

Tropical Soda Apple (*Solanum viarum* Dunal) Identification and Control

INTRODUCTION

Tropical soda apple, *Solanum viarum* Dunal (Solanaceae), a perennial shrub native to Brazil and Argentina, has become a weed in several countries, including the United States. Tropical soda apple is a Federal Noxious Weed and has been listed as a noxious weed by several states, including Mississippi.

Tropical soda apple infests pastures and other areas inhabited by livestock, but it can also occur in wooded areas. The primary method of plant dispersal is livestock or wildlife feeding on

However, equipment, hay, crop seeds, composted manure, and sod may also serve as a means of dispersal if contaminated with tropical soda apple seeds. Once established in an area, tropical soda apple continues to spread because of consumption by wildlife.

Since tropical soda apple is an alternate host to several viral diseases and pathogens that attack vegetable crops, it is a threat to the vegetable industry. Many vegetables that are also members of the nightshade family, such as eggplant, peppers, potatoes, and tomatoes, can be negatively affected by diseases transmitted from tropical soda apple.

IDENTIFICATION

Mature tropical soda apple plants are 3 to 6 feet tall. Leaves, stems, pedicles, petioles, and calyxes contain broad-based, white to yellowish, thorn-like prickles that may be as long as $\frac{3}{4}$ of an inch. Leaves and stems are densely covered with short hairs. The flower petals are white and curve backwards, and the stamens are white to cream-colored and surround a solitary pistil.



If left undisturbed, tropical soda apple can grow into a large “bushy” plant, such as this one.

mature fruits of the plants that contain seeds. Scarification of seeds by digestive systems of animals and birds seems to promote seed germination. The movement of livestock between states and counties with tropical soda apple seeds inside their digestive track contributes to the spread of tropical soda apple.



Immature fruit of tropical soda apple (left) are green and white, and have a mottled appearance. When the fruits become mature, they are a bright yellow in color (right).



Tropical soda apple flower petals (left) curve backward while horsenettle flower petals (right) do not.

Immature fruits are smooth, round, and mottled whitish to light green and dark green, like a watermelon. Mature fruits are yellow, $\frac{3}{4}$ to $1\frac{1}{4}$ inches in diameter, and have a leathery-skin surrounding a thin-layered, pale-green, scented pulp. The fruit contain 200 to 400 flat, reddish brown seeds that can remain viable in the soil for two years. Each plant is capable of producing 200 or more fruit per year.

Tropical soda apple is a shallowly-rooted perennial. In severe winters, above-ground stems will be winter-killed, but new stems will emerge from fleshy roots the following spring. Plants in pastures that are mowed will be wider than tall and can be 10 feet across.



Tropical soda apple leaves (left) droop downward while horsenettle leaves (right) point upward.

Of the nightshade plants that naturally occur in Mississippi, tropical soda apple most closely resembles horsenettle, *Solanum carolinense* L. (See Table 1 for a comparison of characteristics of tropical soda apple and horsenettle.)

TROPICAL SODA APPLE OCCURRENCE IN THE UNITED STATES

The first know collection of tropical soda apple in the United States was from Florida in 1988. Since that time, tropical soda apple has spread rapidly, and now occurs in Alabama, Florida, Georgia, North and South Carolina, and Mississippi. In order to detect and prevent further spread of this weed in the United States, State Extension Services, the Agricultural Research Service (ARS) and the Animal and Plant Health Inspection Service (APHIS) of the U.S. Department of Agriculture have initiated an education and notification campaign on tropical soda apple.

Early detection is paramount to eliminate the threat of this weed, which has the potential to infest millions of acres of pastures, crops, forests, and natural areas in the U.S. Individuals who find tropical soda apple should contact their county agent

or the Bureau of Plant Industry at (662) 325-3390 to verify the identity and begin control measures.

CONTROL METHODS FOR TROPICAL SODA APPLE

To prevent tropical soda apple spread within a farm or community, steps should be taken to minimize seed production. Mowing is an effective practice to prevent seed production, even after initial flowering has started, although plant regrowth will occur and the practice should be repeated when plants start flowering again. Plants discovered with mature fruits should be cut, piled, and burned to destroy seed viability, or buried more than 3 feet deep.

Chemical treatments can be effective for tropical soda apple control. Triclopyr (**Remedy**®) is very effective for control of emerged tropical soda apple when applied at 1 quart per acre or 1 to 1.5 percent solution with ¼ percent nonionic surfactant. However, if plants have been established long enough to release seed, the site should be frequently re-inspected and newly emerged seedlings treated. As an alternative, 1.5 to 2 quarts per acre or a 1 percent solution of 2, 4-D plus picloram (**Grazon P+D**®) with ¼ percent nonionic surfactant can be used for tropical soda apple control.



Another view of the leaves of a tropical soda apple plant. TSA plants can reach up to 6 feet in height.

TABLE 1. A COMPARISON OF TROPICAL SODA APPLE AND HORSENETTLE FEATURES

FEATURE	TROPICAL SODA APPLE	HORSENETTLE
Mature plant height	to 6 feet	to 4 feet
Leaf orientation	drooping	upward
Flower petal color and shape	white, curve backward	white or purple, lay flat
Fruiting pattern	usually singular	usually clustered
Fruit size at maturity	up to 1-inch diameter	up to 1/2-inch diameter
Stem diameter at soil level	to 1 inch	to 1/4 inch
Stem color at soil level	green	brown
Longest leaf prickles	1/2 to 3/4 inch	1/4 to 3/8 inch
Root system	shallow to 6 inches	deep to 3 feet
Immature fruit color	green-and-white mottled	light-and-dark-green mottled
Fruit color at maturity	yellow	yellow