INTRODUCTION

- The Insect Pest Management Guide is issued by the LSU AgCenter, Baton Rouge, Louisiana 70803. It supercedes the Insect Pest Management guide for all prior years. (www.lsuagcenter.com)
- Insecticide recommendations and rates of application listed in this guide are in conformance with the U.S. Environmental Protection Agency registrations and with the U.S. Food and Drug Administration tolerances.
- Each Extension agent will be notified of updates as labels change.
- Users of this guide should read the label on the insecticide container and follow the directions and precautions on the label when using the insecticides recommended in this guide.
- Some insecticides registered by the U.S. Environmental Protection Agency are not included in this guide. This is due to their hazardous nature, their lack of availability, their inefficient control of the pest, or their higher cost to use.

RESTRICTED USE PESTICIDES

- Some of the pesticides or certain uses of pesticides in this publication may be classified for restricted use. The labels of those pesticides with restricted uses will contain information regarding these restrictions. Be sure to read all labels thoroughly. It is illegal to use any pesticide in a manner that is inconsistent with the label directions. It is unlawful for a non-certified applicator to use a pesticide that has been classified with restricted uses. Information on pesticide applicator certification programs may be obtained from the LSU AgCenter.

*** Compiled by LSU AgCenter Personnel**
Jack L. Baldwin, Professor (Livestock, Feed Grains, Soybeans, Small Grains, Pastures), LCES
Lane D. Foil, Professor (Man and Animal Insect Research), LAES
Mary L. Grodner, Professor (Pesticide Safety), LCES
Abner Hammond, Professor, (Insect Physiology and Chemical Ecology Research, Sweet Potatoes) LAES, LCES
Gregg Henderson, Professor (Urban Entomology Research), LAES
Natalie Hummel, Assistant Professor (Rice, Small Fruits, Citrus, Pecans), LCES
Seth Johnson, Professor (Ecology and Population, Dynamics of Lepidopterous Pests Research), LAES
Roger Leonard, Professor (Cotton Insect Research) LAES
Alan Morgan, Professor (Household, Structural, Vegetables)
Dale K. Pollet, Professor, Project Leader (Sugarcane, Lawns, Ornamentals, Beekeeping, Forestry, Urban Forestry, Fire Ants, and Turf) LCES
John Pyzner, Associate Professor (Horticultural crops, Pecans, Other Fruits, Pest Management), LCES
T.E. Reagan, Professor (Sugarcane Insect Research), LAES
Don Reed, Professor (Wildlife Management, Animal Damage Control, Earthworms, Crickets, 4-H Wildlife Projects) LCES
Dennis Ring, Professor (Household and Structural) LCES
Richard N. Story, Professor (Vegetable and Fruit Insect Research) LAES
Mike Stout, Associate Professor (Rice Insect Research) LAES

GENERAL INFORMATION FOR USERS OF THIS GUIDE

The following pest control recommendations are based upon research conducted by LSU AgCenter personnel in the Louisiana Agricultural Experiment Station and the Louisiana Cooperative Extension Service in cooperation with the United States Department of Agriculture.

Pest control recommendations made by LSU AgCenter personnel are based upon those materials for which there are specific data regarding effectiveness under Louisiana conditions, residues that will remain on the crop at harvest, phytotoxicity, and effect upon beneficial predators, parasites, honeybees, fish and other wildlife. Also, effects upon the environment particularly as each pesticide relates to water, are given strong consideration. Recommended chemicals must also be registered and labeled for use both by the Environmental Protection Agency and the Louisiana State Department of Agriculture and Forestry.

New materials and formulations will be included in the recommendations only after they have been properly registered, proved effective, and that the registered use when applied under Louisiana conditions as directed will not result in a residue that exceeds the legal tolerance.

These suggestions for pest control are based on the best information currently available for each pesticide listed. If followed carefully, they should result in satisfactory control and should not leave residues that will exceed the tolerance established for any particular chemical on this crop. To avoid excessive residues on the harvested crop follow directions carefully with

GENERAL INFORMATION FOR USERS OF THIS GUIDE (cont'd)

respect to dosage levels, number of applications, and minimum interval between application and harvest. Observe the waiting period for re-entry to the field after a pesticide application if stated on the label. Also, wear any protective clothing or devices specified on the label for applying pesticides or entry into a treated field.

THE GROWER IS RESPONSIBLE for residues on his own crop as well as for problems caused by drift from his property to other properties or crops.

