

USE PESTICIDES SAFELY

Pesticides are biologically active materials applied to kill or disable target pests. Pesticides are toxins, if not handled properly, many can be dangerous, or even lethal, to non-target plants and animals, including man. Pesticide labels should be carefully followed, as they enable the applicator to use these materials in a fashion that appropriately minimizes the risks of pesticides to human health, mitigates the risks of pesticide residues in our food, minimize pesticide risks to key pollinator species such as honey bees, and encourages pesticide use patterns that slow the development of pesticide resistance in pest species. Pesticide labels, instructions affixed to all pesticide containers, provide guidelines for safe, efficient pesticide use. Pesticide labels carry the weight of law. Federal and state statutes prohibit the use of any pesticide in a manner not prescribed on the label.

Pesticide stewardship, the safe responsible use of pesticides, is a key management commitment that embraces legal requirements regulating pesticide use, while cultivating a culture of common sense and responsibility that goes beyond requirements. Conscientious pesticide stewardship is a key element in successful, justifiable use of pesticides. Pesticide users should always be aware of ethical and social issues. Commitments to worker and food safety are necessary elements of wise pesticide use. Bees and other pollinators are key providers of ecological service by enhancing fruit and seed set in numerous vegetables, fruits and wild species vital to the health of ecosystems. Honey bees are particularly important because they can be readily managed. Unfortunately, honey bees are in decline across much of the developed world. Numerous studies suggest that Varroa mites and bee diseases are primary causes of colony collapse disorder. However, pesticides, particularly insecticides, are important risk factors around heavily sprayed crops. Prudent pesticide users should proactively initiate positive relationships with beekeepers to develop and maintain a mutual appreciation for the key roles both pesticides and bees play in modern agriculture. However, other key pesticide stewardship considerations should include diligent protection of wetlands, streams and other sensitive habitats. In like fashion, protection of neighboring populated areas from pesticide runoff or drift is imperative. All pesticide users should work to minimize or slow the development of pesticide resistant pests by using IPM and rotating chemicals classes.

1. **Integrated Pest Management (IPM)** reduces dependence on pesticides by integrating nonchemical methods to help control or prevent damaging pest populations. Use IPM to make pesticide use more efficient. Ask your county agent about IPM technique.
2. **Apply pesticides only when they are needed.** Properly identify the pest and evaluate whether it will cause enough damage to justify a pesticide application. Your local Extension office can help you identify and evaluate your pest problems.

3. **Choose the correct pesticide.** Refer to the pesticide label and other unbiased references to make sure candidate materials are effective against your target pest(s) and registered for the site you need to treat. This handbook and your local Extension office can help you choose the right pesticide.
4. **FOLLOW THE LABEL DIRECTIONS!** It is illegal to use any pesticide in a manner not prescribed on the label. Most pesticide accidents are the result of not following the directions, restrictions and precautions on the label. Avoid the temptation to use greater than the labeled rates; you increase your risks, you may cause injury or damage the site of application, and you dramatically increase your risk of adverse non-target mishaps, such as fish kills or bee kills.
5. **Prevention of adverse, non-target impacts** to people, bees and other pollinators, domestic animals, wildlife and fish should always be an overriding commitment. Careful adherence to all label precautions, close supervision of pesticide use and application of common sense are vital elements in assuring safe pesticide use.
6. **Prevent pesticide drift and runoff.** Never apply pesticide when the wind is blowing more than 5 mph or when rain is imminent. Crops that receive regular pesticide applications should not be planted near bodies of water or near sensitive areas, such as schools or wildlife habitat.
7. **Store pesticides safely.** Keep pesticides beyond the reach of children and animals. Far too many households with young children have a pesticide stored within easy reach. Keep pesticides in the original packaging with the label securely affixed. Storage areas should be clearly marked and locked. Do not store pesticides with food, feed, or clothing. Unused pesticides should be stored in their original container or package. NEVER store pesticides in any food or drink container!
8. **Wear proper protective clothing.** Always wear the label-prescribed protective equipment, this greatly reduces your risk from mixing or applying pesticides.
9. **Measure pesticides carefully.** Mix no more pesticide than you need. It is far easier to use pesticides than to properly and safely dispose of them.
10. **Dispose of pesticide waste properly.** Refer to the pesticide label for proper disposal protocols. Empty containers that are properly rinsed, normally three times, can often be recycled or placed in landfills. Excess pesticides and rinse water can be applied to labeled sites if you will not exceed labeled rates. Contact your local landfill to determine if they accept small quantities of waste pesticides and/or properly rinsed containers.

