45 °F before planting them in November and December. The many tulip varieties available today offer gardeners a choice of colors and a longer blooming season.

Daffodils (*Narcissus* sp.) – Daffodils are one of the most popular spring-flowering bulbs. Plant the bulbs in fall (October through November) 3 to 6 inches, depending on size of bulb (three times deeper than the diameter of the bulb). Space the bulbs 6 to 8 inches apart. You can plant daffodils in sun or light shade and leave in the ground where they multiply. When the flower size and number decline, dig the bulbs in late spring and separate them. It is important to wait until the foliage begins to yellow and wither to ensure optimum growth and development of the bulb. The presence of foliage helps in finding the bulbs underground.

Hyacinths* (*Hyacinthus* sp.) – Hyacinths smell sweet, announcing the arrival of spring. These bulbs are hardy in Mississippi. Leave them in the ground to multiply. Flower size may decline as the bulbs multiply. Plant hyacinth bulbs in full sun in the fall 3 to 6 inches apart and 3 to 5 inches deep. To have large flowers every year, dig the bulbs after the leaves wither, and replace them next fall with more large bulbs.

Crocuses* (*Crocus* sp.) – Crocuses are normally thought to be spring-flowering corms, but some offer midwinter blooms while others offer their beauty in the fall. Plant crocuses in full sun in early fall. Plant the corms 2 to 3 inches deep and 2 to 6 inches apart. Separate every few years after the foliage begins to wither.

Irises (*Iris* sp.) – Irises are persistent bloomers in the landscape, offering years of beauty with little attention. The principal types of iris are bearded, beardless, crested, and bulb. Plant heights range from 2 inches to 6 feet, depending on variety. Dig and separate every few years as the rhizomes become crowded.

Summer-Flowering Bulbs

Dahlias (*Dahlia* sp.) –- Dahlias are among the easiest garden plants to grow. The plants flower in virtually every color except clear blue, and flowers range in size from less than 1 inch across to those more than a foot in diameter. Plants normally bloom from midsummer until frost. You must dig and store the fleshy roots each year, since they are not winter hardy. Many varieties can be started from seed. When propagating roots, be sure a portion of the old stem remains attached. This ensures bud development of the new plant.

Gladioli (*Gladiolus* sp.) – Gladioli offer a wide array of colors and are often grown as cut flowers. The plants grow and flower best in full sun. To extend the flowering season throughout the summer, plant the corms at 7- to 10-day intervals until 2 months before the first frost is expected. Plant the corms 3 to 6 inches deep, depending on size of corm. To keep the plants erect, stake them or mound up additional soil around the plants when they reach a height of 12 inches.

Cannas (*Canna* sp.) – Cannas can be left in the ground in Mississippi throughout the year. Plant the rhizomes 2 to 4 inches deep and 12 to 18 inches apart. Plant in full sun. Propagate by dividing the rhizomes in the spring.

Caladium (*Caladium* sp.) – Caladiums are grown for their beautiful colored leaves. They provide beauty in full sun to heavy shade, depending on the species you select. Plant caladium tubers when the soil temperature is approximately 70 °F. Plant with the top of the tuber even with the soil surface and 8 to 12 inches apart. In the fall, dig the plants just before the first frost, and let the foliage wither in a protected place. Remove the foliage once it is dry, and store the tubers over winter at 55 to 60 °F. To encourage a single, large stem with leaves, remove all eyes except one before planting.

Daylilies (*Hemerocallis* sp.) – Plant the tuberous roots of daylilies ½ to 1 inch deep and 2 to 2½ feet apart. There are many colors and heights for any landscape. You can extend the early summer blooms for more than a month by choosing the right variety. Divide the clumps every 3 to 5 years.

**Tulip, crocus, and hyacinth bulbs are subject to bulb mite infestation in the field. These infestations can be carried over in storage. When buying bulbs, select only those that are of high quality and insect-free.*

Cultural Tips

- Provide plenty of phosphorus for the development of the underground storage organs.
- Soil test to insure proper soil pH is obtained and adequate fertility provided.
- Plant smaller bulbs, tubers, or corms more shallowly and closer together.

Methods of Planting

- Prepare a bed to plant bulbs in quantity.
- Plant bulbs two and one-half times deeper than their diameters.
- Bulbs may be planted individually by using a bulb planter to remove a core of soil and placing the bulb in the hole, or use a trowel to open a hole within the soil. Pull the trowel toward you to open the hole for placement of the bulb.
- For bulbs that are **rootless** at planting time, dig a wide-based hole and set bulb securely on soil.
- For bulbs **with roots**, make a ridge of soil and spread roots downward.
- After planting, thoroughly water the soil to establish good contact between bulb and soil and to provide enough moisture to initiate root growth.
- To extend the blooming period, plant bulbs at different depths. Location, such as sun versus shade, is an excellent way to vary the time of bloom up to 2 weeks.

