

Study guidelines for license exam GRC (General pest and rodent control)

Some information you should have knowledge of before taking the license examination for General pest and rodent control.

This outline may be used as a study guide for the license examination General pest and rodent control. The Mississippi Bureau of Plant Industry is providing a list of subject areas you need to study for the license examination.

A copy of the Regulations Governing Commercial Insect, Rodent, Plant Disease and Weed Control Work can be found at The Mississippi Department of Agriculture and Commerce, Bureau of Plant Industry website, <http://www.mdac.ms.gov/wp-content/uploads/11-Regulation-of-Professional-Services.pdf>. **Please note that you should be familiar with the topics in this outline, but there is no guarantee that all the topics listed, or only the topics listed will be included on any Licensing examination.**

1. You should be thoroughly familiar with the Regulations Governing Commercial Insect, Rodent, Plant Disease and Weed Control Work. Topics include, but are not limited to:
 - Definitions
 - Licensing requirements
 - Licensing renewal requirements
 - Violations
 - Bond requirements
 - Insurance requirements
 - Record keeping
 - Record access
 - Pesticide storage and transport
 - Registered technician training standards
 - Equipment
 - Expiration of a registered technician and conditions of renewal

2. Insects: structure, function and development

External morphology: head, thorax and abdomen.

Internal morphology: respiratory (spiracles), circulatory, nervous, excretory, digestive, muscular and reproductive systems

Metamorphosis:

Without
Gradual
Incomplete
Complete

Be able to ID, know typical habitat, life cycle and management strategies of the following:

3. Cockroaches

General biology, behavior, management, ID egg capsules, nymphs, and adults of:

German
American
Oriental
Brown-banded
Smoky-brown
Woods
Asian
Cuban

Terminology: Thigmotaxis, Frass, Omnivorous, Ootheca

4. Ants

External and internal morphology of: wings, antennae, and body structure

5. Fleas

Life cycle
Feeding habits of larvae and adults
Hosts
Management strategies

6. Varied carpet beetles
Feeding habits
Control strategies

7. Mosquitoes

Life cycle
Habitat
Feeding habits of: males and females
Diseases transmitted by
Management strategies

8. Diptera

Flesh flies; Bottle flies; House flies; Deer flies; Horse flies; Black Soldier flies; Blow flies; Black flies; Midges; Face flies; Sand flies; Fungus gnats; Moth/drain flies; Fruit flies; Hover flies; blood worm; midge larva; Filth flies; Phorid flies; black soldier fly larva

9. Hymenoptera

Carpenter bees; Bumble bees; Bald-faced hornet; Paper wasps; Honey bees; European hornets; Yellowjacket; Cicada killers; Velvet wasps; Mud dauber wasps; Horntails; Potter wasps; Mason wasps; Argentine ant; Pharaoh ant; Imported fire ant; Acrobat ant; Odorous house ant; Dark rover ant; Carpenter ant; Pavement ant; Leaf-cutting ant; Harvester ant

10. Orthoptera

House crickets; Field crickets; Mole Crickets; Camel crickets

11. Dermaptera

Earwigs

12. Psocoptera

Psocids

13. Collembola

Springtails

14. Hemiptera
Chinch bugs; Boxelder bugs; Bed bugs;
Reduviid bugs; Kudzu bug
15. Coleoptera
Japanese beetles; Ground beetles;
Scavenger beetles; Fungus beetles;
Stored grain insects
Confused flour beetle; Rice weevils
Sawtoothed grain beetles
Red flour beetle
Mealworms; Sugarcane beetle
Asian lady beetle
Drugstore beetle; Cigarette beetle
16. Lepidoptera
Saddle back caterpillars; Puss caterpillars
Webbing clothes moth
Mediterranean flour moth;
Casemaking clothes moth
Indian meal moth
17. Thysanura
Silverfish; Firebrats
18. Occasional Invaders
Mites; Centipedes; Millipedes; Sowbugs;
Pillbugs; Scorpions; Snails; Slugs;
Amphipods; House centipede
19. Spiders
Brown recluse, black widow
brown widow, wolf, crab, jumping,
common house spider
Common habitat for each
Venom and effect on humans:
Brown recluse
Black widow
Brown widow
Control strategies

20. Ticks
Black legged deer tick
American dog tick
Brown dog tick
Lone star tick
Life cycle
Hosts
Diseases transmitted by
21. Rats
Roof rat; Norway rat
Behavior
Habitat
Diseases carried by
Fecal dropping ID
Control strategies
Terminology: neophobic
22. Mice
House mouse
Behavior
Life cycle
Life span: Indoors vs. the wild
Fecal dropping ID
Control strategies

23. Rodenticides. Be thoroughly familiar with different classes, common product trade names and modes of action.

First Generation Anticoagulants:

Warfarin, Chlorophacinone, Diphacinone

Second Generation Anticoagulants:

Brodifacoum, Bromadiolone

Difenacoum, Difethialone

Non-anticoagulants:

Bromethalin, Cholecalciferol

Zinc Phosphide

24. What is FIFRA?

25. Urban Pest Birds and Urban Wildlife
- Snakes
Poisonous vs. nonpoisonous
Control strategies
- Bats
Control strategies; Rabies
Chiroptera means winged-hand
- Birds
Pigeons; Sparrows
Disease transmission
Common species that carry diseases
Control strategies
- Misc. wildlife management strategies
- | | |
|----------|-----------|
| Moles | Squirrel |
| Raccoons | Opossums |
| Skunks | Chipmunks |
26. Pesticides
Know how to interpret the label
LD50 interpretation – What is it?
Be able to interpret values as:
Slightly toxic
Moderately toxic
Highly toxic
Signal word interpretation
Formulations effectiveness on specific pests
Surface spot treatment
Common volume conversions
Liquid pint to fluid ounces
Liquid quart to fluid ounces
- Insecticides
Larvicides
Ovicides
Nematicides
Acaricides – controls mites
Botanicals (oldest pesticide)
Insect growth regulators (Methoprene)
Inorganics (boric acid)
Terminology: Synergist
Pesticide mixing; Pesticide application;
Pesticide cleanup; Pesticide transport;
Pesticide spills; Pesticide disposal;
Pesticide safety

27. Calculations involving barrier, aerosol and crack and crevice treatments

28. Presented on exam as Photo ID:

Varied carpet beetle
Carpet beetle larva
Drugstore beetle
Yellowjacket nest entrance
Ground beetle
Asian lady beetles
Rice weevil
Maize weevil
Red flour beetle
Bed bug
German cockroach
American cockroach
Brown banded cockroach
Cuban cockroach
Oriental cockroach
Black carpenter ant
Argentine ant
Imported fire ant
Acrobat ant
Eastern subterranean termite swarmer
Asian tiger mosquito
Drywood termite fecal pellets
Flea
Phorid fly
Blow fly
Flesh fly
Moth (drain) fly
Black soldier fly larva
Paper wasp
Velvet wasp
Carpenter bee
Field cricket
Camel cricket
Mole cricket
Earwig
Springtail
Indian meal moth
Webbing clothes moth
Cakemaking clothes moth

Centipede
Pillbug
House centipede
American dog tick
Lone star tick
Black legged deer tick
Formosan termite swarmer
Pigeon
Mole
Bat
Southern unstriped scorpion
Spider beetle
Wolf spider
Brown widow spider
Brown recluse spider
Jumping spider
Long bodied cellar spider
Silverfish

Rodenticide Risk Mitigation Decision Compliance



- This document applies only to rodenticide baits labeled for use against house mice, Norway rats and roof rats (commensal rodents) containing any of the ten currently registered active ingredients (AI):
 - **First Generation Anticoagulants:** *Warfarin, Chlorophacinone, and Diphacinone*
 - **Second Generation Anticoagulants:** *Brodifacoum, Bromadiolone, Difencoum, and Difethialone*
 - **Non-Anticoagulants:** *Bromethalin, Cholecalciferol, and Zinc Phosphide*
- **Does not** apply to rodenticides labeled only for rodents other than commensal rodents such as voles, ground squirrels and pocket gophers.
- **Does not** apply to commensal rodent tracking powders as these products were re-registered separately (with new label language) in 2009.

Products in the Marketplace:



- Manufacturers were required to have products comply with the RMD by June 4, 2011. Non-compliant products could not be shipped after that date.
- Twelve of Reckitt-Benckiser's D-Con products do not comply with EPA's RMD. Due to a federal court decision, Reckitt may continue to sell these products until EPA completes the formal cancellation process, initiated in January 2013. Although D-Con products may continue to be sold, as of April 2013, at least one state has initiated regulatory action to remove these products from consumer markets. Check with your state lead agency for pesticides to determine current status in your state.
- Distributors are still allowed to sell rodenticides obtained prior to June 4, 2011, including non-compliant products.
- Users can use rodenticides obtained prior to June 4, 2011, following the attached container label, until depleted.