USE PESTICIDES SAFELY

11. **Wash your hands** before you eat, drink, use tobacco or go to the restroom. Shower as soon as you can, taking care to thoroughly clean your hair and fingernails. Wash the clothes you wore while mixing or applying pesticides before wearing them again. Separate your pesticide application garments from regular household laundry, washing them in separate loads.
12. **If you or someone else is exposed to a pesticide, take immediate action.** Remove any contaminated clothing. If pesticide is on the skin, wash immediately. If pesticide is in the eye, rinse with clean water for at least 15 minutes. If pesticide is swallowed, give large amounts of water or milk to drink. **DO NOT** induce vomiting unless the label directs you to. Never give liquids or induce vomiting if a person is unconscious or convulsive. If pesticide is inhaled, move victim to fresh air. Get a copy of the pesticide label(s) off whatever material(s) the victim was exposed to. Promptly seek medical attention, be sure to bring the pesticide label(s) with the victim when they are taken to the hospital.

Selecting and Purchasing the Pesticide

1. When you choose a pesticide, consider: 1) is this pesticide labeled for use where you want to apply? 2) will your material of choice control your target pest? 3) is this material among the safest products that will control your target pest? 4) restrictions on use, 5) experience of the applicator, 6) required protective clothing, and 7) equipment needed to apply the product. You may want to choose a safer pesticide or formulation if the applicator is inexperienced.
2. Never use a restricted-use pesticide unless you or your supervisor are properly licensed through the Georgia Department of Agriculture Pesticide Applicator Licensing and Certification program (<http://www.agr.georgia.gov/pesticides.aspx>).

Transporting the Pesticide

1. NEVER transport pesticides in the passenger section of a vehicle.
2. NEVER transport pesticides with food, feed, or other products that may come in contact with humans or animals.
3. NEVER leave pesticides unattended. You are responsible for any accidents that may occur while you are away.
4. Secure pesticide containers in the back of a truck to prevent the breaks or spills that may occur when loads shift. Protect paper/cardboard from moisture.
5. Report spills on roadways immediately to the local authorities.

Storing the Pesticide

1. Pesticide storage areas should be fire-resistant, well ventilated, well lighted, locked, dry, protected from direct sunlight and insulated against temperature extremes. Access should be limited to those tasked to work with pesticides. Always keep pesticides out of reach of children, untrained adults and animals.
2. Store pesticides in their original containers with intact labels. NEVER place a pesticide in a food or beverage container.
3. Do not store pesticides with food, feed or seed. Store pesticides at least 100 feet from wells and other waterways.
4. Pesticide containers should frequently be checked for leaks or breaks. Transfer the contents of a damaged container into a replacement container with labels carefully affixed.
5. Immediately clean up any spills using label specified methods and precautions.
6. Store empty, properly rinsed pesticide containers securely until appropriate disposal is available.

Mixing and Loading Pesticides

1. Carefully read the label before using any pesticide. Make sure you understand all directions and precautions. Mix only the amount you need.
2. Have an adequate supply of clean water and soap nearby.
3. Know the early symptoms of pesticide poisoning for each material you will use.
4. Be sure that emergency equipment for spills and first-aid are readily available.
5. Keep unauthorized people and animals out of the mixing area.
6. Do not work alone.
7. Work in a well-lighted and well-ventilated area, preferably outdoors.
8. Wear the protective equipment required by the pesticide label. Check protective equipment for leaks and wear. Be sure you know how to use protective equipment properly.
9. Mix in an area where spills can be contained, at least 100 feet from wells and other waterways.
10. NEVER mix pesticides near a well or where other bodies of water may be contaminated. Keep the end of the hose above pesticide/water level.
11. NEVER eat, drink, or smoke while mixing pesticides.