Diseases, Disorders, and Insects of Bulbs

Name	Symptom or description	Control**
Anthracnose (tulips)	Small to large elongated dark lesions on the stem and leaf blades.	Remove and destroy infected parts. Spray with Ferbam, Mancozeb, or another fungicide approved for this use.
Basal rot (tulips)	A white to pink mold usually covers the bulbs.	Discard all infected bulbs, and treat healthy looking bulbs with a fungicide before planting (Thiram).
Leaf scorch (daffodils)	Resembles frost injury. The leaf tips may burn one-third of the way down.	Treat bulbs to kill fungus that may survive in the other scales. Bulbs may be soaked in a formaldehyde solution before planting.
Virus (all bulbs)	Variegation (breaking) may occur in the flower, yellow streaks may develop in the leaves, and plants are generally smaller and weaker.	No chemical control. Destroy all infected plants as they appear. Also control all sucking insects that can transmit a virus.
Tuber Rot (caladium)	A decay of the tubers may occur when in storage or during the growing season.	Select disease-free tubers and store properly. Soak tubers in a fungicide solution (Merteck 340-F or Ferbam) before storage. Remove any decayed tubers.
Leaf Spot (caladium)	Lower leaves may develop light tan to brown spots.	Leaf spots may occur but generally are not severe enough to warrant chemical control. Remove diseased leaves as they appear.
Leaf Burn (caladium)	Burning of margin of older leaves.	Usually due to lack of water.
Aphids (caladium)	Small soft-bodied insects found on either surface of the leaf. Insects may be green, pink to reddish brown, or black.	Spray with malathion.
Cutworms (caladium)	Damage by a chewing insect on young leaflets as they emerge from soil.	Dust 5 percent carbaryl (Sevin) at base of plant.
Thrips (caladium)	Young leaves show puckering, curling, or other abnormalities.	Spray or dust with carbaryl (Sevin).

***Use rates and frequency of materials listed as directed on container label.*

Revised by **Dr. R. Crofton Sloan**, Assistant Research Professor, North Mississippi Research and Extension Center, from an earlier version by **Dr. David Tatum**, former Extension Horticulturist.

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Amending the Planting Site For Landscape Plants

The soil around your home is the result of millions of years of weathering (biological, chemical, and physical), bedrock erosion, and human activities. Continually forming, soil varies from place to place based on the proportions (percentages) of sand, silt, or clay it contains. Various combinations of sand, silt, and clay result in different soil textures.

Soil Textures

A soil's texture reflects the fineness or coarseness of its soil particles. Sand particles are relatively large, making the soil more coarse; clay particles are considered fine-textured.

Soil texture affects a soil's ability to provide good air and water circulation. Desirable soil has the ability to hold water while allowing for adequate drainage. It also provides adequate oxygen for root development.

The amount of pore space between soil particles regulates the amount of air and water that is available to the plant. Large gaps between soil particles are normally filled with air. Small gaps between soil particles are normally filled with water.

Careful Planning

Before you ever begin to plant on your landscape site, assess your soil type and its water drainage pattern. Then you can plan how to improve the soil's texture and how to correct any drainage problems you may have. By adding amendments and improving the soil, you will have a better chance of success with your landscape planting.

Assessing Soil Drainage

Two methods make it easy to determine how well water drains from the soil. In the first method, use a large (46-oz size) coffee can or other container. Remove the top and the bottom of the can. Dig a hole 4 inches deep, and set the can on the floor of the hole. Firm the soil around the can so that water can't slip under the bottom edge. Fill the can with water to the top. Wait 1 hour then measure the water level. If the water level has dropped at least 2 inches in 1 hour, the drainage is normal. If the level drops more than 5 inches in 1 hour, the drainage is excessive. If the water doesn't seem to drain at all, poor drainage is a problem. Using the second method, dig a hole 1 foot deep and 1 foot wide and fill it with water. If all the water has not drained within 6 hours, the soil has poor subsurface drainage.

Planting in Poorly Drained Soils

Clay soils usually result in poorly drained planting sites unless steps are taken to correct the situation. If the planting site does not allow for surface drainage to remove excess water, some alternatives exist for altering the site: installing a French drain or making a raised bed or a berm.

A French drain is installed to remove the water through a network of drains. There must be a point lower than the landscape site for the water to drain to. A French drain involves digging a trench, filling it partially with gravel, and laying pipes to carry away the water.

Another alternative is to plant in a raised bed. The raised bed should at least

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12 inches high. The raised bed can either be enclosed using treated lumber or it can be a mound of soil called a berm. A large berm can be prepared ranging from one to several feet tall. Such structures are large and should complement the landscape. See the illustration of a berm.