GENERAL PRECAUTIONS

All pesticides are poisonous and should always be used with caution. The following suggestions for the use and handling of pesticides will help minimize the likelihood of injury to humans, animals, and crops from exposure to the chemicals.

1. **Always** read all precautionary labeling directions before using pesticides and follow them exactly. Notice warnings and cautions before opening the containers. Repeat the process every time no matter how often you use a pesticide or how familiar you think you are with the directions. Apply the pesticide only in amounts and at times specified.

2. Keep pesticides out of reach of children, pets, irresponsible persons, and livestock. Pesticides should be stored outside the house, away from food and feed, and under lock and key.

3. **Always** store pesticides in their original containers and keep them tightly closed. Never keep them in anything but the original containers with a legible label.

4. **Never** smoke or eat while applying pesticides.

5. Avoid inhaling sprays or dusts. When directed on the label, wear protective clothing and an approved mask.

6. Should pesticides be accidentally spilled on the skin or clothing, remove contaminated clothing **immediately** and wash the contaminated skin thoroughly.

7. Bathe and change to clean clothing after spraying or dusting. If it is not possible to bathe, wash hands and face thoroughly and change clothes. Also, wear fresh clothing each day.

8. Cover food and water containers when treating around livestock or pet areas. Do not contaminate fish ponds, streams, or lakes.

9. Do not reuse pesticide containers for any purpose.

10. Observe label directions and follow recommendations in order to keep the residue on edible portions of plants within the limits permitted by law.

11. If symptoms of illness occur during or shortly after dusting or spraying, call a physician or get the patient to a hospital **immediately**. Also, bring with you a label from the container of insecticide that was used.

12. Do not use the mouth to siphon liquids from containers or to blow out clogged lines, nozzles, etc.

13. Do not spray with leaking hoses or connections.

14. Do not work in the drift of a spray or dust.

15. Confine pesticide to the property being treated. Avoid drift to adjacent properties by stopping treatment if weather conditions become unfavorable.

16. Do not apply pesticides over waterways or canals and do not apply them to fields being irrigated if drain water runs off field. If laborers are working in crops with heavy foliage such as cotton, tomatoes, peaches, citrus, etc. that have been treated with highly toxic compounds, be sure the recommended interval between the treatment and entrance into the treated area is served. These workers should follow the same precautions as given for the applicators in regard to changing clothing, wearing protective clothing, eating or smoking, and bathing. If a worker becomes ill while working under these conditions, call a physician immediately.

INSECTICIDE/ACARICIDE RESISTANCE MANAGEMENT

The insecticides recommended in this publication are important components of an integrated pest management plan. If the insecticides are not used properly, or used repeatedly over time, there is a possibility that resistance to those insecticides will develop. It is the responsibility of the producer or pesticide applicator to conserve the use of insecticides. It is important that insecticides with different mode of action (MoA) classifications are rotated during a season. The mode of action of an insecticide defines the way a specific pesticide kills an insect or mite. Repeated use of pesticides with the same mode of action will often result in the development of resistance to the entire class of insecticide. Resistance to insecticides may be defined as '*a heritable change in the sensitivity of a pest population that is reflected in the repeated failure of a product to achieve the expected level of control when used according to the label recommendation for that pest species*' (Insecticide resistance action committee). Once an insect population becomes resistant to a class of insecticides, that entire class can no longer be used to control the target insect.

While using this pest control guide, please be sure to refer to the IRAC MoA classification in the final table in this publication. Be sure to keep record of the insecticides you use during the season to control pests in your crop. We encourage you to practice pesticide stewardship and rotate insecticides used during the season based on the MoA classification.

DRIFT OF PESTICIDES

Drift of pesticides is by far the most important cause of illegal residues on forage crops. No pesticide can be applied by either aerial or ground equipment without some drift occurring.

Drift can be kept to a minimum and the contamination to forage crops reduced if certain precautions are observed in the selection of the pesticide, method of application, type of formulation (dust, spray, or granular), timing of treatment, wind direction and velocity, and the distance between the point of application and the nearest forage crop downwind.

PESTICIDES HAZARDOUS TO HONEYBEES AND OTHER BENEFICIAL INSECTS

Many pesticides are highly toxic to honey bees and other beneficial insects. The farmer, the beekeeper, and the pest control industry should cooperate closely to keep losses of beneficial insects to a minimum. Certain pesticides are more toxic than others to these insects; therefore, whenever possible use the material that is least toxic. When bees are present the safest time and method of application of pesticides should be employed. Avoid drift of pesticides onto bee colonies or nearby crops and weeds in bloom. Do not contaminate bee drinking water.

