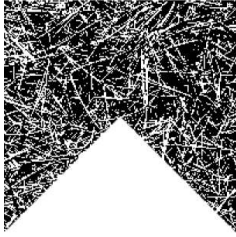


IPM



Commercial Apple

Insect, Disease, and Weed Control Recommendations
for 2011

INSECT AND DISEASE CONTROL

Current insect and disease control recommendations for commercial peaches in Alabama can be found in the **2011 Integrated Orchard Management Guide for Commercial Apples in the Southeast**. Copies of the guide are available through your county Extension office or can be downloaded by going to the following link: http://www.ces.ncsu.edu/fletcher/programs/apple/2011orchard_management.pdf

The guide contains the latest recommendations for insecticides, fungicides, nematicides, and herbicides for commercial apple production. The guide is a collaborative effort by Extension specialists and researchers from land grant institutions in the southeastern United States.

Commercial Apple: Insect and Disease Control section prepared by Robert Boozer, *Area Extension Research Horticulturist*, Alabama Cooperative Extension System, Alabama A&M University and Auburn University; and Edward J. Sikora, *Extension Plant Pathologist*, Professor, Entomology and Plant Pathology, Auburn University.

WEED CONTROL

A sod-chemical-strip form of orchard floor management is recommended for apples. Use a herbicide band 6 to 8 feet wide down the tree row and mow the ground cover between the rows. Cultivation may cause mechanical damage to tree

trunks and root systems. Follow closely all instructions on the label regarding rates for variations in soil types, organic matter, age of trees, grazing of livestock, and other special precautions.

Table 1. Apple Weed Control

Herbicide Trade Name (Rate/Acre Broadcast)	Herbicide Common Name (Active Herbicide/Acre)	Comments
Preemergence (PRE)		
CASORON 4G (100-150 lb.)	dichlobenil (4-6 lb.)	May be used under bearing or non-bearing trees and nursery stock. DO NOT apply until 6 weeks after transplanting. DO NOT make an application within 1 month of harvest. Air temperature should be 50°F or lower at time of application. Rainfall or sprinkler irrigation after application is needed to move the herbicide into the soil. Controls annual broadleaf weeds and grasses and certain perennials. Apply as a granule in early spring before weeds germinate or after cultivation has removed growing weeds. DO NOT allow animals to graze treated areas. *MOA–Cellulose inhibitor
CHATEAU WDG (6-12 oz.)	flumioxazin (0.19-0.38 lb.)	Provides residual control of several broadleaf weeds and grasses. Use low rate on sandy soils. May be mixed with glyphosate, paraquat, or Rely to increase foliar control. Add non-ionic surfactant at a rate of 2 pints per 100 gallons of spray mix for foliar control. DO NOT allow spray to contact crop. DO NOT apply within 60 days of harvest. MOA–PPO inhibitor
DEVRIKOL 50DF (8 lb.)	napropamide (4 lb.)	May be used in newly planted and established orchards. Controls annual grasses and some broadleaf weeds from seed. Apply in fall through early spring. Incorporation by tillage, rainfall, or sprinkler irrigation is needed within 24 hours of application. DO NOT apply within 35 days of harvest. MOA–Mitosis inhibitor
GALLERY 75DF (0.66-1.33 lb.)	isoxaben (0.5-1.0 lb.)	Apply ONLY to trees that will not bear harvestable fruit within 12 months. May be applied after soil has settled around newly planted trees. Controls several broadleaf weeds. MOA–Cellulose inhibitor
GOAL 2XL (2-8 pt.)	oxyfluorfen (0.5-2 lb.)	Apply under dormant trees before bud-swell for control of broadleaf weeds. Higher rates provide residual control. May be tank mixed with other herbicides. Check label. MOA–PPO inhibitor
KARMEX DF (2-4 lb.) or DIREX 4L (3-6 pt.)	diuron (1.5-3 lb.)	Use only under trees which have completed their first growing season. Read label regarding grafted rootstock. Controls annual broadleaf weeds and grasses. Apply in early spring before weeds emerge or during early seedling stage. If weed seedlings are present, add surfactant at rate of 2 quarts per 100 gallons spray mixture. DO NOT apply within 3 months of harvest. Read label for special precautions regarding irrigation or flooding. DO NOT allow animals to graze in treated areas. MOA–Photosystem II inhibitor

*MOA=Mechanism of action. Herbicides with different MOAs should be used in weed resistance management programs. See Table 2 for classifications of mechanisms of action.