If planting directly on heavy clay soil, incorporate a 3-inch layer of new soil to form a transition layer. A sudden change in soil texture will disrupt the flow of water through the soil, possibly causing a stagnant area beneath the new soil.

Adding amendments to the soil may help correct your subsurface drainage problems.

Soil Amendments

If you want to improve your soil by modifying it, choose the amendment materials carefully. Remember, the young plant eventually will send out its roots beyond the planting hole. You want to create a balanced medium in the planting hole, allowing for good water drainage and air circulation. When the plant grows an extensive root system, you want the plant's roots to be able to penetrate easily beyond the growing medium into the surrounding soil.

When improving the soil, you can add peat moss or other soil structure improvers to the growing medium. Ideal soil consists of 15 percent air, 50 percent solids, and 35 percent water.

The addition of organic matter such as pine bark (less than one-half of an inch in diameter), or sharp sand is recommended for clay soils. Amend clay soil with 2 to 3 inches of pine bark per 6-inch depth. Add sharp sand at the rate of 3 to 4 inches per 6-inch layer of clay soil.

Amend sandy soil to a 6-inch depth with 1 to 2 inches of peat moss or compost.

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Caladiums for the Landscape

Caladiums are tropical foliage plants, discovered within the Amazon basin of Brazil. Now, widely grown for their colorful leaves, they are used as pot, border, and bedding plants. Mass plantings are used to create a focal point in the landscape. Colorful caladiums provide a striking contrast with the green foliage of other plants, especially when caladiums are planted in the foreground. Count on caladiums to provide summer color in shaded areas where sun-loving flowers won't grow.

Fancy- and strap-leaved varieties are the two main types of caladiums and are distinguished by leaf size and shape. Fancy-leaved types have large heart-shaped leaves, grow best in semishade, and may reach a height of 12 to 30 inches, depending on variety and growing conditions. The strap- or lance-leaved types have narrow, elongated leaves and perform best as accent plants in borders, in hanging baskets, and in patio planters.

Varieties exhibit combinations of shades of red, pink, or white, with prominently colored midribs and contrasting backgrounds and borders. The variation in leaf color and pattern provides many uses for caladiums in the landscape.

Nurseries and garden centers offer caladiums as potted plants or dormant tubers. Tubers are available in four different sizes based on diameter and are priced accordingly. Tuber sizes are classified as mammoth, 3.5 inches and up; jumbo, 2.5 to 3.5 inches; No. 1, 1.75 to 2.5 inches; and No. 2, 1.25 to 1.75 inches. Large tubers have more leaf buds than small tubers and, therefore, make larger and better displays.

Caladiums require a warm, moist soil to grow. A minimum soil temperature of 70 degrees Fahrenheit is preferred. Planting in cool soil results in slow growth or tuber rot. A good rule of thumb in determining when to set out caladiums is to plant them when you plant okra seed in the vegetable garden.

Each caladium tuber has a large central bud surrounded by several small buds. Most caladium varieties produce only a few colorful leaves if the large central bud is allowed to grow. Its presence prevents the small buds from growing and producing leaves. The small buds are encouraged to grow when the large central bud is removed before planting the tuber in a process called “de-eyeing.”

Commercial caladium plant producers do this, and so can gardeners. Hold the tuber with four fingers and leave your thumb free to remove the large, central bud. It should snap off fairly easily if the tuber is heathy. De-eyeing also reduces flower production, which some gardeners prefer. Caladiums have traditionally needed protection from full sun for best growth and color, but some of the newer varieties tolerate exposure to full sun for a couple of hours daily.

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See variety descriptions at the end of this information sheet.

For best growth, plant caladiums in porous soil that contains plenty of organic matter, with a pH between 6.0 and 6.5. Peat moss or other organic materials such as compost can be used to increase the soil's organic matter content and decrease soil pH. Plant tubers 2 to 3 inches deep and, depending on their size, 8 to 12 inches apart. At planting time, incorporate a complete nursery special fertilizer into the soil at a rate of 1 to 2 pounds per 100 square feet of bed area. Follow this with 1 pound of fertilizer each month during the growing season. Make proportional reductions in amounts of fertilizer for smaller areas. Do not allow fertilizer to contact the caladium leaves. Water thoroughly after fertilization to prevent fertilizer burn.

Mulch caladium plants when they are established to keep the soil moist and cool. Soil temperatures over 85 °F can result in leaves with more green color and less of the highly prized brilliant colors. High levels of nitrogen fertilization can produce the same effect.

Most caladium plants will produce flowers during the growing season. The presence of the greenish-white flowers slows production of the colorful leaves, and flowers should be removed as soon as detected.