WILDLIFE

To protect fish and other wildlife do not apply pesticides over canals or streams and do not allow drainage from treated fields to enter waterways immediately after application.

PHYTOTOXICITY

Certain chemicals may cause plant injury when used at the wrong stage of plant development or when temperatures are too high. Injury may also result when excessive dosage rates, wrong formulations, or incompatible pesticide combinations are applied. To avoid injury follow recommendations precisely.

BUFFERS/WATER pH

Water pH is a critical factor in the effectiveness of most insecticides. Since most insecticides are acid-formers, it is critical that your water pH be acidic to prevent chemical hydrolysis (breakdown). Optimum pH is between 5.0 and 6.0. The best way to correct a high water pH is with a buffer because it will lock the pH in, and it will not fluctuate with changes in temperatures. pH can be measured using a swimming pool test kit, litmus paper, or a pH meter. Use what will work best for you. Water pH is affected by temperatures, sunlight, rainfall, drought, and many other factors and is seldom the same from one spraying to the next. Thus, check water pH before each spray.

There are several buffers on the market that are about equal. Use the one available to you. However, you should test the effectiveness of the buffer by using 1 to 2 ounces per 50 gallons of water, mix, and recheck the pH. Whatever is dissolved in the water will determine how many buffers you may need. The label may say 1 quart, and you may need less or occasionally more. Check each time and start with about 2 ounces per 50 gallons of water and add 1 ounce at a time until the correct pH is reached. Too much of a buffer will cause the water to be too acidic, and it can be phytotoxic on your plants. Buffers will help to enhance the initial knockdown of your spray and give you a better residual. This will, in the long term, reduce the number of sprays you make, reducing tolerance development of the pest, harm to the environment, effect on beneficial, and save beneficials, and save money while helping you to produce a good crop.

OILS

Oils may be used to control many pest populations of insects and mites. They may be used alone or in combination with insecticides or miticides. Oils may be used year-round simply by varying the rates for the seasons. Some examples include dormant oil, Volck oil, Superior oil, Sun Spray Ultra Fine oil and others. Some oils can be used on a wide variety of crops such as fruits, vegetables, ornamentals, trees, flowers, and foliage plants. Others may be limited. Follow label for proper control.

PREDATORS AND PARASITES

The use of beneficials to control pest populations is a natural phenomenon. Parasites and predators usually build up once a pest or host population becomes established. In some cases these naturally occurring controls are very effective in maintaining pest populations below economic thresholds. Pest populations are usually more prolific and, as pest density increases, it initiates the beneficial population development. Beneficial insect populations, however, can be purchased to supplement the natural populations and enhance control thereby reducing the need for pesticide usage. Beneficials should always be purchased in either the egg or immature stage to assure the desired control. Adults are capable of flying off to other areas. Some beneficials can become a nuisance if populations become dense. Such a problem has developed in areas with the Asian lady beetle. Another example is the small braconid wasp that will infest catalpa worms when released to control hornworms in vegetables and tobacco. A list of supplies of various beneficials may be obtained from the Louisiana Department of Agriculture and Forestry. The use of beneficials for pest control is an integral part of the Integrated Pest Management and the Sustainable Agriculture Programs. For a list of available parasites and predators contact Tad Hardy, Louisiana Department of Agriculture and Forestry at (225) 925-7772 or write to him at P.O. Box 3118, Baton Rouge, LA 70821-3118.

IN CASE OF POISONING:

LOUISIANA DRUG AND POISON INFORMATION CENTER
(800) 256-9822 (Louisiana only)
(318) 342-1710
24-HOUR SERVICE

NATIONWIDE TOLL FREE POISON CONTROL CENTER
(800) 222-1222

NATIONAL PESTICIDE INFORMATION CENTER
(800) 858-7378
[(800) 858-PEST]
Monday-Saturday 6:30 a.m.-4:30 p.m. (Pacific Time)
www.npic.orst.edu
READ THE PESTICIDE LABEL FOR YOUR AREA

Restricted Entry Intervals (REIs)

Read the agricultural use requirements on the label very carefully to determine the REI for a particular use of an insecticide. The REIs may vary for different uses of the same insecticide.

AWAYS READ THE LABEL!