Herbicide Trade Name (Rate/Acre Broadcast)	Herbicide Common Name (Active Herbicide/Acre)	Comments
Preemergence (PRE) (cont.)		
KARMEX DF (1-2 lb.) or DIREX 4L (0.8-1.6 qt.) +	diuron (0.8-1.6 lb.)	Use only under trees which have completed their first growing season. Controls annual broadleaf weeds and grasses. Apply in spring or after harvest in fall before weeds emerge or at early seedling stage. Read label for special precautions regarding irrigation and organic matter. DO NOT allow animals to graze in treated areas. The addition of a non-ionic surfactant at 2 pints per 50 gallons of spray mix will provide some postemergence activity. MOA–Photosystem II inhibitor
SINBAR 80W (1-2 lb.)	terbacil (0.8-1.6 lb.)	
MATRIX FNV (4 oz.)	rimsulfuron (0.063 lb.)	For trees established one year or more in orchard. Provides residual control of several annual weeds. Add Surflan or Prowl H2O for increased grass control. MOA–ALS inhibitor
PRINCEP 4L or SIMAZINE 4L (2-4 qt.)	simazine (2-4 lb.)	Use in orchards established 1 year or more. Controls annual broadleaf weeds and grasses. Apply in early spring before weeds emerge or in late fall. May be applied as a split application. Use half rate in spring and half rate in fall. Avoid contact with fruit and foliage. Use the lower rate on coarse-textured soils and the higher rate on fine-textured soils. DO NOT apply to sands, loamy sands, or gravelly soils. DO NOT allow animals to graze treated areas. Princep may be tank mixed with Surflan and/or Gramoxone. See label for appropriate use rates. MOA–Photosystem II inhibitor
PROWL 3.3EC (2.4-4.8 qt.) or PROWL H ₂ O (4-8 pt.)	pendimethalin (2-4 lb.)	Use for control of annual grasses and small-seeded broadleaf weeds in NON-BEARING orchards. Apply to ground beneath trees before weeds emerge. A minimum of 0.5 inch of rainfall or sprinkler irrigation water is needed after application for adequate weed control. MOA–Mitosis inhibitor
SINBAR 80W (2 lb.)	terbacil (1.6 lb.)	Use only under trees which have completed their second growing season. Controls annual broadleaf weeds and grasses and some perennials. Apply in spring before weeds emerge or in the early seedling stage or in fall after harvest. DO NOT allow spray to contact fruit or foliage. Follow label recommendations regarding soil types and organic matter. Avoid eroded areas where roots are exposed. MOA–Photosystem II inhibitor
SOLICAM DF (2.5-5 lb.)	norflurazon (2-4 lb.)	Apply under bearing and non-bearing trees. DO NOT apply until the soil has settled around transplanted trees. Make only one application per year. Application should be made either postharvest in the fall or in the early spring. DO NOT graze treated areas. Solicam may be tank mixed with Gramoxone. Use low rate on sandy soils, high rate on clay-textured soils. MOA–Carotenoid biosynthesis inhibitor
SURFLAN AS (2-6 qt.)	oryzalin (2-6 lb.)	Apply under bearing and non-bearing trees. DO NOT apply to newly transplanted trees until the soil has settled and no cracks are present. Use the low rate for 2 to 4 months of weed control, the medium rate for 6 to 8 months of weed control, or the high rate for 8 to 12 months of weed control. DO NOT graze treated areas. MOA–Mitosis inhibitor