Caladiums can be treated as annual plants and left in the garden at the end of the season to be killed by cold weather. However, it is possible to save caladium tubers for planting again the following year. At the end of the growing season, but before the leaves have lost all color and before soil temperatures drop below 55 °F, dig the tubers that are to be saved, retaining the foliage, and sort them by color or variety. Spread them out in an area protected from rain and cold, and allow them to dry for a week. Cut or pull the dry foliage from the tubers and remove all dry soil. Place the tubers in a mesh sack and store them where the temperature does not fall below 60 °F.

Diseases of Caladiums

Tuber Rot

Tubers may decay when in storage or during the growing season. Several organisms cause tuber rot. Bacteria cause a soft rot and slimy decay, while fungi cause a dry and chalky rot. Select disease-free tubers for planting. Store tubers properly to avoid high humidities and cool temperatures. Never store caladium tubers in the refrigerator. Tubers purchased in early spring, before ideal planting time, should be held at room temperature.

Leaf Spot

An anthracnose fungus has been found to attack caladiums, and lower leaves may develop light tan-to-brown spots. Generally, the disease is not severe enough to warrant chemical control. Remove diseased leaves as they appear.

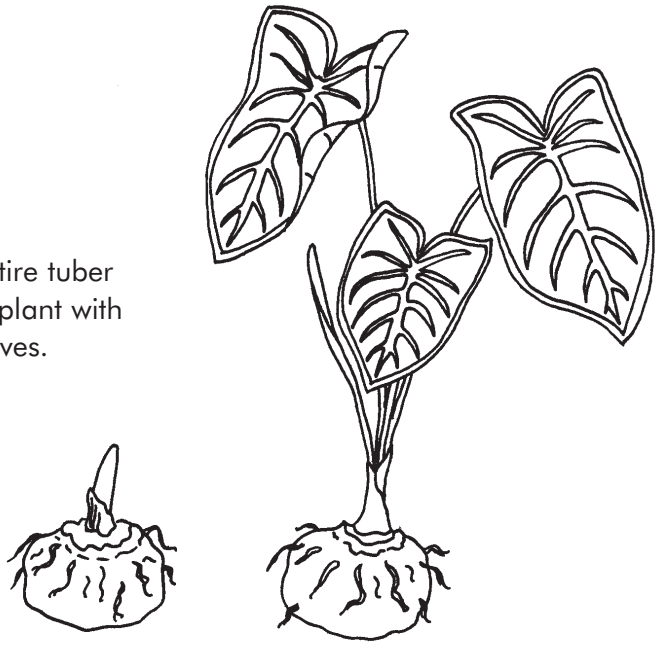
Leaf Burn

Burning of the margins of older leaves and scorching of leaves usually are the result of foliar application of fertilizer, watering during the hot part of the day, or a lack of water.



Preparation of caladium tubers for planting

Planting the entire tuber will produce a plant with a few large leaves.



Removing the central or dominant bud(s) will allow the tuber to produce many small shoots and leaves.