USE PESTICIDES SAFELY

12. NEVER mix or load pesticides at or above eye-level. Close containers that are not in use.
13. When you are mixing or loading, stand so that wind does not blow pesticide on you.

Applying the Pesticide

1. Calibrate your application equipment so you can apply the desired rate(s). Check for leaks, clogged nozzles and excessive wear.
2. Wear the protective clothing indicated on the label. Check your protective equipment before, during, and after a pesticide application for wear or damage.
3. Clear the area of other people and animals.
4. Follow label precautions to minimize drift or run off. Spray only when there is little or no wind. Do not spray when rain is imminent.
5. Be prepared for leaks, spills or equipment failures.
6. Check the label to see what precautions are indicated. Post the area if required. Be sure that people entering the area during the re-entry interval are properly protected.
7. Notify area beekeepers far enough in advance of treatments to allow them to protect their bees.

Cleaning Equipment

1. Thoroughly clean mixing, loading and application equipment inside and out after each use.
2. Wear protective clothing while you are cleaning equipment or repairing it.
3. Take care to be sure runoff from rinsing sprayer tanks does not contaminate streams, ponds, marshes, wells or other sensitive areas.

Disposing of Excess Pesticides and Empty Containers

1. Consult the label or your local extension office for other disposal information.
2. Use excess pesticides according to label directions if possible. Follow label instructions for disposal.
3. Empty metal, plastic or glass containers should be pressure-rinsed or triple-rinsed. The rinse water should be directed back into the spray tank. Properly rinsed containers can sometimes be placed in landfills or recycled.
4. Contact your local landfill to determine their policies on disposal of appropriately rinsed pesticide containers or small properly treated volumes of unused, properly identified pesticides.

PESTICIDE EMERGENCIES

POISON CONTROL CENTER (HUMAN OR ANIMAL)

Georgia Poison Control Hotline (Spanish speakers available)

(800) 222-1222

<http://www.aapcc.org/>

SPILLS

(Georgia Environmental Protection Division)

(800) 241-4113

<http://www.gaepd.org/>

Avoid emergencies / Prepare for emergencies.

1. Maintain a communication link at your pesticide storage and mix/load site.
2. NEVER handle 'DANGER' pesticides or fumigants alone.
3. Closely supervise fumigant use. Have protective clothing available in case a rescue is needed.
4. Maintain contact with anyone using a pesticide with the signal word 'DANGER'.
5. Keep Material Data Safety Sheets readily accessible for every pesticide you use.
6. Keep protective clothing readily available wherever pesticides are stored or handled.
7. Have water available to wash pesticides from skin or eyes.
8. Store and handle pesticides in areas where spills will be contained.
9. Assemble and maintain a spill kit wherever you handle pesticides.
10. Make sure that all employees understand how to handle pesticide emergencies.
11. Be familiar with the first aid instructions on the pesticide label.
12. NEVER store pesticides around food or drink, especially avoid storage of pesticides in food or drink containers.

PESTICIDE EMERGENCIES

FIRST AID FOR POISONING

Symptoms of pesticide poisoning: nausea, vomiting, diarrhea, cramps, headache, dizziness, weakness, confusion, sweating, chills, chest pains, difficulty breathing, unconsciousness. If you have any of these symptoms while you are handling pesticides, suspect pesticide poisoning.

