

# Agricultural Pest Control 1A Exam Study Guide

This study guide is intended to serve as an outline of the knowledge base covered by the *Agricultural Pest Control Category 1A Exam*. If you don't understand a term, concept, or statement, refer to the NM Pesticide Applicator Training Category 1A & 1B Manual for more information. This exam consists of 50 multiple choice, true/false and matching questions taken from the manual. Topics include:

1. General Ag Pest Knowledge
2. Common Ag Pests
3. Beneficial Insects
4. Insect, Mite and Invertebrate Control
5. Pathogen Control
6. Identification
7. Calculations

## 1. General Ag Pest Knowledge

- a. Spiders and ticks belong to the class Arachnoidea.
- b. Beetles and flies belong to the class Insecta.
- c. All adult insects have 3 pairs of jointed legs and 3 body regions.
- d. The exoskeleton of an insect is composed of a proteinaceous material called chitin.
- e. Aphids have sucking mouthparts.
- f. Lygus bugs have piercing-sucking mouthparts.
- g. Gradual metamorphosis consists of 4 life stages; egg, larva, pupa, adult.
- h. Complete metamorphosis consists of 3 life stages; egg, nymph, adult.
- i. Incomplete metamorphosis consists of 3 life stages; egg, naiad, adult.
- j. Grasshoppers exhibit gradual metamorphosis.

## 2. Common Ag Pests

- a. The insect known as the corn earworm may also be known as the bollworm and the tomato fruitworm.
- b. Greenbugs are a type of aphid.
- c. The black, black margin and yellow aphids commonly attack pecans.
- d. Some species of aphids attack virtually every crop in New Mexico.
- e. Fleahoppers may affect cotton during its seedling stage but has its major effect around the time of squaring.
- f. An infestation of mites can often be detected by the webbing of silk on the leaf surface.
- g. The Banks grass mite, citrus flat mite and the two-spotted mite may all be found in small grains in New Mexico.
- h. The alfalfa weevil is most damaging to alfalfa in the larval stage.
- i. Stink bugs are serious pests of cotton, sorghum and alfalfa.
- j. The pepper weevil is a severe pest of sweet and hot peppers.
- k. The characteristic ragging of cotton leaves with large, blotchy holes and clean, sharp, non-necrotic margins is evidence of cabbage loopers.

## 3. Beneficial Insects

- a. Many predatory and parasitic insects can hold or reduce populations of harmful insects to levels that do not require control.
- b. Minute pirate bugs, assassin bugs and syrphid flies are examples of beneficial insects.
- c. Assassin bugs do not restrict their prey to a few species, but will feed on most prey species they encounter.
- d. Big-eyed bugs may be confused with immature stink bugs.
- e. Lady beetles are among the most efficient known predators of aphids and mites.
- f. Nabids are effective predators of aphids, leafhoppers, and lygus bugs.

#### 4. Insect, Mite and Invertebrate Control

- a. The best time to apply an insecticide is when the pest population has reached the economic threshold.
- b. To be effective, a pesticide must penetrate the pest organism, move or be transported to the site of action, and disrupt or alter a vital function.
- c. When selecting an insecticide, you should consider the target pest, the number of beneficial insects present, and the kind of crop you will be spraying.
- d. Insecticides which must be eaten by the insect in order to be effective are called stomach poisons.
- e. Bacillus thuringiensis (Bt) is an example of a biological insecticide.
- f. Pyrethroids are derived from the naturally occurring insecticide pyrethrum.
- g. Insecticide resistance develops by selective breeding from survivors of pesticide treatments.
- h. Generally speaking, insecticides are the most toxic to humans.
- i. Disruption of the ecosystem by pesticide spraying may show up as chronic effects of aquatic organisms, reduction of beneficial insects and mortality in fish and birds.
- j. Volatilization from surfaces may be responsible for the loss of large amounts of some pesticides in the air.

#### 5. Pathogen Control

- a. The most common plant diseases that can result in economic loss in the Southwest are caused by soil-borne diseases.
- b. Verticillium wilt is caused by a soil-borne fungus.
- c. Curly top disease of vegetables is caused by a virus injected into plants by the sugarbeet leafhopper.
- d. Fungi are the largest group of plant pathogens.
- e. Powdery mildew is a fungus.
- f. Phymatotrichum or Texas root rot is a common disease on cotton, alfalfa and grapes.
- g. Nematodes are microscopic worms.
- h. Leaf spot, wilt or mosaic are examples of symptoms of plant diseases; mycelia or sclerotia are examples of signs of plant disease.
- i. *Synergism* occurs when the combined action of two pesticides is greater than the sum of their individual actions.
- j. The most effective, simple and economical means of controlling plant disease is usually provided by using disease-resistant varieties.

#### 6. Identification

Be able to identify (from pictures) the following pests.

- a. Alfalfa Weevil
- b. Stink Bug
- c. Two-spotted Spider Mite
- d. Corn Earworm
- e. Cabbage Looper
- f. Pink Bollworm
- g. Pepper Weevil
- h. Aphid
- i. Leafhopper

## **7. Calculations**

- a. Be able to determine the total pounds of a certain pesticide formulation required to treat a field when given the field size, the pesticide formulation percentage and the label required amount of active ingredient.
- b. Be able to determine the amount of pesticide required for one swath of a field when given the field dimensions and the application rate per acre.