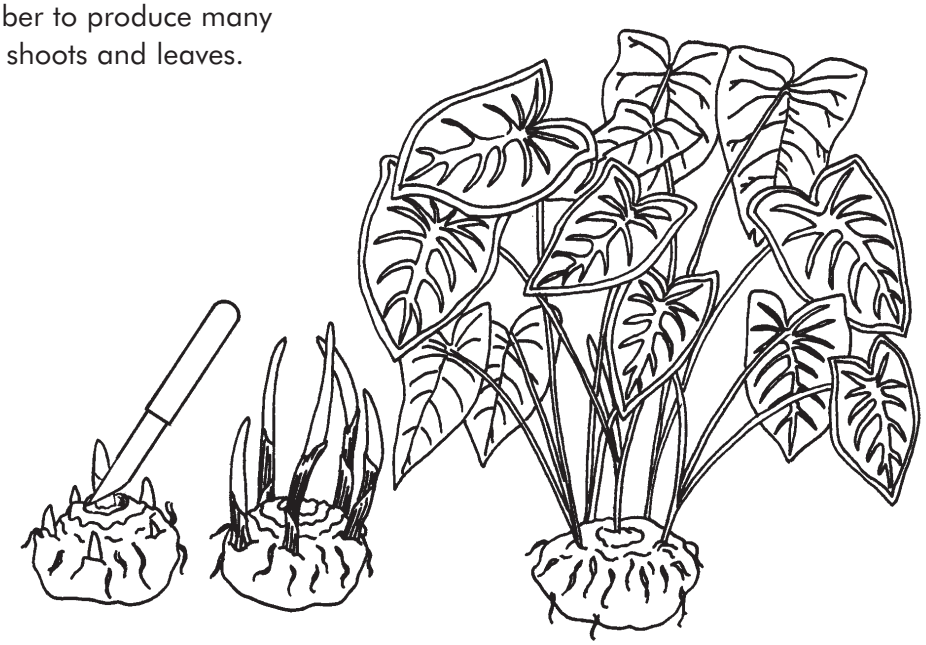


Table 1. Caladium Varieties for Mississippi Landscapes

Variety	Fancy-leaved
Aaron	white with green margin some sun tolerance
Candidum	white with green veins
Florida Fantasy	white with red veins
June Bride	white with green margin
Marie Moir	whitish green with red spots
White Christmas	white
White Queen	white with red veins, some sun tolerance, more red with shade
Carolyn Whorton	pink with red veins and green margin
Fannie Munson	pink
Fire Chief	dark pink, limited sun tolerance
Pink Beauty	pink, lighter than Fannie Munson
Pink Cloud	pink, green margins, some sun tolerance
Gypsy Rose	pink veins with green blotches
Freida Hemple	deep red (lighter than Postman Joyner) with green margins, no sun tolerance
Kathleen	red with green margin
Postman Joyner	dark red with green margin
Red Flash	dark red, fuchsia spots, green margin, good sun tolerance
Rosebud	red with green margin
Variety	**Strap-leaved**
Caloosahatchee	white with green margin
Candidum Jr.	dwarf white with green vein
Gingerland	white with red blotches and green margin
White Wing	white with green margin
Florida Sweet Heart	mauve pink with green margin
Pink Gem	pink, excellent for basket
Pink Symphony	pink with green veins
Lance Whorton	red with white blotches and green margin
Red Frill	red, excellent for basket
Rosalie	red with green margin
Miss Muffett	dwarf green with white veins and red blotches, no sun tolerance

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Revised by **Mengmeng Gu, Ph.D.**, assistant Extension professor, Plant and Soil Sciences. By **David H. Tatum, Ph.D.**, Extension Horticulturist, and **Milo Burnham, Ph.D.**, Extension Leader-Horticulture (retired), Department of Plant and Soil Sciences; **Mukund V. Patel**, Extension Plant Pathologist (retired), Department of Entomology and Plant Pathology

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Landscaping to Conserve Energy

Proper Landscaping

Too frequently people do not use landscape plants to conserve energy. Proper placement of trees, shrubs, and vines around a house conserves energy while adding beauty. Trees are the number-one landscape plant used in energy conservation in the home landscape.

Trees placed properly within the landscape can be as effective as other home improvements in reducing heating and cooling costs. Good selection and placement of trees within the landscape can help cool your house in summer and allow the sun's rays to warm your house in winter. They also can absorb carbon dioxide, reduce the greenhouse effect, and produce oxygen for us to breathe. Trees and other plants can shade houses and office buildings. This benefit reduces air conditioning needs up to 30 percent because less electricity is required for cooling.

Trees can add to the value of property, as well. Well-landscaped property has more curb appeal and can increase residential property values up to 15 percent over property that is not landscaped.

To install properly an energy conserving landscape, you must understand the different positions of the sun at various times of the year. Figure 1 shows the movement of the sun in mid-December (winter solstice). Notice that the sun rises in the southeast and remains low in the sky during the day. The winter sun sets in the southwest. Figure 2 shows the position of the sun on June 22 (summer solstice). The sun rises in the northeast and appears higher overhead at midday. The sun sets in the northwest during summer.

Solar Angle for 32° Latitude North

Figure 1

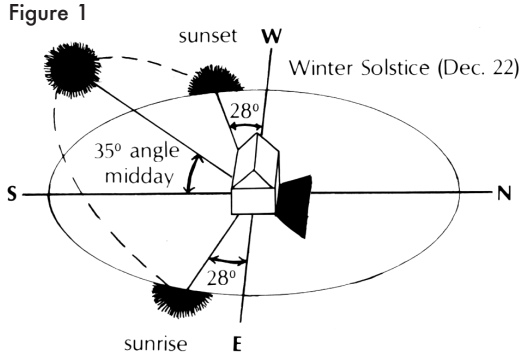
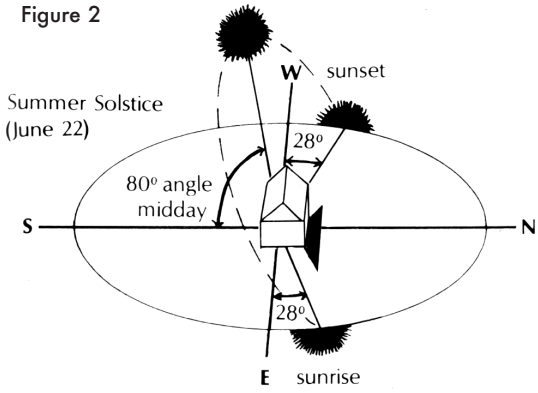


Figure 2



Planning for Summer Shade

Place trees around the house to provide shade from hot morning and afternoon sun. Trees on eastern and northeastern exposures of the house provide morning shade in summer. Trees placed on western and northwestern exposures of the house provide shade during afternoons, as shown in Figure 3. Increase the effectiveness of the cooling effect by having a shrub or a vine shade east and west walls. You can grow vines on masonry brick or concrete walls, but do not allow them to grow directly on walls with wood sidings. Provide a simple trellis for wooden sidings.