1. Stop the pesticide exposure as quickly as possible. **CALL 911 IF SYMPTOMS ARE SERIOUS! CALL POISON CONTROL (800-222-1222) FOR FIRST AID INFORMATION. YOU WILL NEED THE PESTICIDE LABEL.**
2. If the victim is not breathing, administer artificial respiration at once.
3. Consult the pesticide labeling if possible. Directions for first aid will be on the front panel.
4. Otherwise, follow these guidelines:
 - **SKIN:** drench skin as quickly as possible with plenty of water. Any moderately clean water can be used if not contaminated with pesticides. Remove contaminated clothing. Wash with soap if available. Dry victim and treat for shock. If skin is burned, cover with clean, loose bandage or cloth. Do not apply ointments to burned skin.
 - **EYE:** Wash eye quickly but gently. Rinse eye with clean water for at least 15 minutes.
 - **INHALED:** Move victim to fresh air. Warn other nearby people. Loosen clothing that restricts breathing. Administer artificial respiration if necessary.
 - **SWALLOWED:** Rinse mouth with plenty of water. Give large amounts of water or milk (up to one quart) to drink. Consult the label before you induce vomiting. Do not give liquids or induce vomiting to anyone who is unconscious or convulsive.
5. **Take the pesticide label with you to the doctor or hospital.** DO NOT transport pesticides in the passenger compartment of the vehicle.

PESTICIDE SPILLS

Assemble a spill kit that contains the following items:

1. Protective equipment indicated on pesticide label.
2. Absorbent material to soak up liquids (cat litter, sand, sawdust, dirt).
3. Scoop to pick up contaminated absorbent material.
4. Container for contaminated absorbent material (e.g., heavy duty plastic bag).
 - You may dispose of the contaminated absorbent material on labeled sites as indicated on the pesticide label. Do not exceed labeled rates.
 - **Large spills, leaks, pesticide fires:** Call Georgia DNR EPD Response Team (800) 241-4113.
 - **Spills on public roads or other public areas:** Georgia State Patrol *GSP (*477) on mobile phone.

Smaller spills:

1. DO NOT HOSE DOWN SPILLS!
2. Protect yourself and others.
3. Stop the spill sources.
4. Confine the spill with a dike of earth or other materials. Protect water sources.
5. Absorb liquids with cat litter, sand, earth, etc.
6. Scoop up contaminated materials. Store securely.
7. Neutralize contaminated site with bleach, activated charcoal, hydrated lime, or by removing contaminated soil.
8. Absorb any liquids used during neutralizing.
9. Contaminated absorbent materials or soil may be land-applied according to the pesticide label.

PESTICIDE EMERGENCIES

HEAT STRESS

Avoid heat stress:

1. Acclimate to hot weather or new strenuous activities slowly.
 2. Drink plenty of water or sports drinks.
 3. Take frequent breaks during hot weather.
 4. Plan strenuous activities for the cooler part of the day.
- **Symptoms of heat stress:** sweating, nausea, headache, confusion, loss of coordination, dry mouth, fainting. Severe heat stress (heat stroke) is VERY dangerous.
 - The EPA Guide to Heat Stress in Agriculture is available through your local Extension office.

FIRST AID FOR HEAT STRESS

1. **CALL 911 IF SYMPTOMS ARE SERIOUS!**
2. Move the victim to a cooler area immediately.
3. Cool the victim as quickly as possible by splashing cool water on them or immersing them in cool water. Do not immerse anyone who is unconscious, convulsive, or confused.
4. Remove all protective equipment or clothing that is keeping the victim too warm.
5. If the victim is conscious, have them drink as much cool water as possible.
6. Keep the victim quiet. Get medical advice.

IMPORTANT TELEPHONE NUMBERS

EMERGENCY NUMBERS

*In an emergency dial 911, especially if the person is unconscious,
has trouble breathing, or has convulsions.*

POISON CONTROL CENTER (HUMAN OR ANIMAL)

National Poison Control Hotline (Spanish speakers available)

(800) 222-1222

Physician: _____

Ambulance: _____

FIRES, SPILLS, LEAKS, ETC.