	Type of Rodenticide Product:		
	Consumer Products	Pest Control Products	Agricultural Products
Active Ingredients Availability:			
Non-anticoagulants	Available	Available	Available
1 st Generation Anticoagulants	Available	Available	Available
2 nd Generation Anticoagulants	Not Available	Available	Available
Package Requirements:			
Non-anticoagulants	1 pound max. - must include at least one bait station – above ground use only	4 pound min.- above ground and in burrow uses	4 pound min. – above ground and in burrow uses
1 st Generation Anticoagulants	1 pound max. - must include at least one bait station – above ground use only	4 pound min. – above ground and in burrow uses	4 pound min. – above ground and in burrow uses
2 nd Generation Anticoagulants	Not allowed	16 pound min. – above and in burrow uses	8 pound min.* - above ground and in burrow uses
Formulations Available:			
Block and other Securable Formulations	Yes	Yes	Yes
Pellets, Liquids, Meals, Treated Grain	None allowed	Yes	Yes
Distribution Channels:			
Non-anticoagulants	Products may be sold anywhere	Only available through Pest Control Outlet Distribution.	Only available at Ag Distribution and Farm Supply Stores.
1 st Generation Anticoagulants (See package size and bait station requirements)		Not allowed to be offered for sale at Hardware, Grocery, Department, Etc.	Not allowed to be offered for sale at Hardware, Grocery, Department, Etc.
2 nd Generation Anticoagulants	Not allowed for sale to consumers		

* These packages will have label language prohibiting use in residential buildings.

Bait Stations For Residential Consumer Rodenticide Products: Tier I-IV

Tier	Qualifications
4	<ul style="list-style-type: none"> • Resistant to opening by child under 6 years old • Indoor use only • Non-refillable – one time use • Not reasonably anticipated to release other than small quantities of bait
3	<ul style="list-style-type: none"> • Tamper resistant for children • Indoor use only
2	<ul style="list-style-type: none"> • Tamper resistant for children and dogs • Indoor use only
1	<ul style="list-style-type: none"> • Tamper resistant for children and dogs and weather • Indoor and outdoor use



Common Products

The currently registered AIs can be found in hundreds of branded products. The following is not intended to be a complete listing. It only provides some examples of some of the most common products in use. (07-20-12) No recommendation is being made.

First Generation Anticoagulants	Common AI %	Predominant Manufacturers	Common Brand Names
Chlorophacinone	0.005	Liphatech J.T. Eaton	Rozol, Ortho Rodenticide Products AC 90
Diphacinone	0.005	Bell Laboratories J.T. Eaton Haaco/Neogen	Ditrac, Eraze Ag, Tomcat Bait Block Ramik (Green, Brown, Mini)
Warfarin	0.025	Haaco/Neogen Scimetrics	Rodex Kaput Rat & Mouse
Second Generation Anticoagulants			
Brodifacoum	0.005 0.0025	Bell Laboratories d-Con Haaco/Neogen Scimetrics Syngenta	Final & Jaguar d.Con Havoc Kaput Doom Talon, Weatherblok
Bromadiolone	0.005	Bell Laboratories Farnam Liphatech PelGar (U.K.) Unichem (Slovenia)	Confrac, Hawk Just One Bite Maki, Boot Hill Brigand Ratimor
Difenacoum	0.005	Haaco/Neogen Victor/Woodstream	DiKill Multi-Kill
Difethialone	0.025	Liphatech	Generation, Hombre, BlueMax, FirstStrike, d-Con
Non-Anticoagulants			
Bromethalin	0.01	Bell Laboratories Haaco/Neogen J.T. Eaton Liphatech PM Resources	Fastrac, Rampage, Tomcat (Bromethalin) CyKill Top Gun Gunslinger Assault
Cholecalciferol	0.075	Bell Laboratories	Agrid, Terad3
Zinc Phosphide	2.0	Bell Laboratories Haaco/Neogen	ZP Pelleted Bait Prozap

Significant Label Changes Affecting Use – including recent changes:

- All outdoor applications must be made within 50 feet of a “building”. *On 3-20-12 the EPA agreed to change this to within 100 feet of a man-made structure except that fences are not considered structures.*
- All outdoor above ground applications must be in a tamper-resistant bait station. *On 3-20-12 the EPA agreed to revise this for pest control and agricultural uses to also allow:*
 - *burrow baiting with 1st generation anti-coagulant and non-anticoagulants within or beyond 100 feet of structures*
 - *burrow baiting with 2nd generation anticoagulants within 100 feet of man-made structures*
- The “urban” / “non-urban” language was eliminated, making it legal to place bait stations outdoors on a farm (subject to the distance restrictions listed above).
- The language “can only be used to control house mouse, roof rat and Norway rat” was added to products if the manufacturer had not provided data for other species. This precludes the deliberate application of a rodenticide to control any rodent pest species not listed on the label. Previously applicators could use a product for non-commensal rodents, such as deer mice or pack rats under the 2ee exemption of FIFRA.

Useful Websites:

- <http://www.epa.gov/pesticides/mice-and-rats/>
- <http://www.epa.gov/pesticides/mice-and-rats/consumer-prod.html#risk>
- <http://www.epa.gov/opp00001/controlling/rodents.htm>

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