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Planning for Winter Sun

Effective tree placement will allow the winter sun to warm the roof and walls of your house. As you can see in Figures 1 and 2, the southern exposure is intense in Mississippi. The most important factor to consider in placing trees on the south side of your house is the use of deciduous tree species. Deciduous trees lose their leaves in winter and allow the sun to warm houses.

Avoid using evergreen trees such as pine, American holly, magnolia, and cedar on the south side of your house. These trees remain green all year, shading the house from the sun in the winter. Houses on properties with a heavy cover of pine trees result in winter shade. Provide winter sun by removing pines that are too close to your house. You can use deciduous trees to provide needed shade for summer.

Placing Trees for Wind Protection

Proper tree placement reduces the effect of winter winds on a house and therefore conserves heat. In most areas of Mississippi, winter winds prevail from the north and from the northwest. A screen planting of evergreen trees along the north and northwest areas of your property will provide wind protection. Figure 4 shows how the planting controls air flow.

Notice that the protected or void area is approximately two times as deep as the height of the trees. The "thumb rule" for placing the trees is to make the protected or void area twice as deep as the trees are tall. Remember, newly planted landscape trees and shrubs will grow in maturity to greater heights. Be sure you place them according to their expected mature sizes.

Planning for Cool Summer Breezes

In most areas of Mississippi, prevailing summer winds are provided by the Gulf breeze from the southwest and from the south. To take advantage of cool summer breezes, avoid dense screen plantings on the southwest and south sides of your property. Prune deciduous trees on the southern exposure of your house to the height of the roof's drip line to provide free air movement into the house.

Tips for Placing Trees for Energy Conservation

- Avoid placing trees too close to a house. Usually 25 feet from the walls or the roof line is adequate.
- Avoid placing trees directly under power lines or over underground sewer, water, or utility lines.
- Space trees properly according to their anticipated mature size.
- Avoid using evergreen species on the south side of a house. Use shrubs or vines to protect east and west wall exposures. Be conscious of where the sun will be at various times of the year.

Figure 3

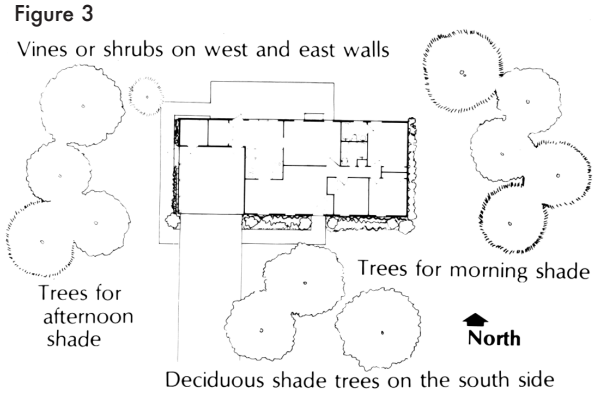
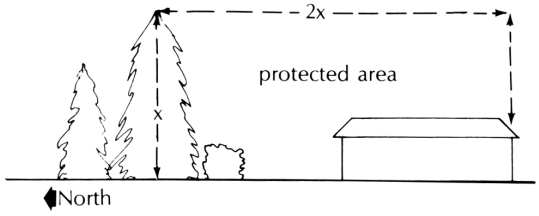


Figure 4



Revised by **Mengmeng Gu, Ph.D.**, assistant Extension professor, Plant and Soil Sciences. Original manuscript written by Jim Perry, landscape architect, and revised by **David Tatum, Ph.D.**, state nursery specialist, and **Norman Winter, Ph.D.**, horticulture specialist, Plant and Soil Sciences.

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Fertilizing Ornamental Trees & Shrubs

Fertilize when shrubs and trees are actively growing. In most areas of Mississippi, the best times to fertilize are from April through October. In the Gulf Coast counties, the best times are from March through October. Young plants are small and growing actively, and they require more fertilizer than mature, established plantings.

Mature, Established Plantings

Well-established shrubs and trees approaching maturity benefit from an annual application of fertilizer in early spring (March 15 through May 30). Mature plants in extremely sandy soils may need an additional application in late summer (August 15 through September 15).