Georgia DNR Environmental Protection Division Response Team (pesticide fires, spills, leaks) **(800) 241-4113**

County Police or Sheriff: _____

City Police: _____

Georgia Highway Patrol Post (*477) for mobile phones: _____

Fire Department: _____

ENDANGERMENT OF GAME OR FISH

Georgia Department of Natural Resources (Non-game endangered species) **(800) 241-4113**

U.S. Fish and Wildlife Service **(800) 344-9453**

PHONE NUMBERS FOR PESTICIDE INFORMATION (NON-EMERGENCY)

University of Georgia Cooperative Extension's Local County Office

1-800-ASK-UGA1

IMPORTANT TELEPHONE NUMBERS

PESTICIDE INFORMATION

National Response Center – Refers caller to proper government agency for hazardous materials **(800) 424-8802 (Voice/TTY)**

National Pesticide Information Center (NPIC)), Oregon State University – General information on toxicology, environmental hazard, etc. (M-F, 11 a.m.-3 p.m. EST)
www.npic.orst.edu, (800) 858-7378

Pesticide Manufacturer – The telephone number should be listed on the pesticide label

CropLife America – General information about the pesticide industry,
www.croplifeamerica.org

PESTICIDE DISPOSAL

Georgia Department of Agriculture **(800) 282-5852**

EPA Hazardous Waste Hotline (Superfund) **(800) 424-9346**

HAZARD COMMUNICATION – Workplace Assistance

OSHA **(800) 321-6742 TTY (877) 889-5627**

Regional IV OSHA Office Alliance in Atlanta **(678) 237-0400**

EPA SAFE DRINKING WATER HOTLINE – Interprets residue data and gives EPA drinking water regulations. **(800) 426-4791**

Or call your local Health Department or Sanitarian.

County: _____

City: _____

ENFORCEMENT OF PESTICIDE LAWS

Georgia Department of Agriculture, Pesticides Division **(404) 656-4958**

EPA Region IV Pesticides Section **(404) 562-8956**

Applicator certification to use restricted-use pesticides **(800) 282-5852**

Structural pest control certification **(800) 282-5852**

Safety/Training/Information – Dr. Milton Taylor (UGA Cooperative Extension)
(706) 540-4108, mickeyt@uga.edu

WEBSITES WITH PESTICIDE INFORMATION

Ga. Integrated Pest Management (IPM) http://ipm.caes.uga.edu
University of Georgia Cooperative Extension http://extension.uga.edu
Georgia Department of Agriculture - Pesticide Division http://agr.georgia.gov.aspx
Pesticide Licensing http://agr.georgia.gov/licensing.aspx
American Crop Protection Association www.croplifeamerica.org
Pesticide Action Network North America www.panna.org
U.S. Fish & Wildlife Service: Endangered Species www.fws.gov
National Pesticide Information Center http://npic.orst.edu
USDA National Organic Program www.ams.usda.gov/nop
Pesticide labels/MSDS from a range of companies. Daily updates at www.CDMS.net
Crop Protection & Turf/Ornamental References – C&P Press www.greenbook.net
National Pesticide Information Retrieval System http://state.ceris.purdue.edu
EPA List of Restricted-Use Pesticides www.epa.gov/opprd001/rup
Pesticide Risks http://extoxnet.orst.edu
EPA Pesticide Safety Programs/Worker Protection Standard www.epa.gov/agriculture/twor.html
EPA Office of Pesticide Programs www.epa.gov/pesticides/
EPA Agriculture Compliance Center www.epa.gov/agriculture/tcom.html
Georgia Organics www.georgiaorganics.org

WORKER PROTECTION STANDARD

The U.S. EPA Worker Protection Standard (WPS) requires agricultural employers to provide four basic protections for their employees.

1. Employees must receive pesticide safety training.
2. Information concerning pesticides applied in the work area must be posted in a central location.
3. Employees must be excluded from treated areas or provided proper training and safety equipment if they may be exposed to pesticides.
4. Employers must supply decontamination sites (soap, water, etc.) for workers. Emergency assistance must be available for any employee injured by pesticides. For details, refer to the EPA Worker Protection Standard for Agricultural Pesticides – How to Comply (available at www.epa.gov/pesticides/safety). Additional information is available from the Georgia Department of Agriculture (800-282-5852) or University of Georgia Cooperative Extension (1-800-ASK-UGA1).