New Plantings

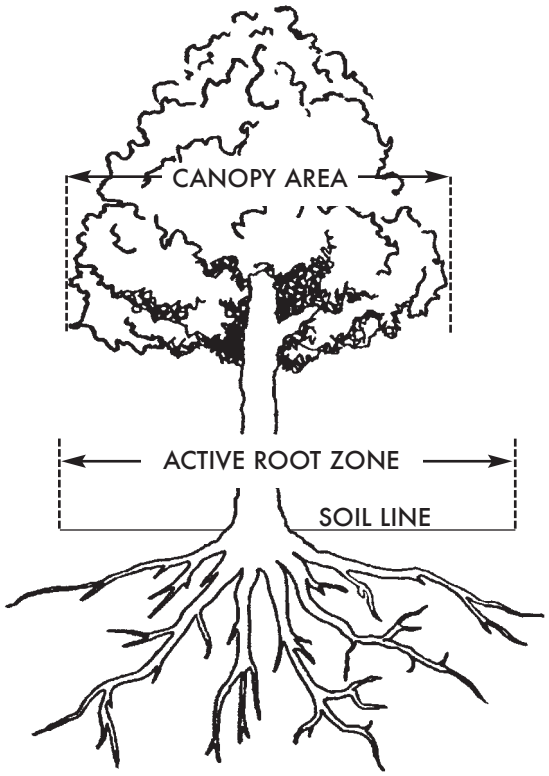
Don't fertilize newly transplanted trees and shrubs for at least 4 weeks after planting. By this time, the root system is growing and can absorb nutrients to stimulate new growth and encourage rapid development. Fertilize young plants at several regular intervals during the first, second, and third growing seasons. After the third growing season, reduce the fertility program to one annual application.

Fertilizer Sources and Rates

Complete fertilizers containing nitrogen, phosphorus, and potassium (potash) can be used on trees and shrubs. These fertilizers (or any fertility addition) introduce nutrients into the environment. Take care to avoid overapplication. Phosphorus and potassium may not be needed in your soil. Base the fertilizer application rates on current soil tests. Follow the chart with this publication to select a fertilizer. You must control soil erosion and water runoff to minimize potential nutrient loss. Information on soil testing is available at your county Extension office or online at http://msucares.com/crops/soils/testing.html.

Where To Place the Fertilizer

The easiest way to apply fertilizer is by broadcasting (spreading evenly) the material on the soil surface of the planted areas. The active root zones of ornamental trees and shrubs include all the soil area from the trunk out past the foliage canopy and often beyond.



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Fertilization Schedule

Kind of Planting	First Application	Second Application
Newly planted trees and shrubs (established less than 3 years)*	Beginning 4 weeks after transplanting or March 15 through May 3	August 15 through September 15
Mature trees and shrubs (or plants established for 3 years or more)	March 15 through May 30	Usually not needed unless soil testing indicates deficiencies

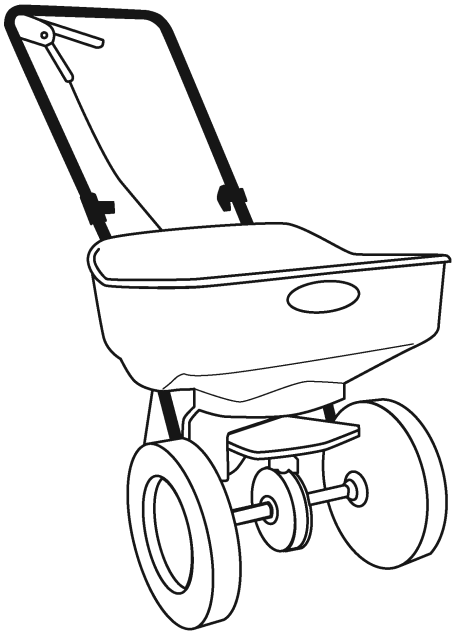
*After the plants have been established for 3 years, consider the planting well-established, and fertilize as for mature trees and shrubs.

How To Apply Fertilizer

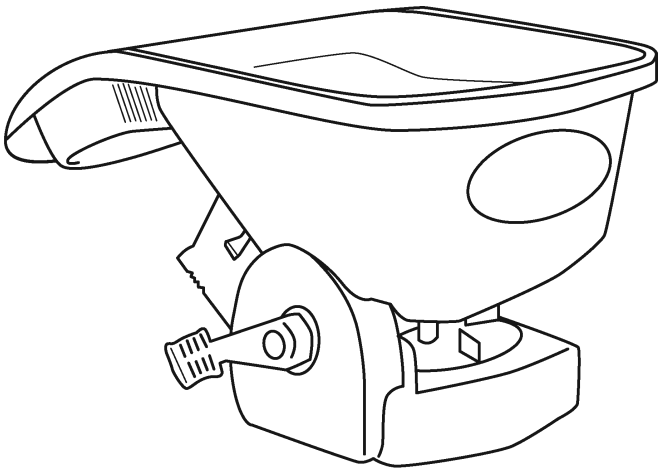
Using any type of fertilizer spreader is better than broadcasting by hand. There are many types of spreaders available from retailers, and a homemade spreader is easy to make. An empty coffee can with a plastic lid makes an excellent fertilizer applicator. Cut holes in the plastic top to make a shaker. Measure and weigh the material needed for your planting area. Place the fertilizer in the can and apply it to the appropriate square footage of planting area. In most cases you must refill the can several times to apply all the materials needed.

Apply the material only when the soil is dry. Make sure the foliage and stems of the plant are dry, too. Always apply the fertilizer evenly. Do not let fertilizer fall on nonsoil areas, such as sidewalks or streets. Avoid a concentrated ring of fertilizer around any shrub, because this could cause root burn. Avoid placing fertilizer in direct contact with the foliage or the main trunk of the plant.

After applying fertilizer, water the plants and soil thoroughly. This will dissolve most of the material and carry it into the root zone where it can be absorbed. In addition, it can help avoid burning roots near the top of the planting area. Never use more than the recommended rate.



Commercial push fertilizer



Commercial hand fertilizer

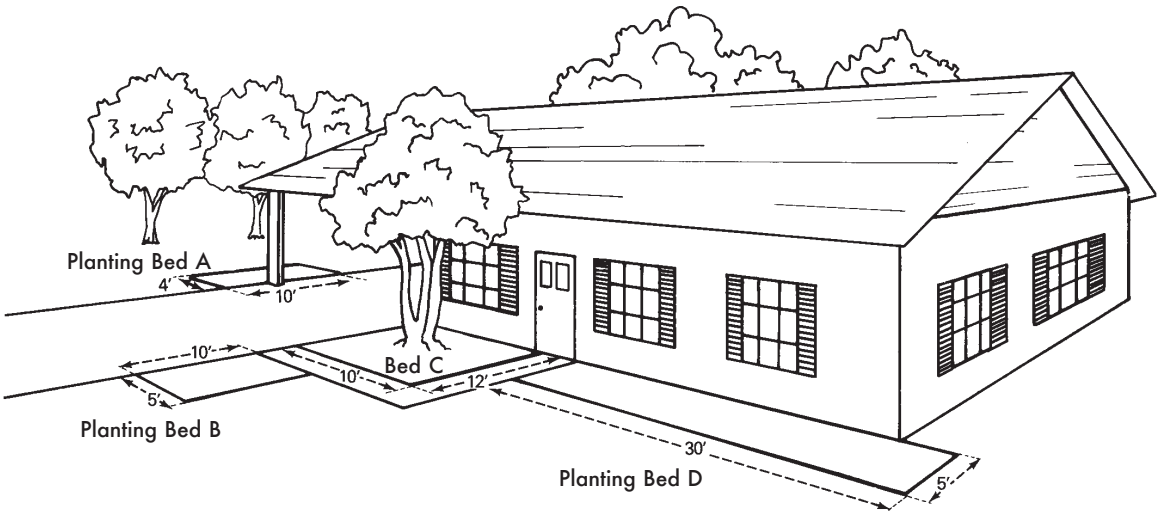
Recommended Fertilizers and Rates

Analysis (N-P-K)	Application Rate (lb/100 sq ft of soil area)
5-10-5	11/2 to 2
6-8-8	1 to 11/2
8-8-8	1
10-10-10	1

Numbers higher than 10-10-10 not recommended. One quart of complete fertilizer (6-8-8, 8-8-8) weighs 2 pounds.

Examples (Using 8-8-8 Fertilizer)

Planting Bed	Measured Length	x	Measured Width	=	Square Footage	x	Rate	=	Amount
A	10 ft	x	4 ft	=	40 sq ft	x	1 lb/100 sq ft	=	0.4 lb
B	10 ft	x	5 ft	=	50 sq ft	x	1 lb/100 sq ft	=	0.5 lb
C	10 ft	x	12 ft	=	120 sq ft	x	1 lb/100 sq ft	=	1.2 lb
D	30 ft	x	5 ft	=	150 sq ft	x	1 lb/100 sq ft	=	1.5 lb
							Total Needed	=	3.6 lb





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Revised by **Dr. Mengmeng Gu**, assistant Extension professor, Plant and Soil Sciences. From an earlier revision by **Dr. David Tatum,** Extension professor, and **Dr. Keith Crouse,** assistant Extension professor, Plant and Soil Sciences

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