ABBREVIATIONS AND EQUIVALENTS

FORMULATIONS¹

ai = active ingredient	EC = emulsifiable concentrate	S = sprayable powder
AC = aqueous concentrate	EL = emulsifiable liquid	SC = spray concentrate
AS = aqueous suspension	F = flowable	SP = soluble powder
DF = dry flowable	FC = flowable concentrate	W = wettable powder
DG = dispersible granules	G = granules	WDG = water dispersible granular
B = bait	L = liquid	WDL = water dispersible liquid
D = dust	LC = liquid concentrate	WM = water miscible
E = emulsifiable	M = microencapsulated	WP = wettable powder

¹ Numbers preceding abbreviations for liquid formulations equal pounds of active ingredient per gallon (e.g., 4EC = 4 lbs/gal. emulsifiable concentrate); numbers preceding abbreviations for solid formulations equal percent active ingredient by weight (e.g., 50WP = 50 percent wettable powder).

METHOD OR TIME OF APPLICATION

CR = cracking stage	PEI = pre-emergence incorporated	PRE = pre-emergence
LV = low volume	PO = post-emergence	PT = post-transplant
NS = nonselective	POT = post-emergence over-the-top	RCS = recirculating sprayer
PDS = post-emergence directed spray	PP = pre-plant	ULV = ultra low volume ²
PE = pre-emergence on surface	PPI = pre-plant soil incorporated	WICK = rope wick applicator

² Ultra low volume refers to a total spray volume of one-half gallon or less per acre.

ABBREVIATIONS AND EQUIVALENTS

MEASURES AND EQUIVALENTS

tsp	=	teaspoon			1 teaspoon	=	4.9 milliliters
Tbsp	=	tablespoon	1 Tbsp	=	3 teaspoons	=	14.8 milliliters
fl oz	=	fluid ounce	1 fl oz	=	2 tablespoons	=	29.6 milliliters
c	=	cup	1 c	=	8 fluid ounces	=	236.6 milliliters
pt	=	pint(s) (1.04 lb of water)	1 pt	=	2 cups	=	473.2 milliliters
pt/100	=	pint(s) per 100 gallons	1 pt/100	=	1 teaspoon per gallon		
qt	=	quart(s) (2.09 lbs of water)	1 qt	=	2 pints	=	946.4 milliliters
gal	=	gallon(s) (8.35 lbs of water)	1 gal	=	4 quarts	=	3.7854 liters
oz	=	ounce			1 ounce	=	28.35 grams
lb	=	pound	1 lb	=	16 ounces	=	453.59 grams
in	=	inch	1 in	=	1000 mils	=	2.54 centimeters (25,400 microns)
ft	=	feet	1 ft	=	12 inches	=	30.48 centimeters
yd	=	yard	1 yd	=	3 feet	=	91.44 centimeters
mi	=	mile	1 mi	=	5280 feet	=	1609 meters (16.09 kilometers)
sq in	=	square inch			1 square inch	=	6.45 square centimeters
sq ft	=	square feet	1 sq ft	=	144 square inches	=	929.03 square centimeters
A	=	acre	1 A	=	43560 square feet	=	0.4047 hectare
cu in	=	cubic inch			1 cubic inch	=	16.387 cubic centimeters
cu ft	=	cubic feet	1 cu ft	=	1728 cubic inches	=	0.0283 cubic meter
cu yd	=	cubic yard	1 cu yd	=	27 cubic feet	=	0.7646 cubic meter
ppm	=	parts per million	1 ppm	=	1000 pp billion	=	1 milligram/kilogram ³
psi	=	pounds per square inch			1 psi	=	70.3 gram-force per square centimeter

³ 1 milligram/kilogram or 1 ppm is equal to 1 milligram/liter of water.