Herbicide Trade Name (Rate/Acre Broadcast)	Herbicide Common Name (Active Herbicide/Acre)	Comments
Postemergence (POST)		
2,4-D AMINE 4 Various trade names (3 pt.)	2,4-D amine (1.5 lb.)	FOR ONE-YEAR-OLD OR OLDER TREES ONLY. Apply to vegetation between dormant trees for control of emerged winter annual weeds. DO NOT apply within 2 weeks of budbreak. DO NOT use on sands or loamy sands. Clean spray equipment thoroughly after using this product. MOA–Synthetic auxin
AIM (1-2 oz.) + Crop Oil Concentrate (2 pt.)	carfentrazone (0.016-0.031 lb.) + crop oil concentrate	Apply as a directed spray. Provides foliar control of several annual broadleaf weeds. Can be mixed with other herbicides to provide residual and/or additional post control. Keep spray off of crop. DO NOT apply within 3 days of harvest. MOA–PPO inhibitor
FUSILADE DX (0.75 pt.) + Crop Oil Concentrate (2 pt./25 gal. spray mix) or Non-ionic Surfactant (0.5 pt./25 gal. spray mix)	fluazifop-butyl (0.2 lb.) + crop oil concentrate or non-ionic surfactant	Apply only to NON-BEARING trees that will not be harvested within 1 year after application for control of annual and perennial grasses. Apply as a directed spray using 20 to 40 gallons of spray solution per acre. Use hollow cone or flat fan nozzles. A non-phytotoxic crop oil concentrate or non-ionic surfactant must be used with this herbicide. Use a crop oil concentrate with Fusilade to control perennial grasses, such as bermudagrass and johnsongrass. Repeat application may be needed if regrowth occurs. Broadleaf weeds and nutsedge (nutgrass) will not be controlled by this herbicide. DO NOT graze treated areas. MOA–ACCcase inhibitor
GRAMOXONE INTEON (2-4 pt.) or FIRESTORM (1.6-2.5 pt.) + Non-ionic Surfactant (1-2 qt./100 gal. spray mix)	paraquat (0.6-1 lb.) + non-ionic surfactant	ONE-YEAR-OLD TREES may have green bark and may be injured by herbicide contact. DO NOT allow spray to contact green stems, fruit, or foliage. Controls annual broadleaf weeds and grasses and top-kills perennials. Apply when weeds are succulent and new growth is 1 to 6 inches tall. Read label instructions for precautions. DO NOT allow animals to graze in treated areas. Gramoxone is a RESTRICTED USE pesticide. MOA–Photosystem I inhibitor
MSMA Various trade names (2.67 pt.)	MSMA (2 lb.)	FOR NON-BEARING TREES ONLY. Controls annual and some perennial grasses and broadleaf weeds. Apply as a directed spray. DO NOT allow spray to contact leaves or green stems. DO NOT use around trees from which crops will be harvested within 1 year. DO NOT allow animals to graze in treated areas. MOA–Unknown
POAST 1.5E (1.5-2.5 pt.) + Crop Oil Concentrate (2 pt./25 gal. spray mix)	sethoxydim (0.25-0.5 lb.) + crop oil concentrate	Apply as a directed spray in a maximum of 20 gallons of spray solution per acre for control of annual and perennial grasses. A repeat application may be needed. Broadleaf weeds and nutsedge will not be controlled. DO NOT graze treated areas. DO NOT apply within 14 days of harvest. MOA–ACCcase inhibitor
SELECT 2E (6-8 oz.) + Crop Oil Concentrate (2 pt./25 gal. spray mix)	clethodim (0.1-0.25 lb.) + crop oil concentrate	FOR NON-BEARING TREES ONLY. Use to control annual and perennial grasses. DO NOT graze treated areas. Broadleaf weeds and nutsedge will not be controlled. MOA–ACCcase inhibitor

Herbicide Trade Name (Rate/Acre Broadcast)	Herbicide Common Name (Active Herbicide/Acre)	Comments
Postemergence (POST) (cont.)		
RELY 200 (1.8-3.6 qt.)	glufosinate (0.75-1.5 lb.)	Apply as a directed spray to actively growing weeds in the orchard floor. DO NOT apply to apple foliage or green bark. Controls a wide variety of broadleaf weeds and grasses but has little or no soil-residual activity. May be tank mixed with Solicam, Karmex, simazine, and other residual herbicides registered for use in apples. Apply in a minimum of 20 gallons spray solution per acre. DO NOT apply within 14 days of harvest. MOA–Glutamine synthetase inhibitor
ROUNDUP or TOUCHDOWN or GLYPHOSATE (Generic forms) + Non-Ionic Surfactant (1 pt./25 gal. spray mix)	glyphosate (1-4 lb.) + non-ionic surfactant	Apply to established trees. DO NOT allow spray to contact foliage or green stems of trees. Apply no later than 90 days after first bloom. Application MUST be made with a shielded boom sprayer or wiper applicator which prevents any contact of Roundup with the foliage or green bark. Remove suckers and hangers at least 10 days before application. EXTREME CARE MUST BE TAKEN TO ENSURE NO PART OF THE TREE IS CONTACTED. Controls a broad spectrum of annual and perennial weeds and grasses. DO NOT allow animals to graze treated areas. See label for specific rates. MOA–EPSP inhibitor

Table 2. Herbicide Classified by Mechanism of Action

Mechanism of Action	Herbicide
Acetolactase Synthase (ALS) inhibitors	Matrix
Acetyl CoA Carboxylase (ACCCase) inhibitor	Fusilade, Poast, Select
Carotenoid biosynthesis inhibitor	Solicam
Cellulose inhibitor	Casoron, Gallery
Enolpyruval shikimate-3-phosphate (EPSP) inhibitor	Roundup, Touchdown
Glutamine synthesis inhibitor	Rely
Mitosis inhibitor	Prowl, Devrinol, Surflan
Protoporphyrinogen oxidase (PPO) inhibitor	Chateau, Aim, Goal
Photosystem I inhibitor	Gramoxone, Firestorm
Photosystem II inhibitor	Karmex, Direx, Pincep, Sinbar
Synthetic auxin	2,4-D

Table 3. Estimated Effectiveness of Recommended Herbicide Treatments on Important Weeds Infesting Apples in Alabama and Properties That May Affect Water Quality¹

WEEDS	HERBICIDES							
	Casoron (PRE)	Chateau (PRE)	Direx, Karmex (PRE)	Gallery (PRE)	Karmex + Sinbar (PRE)	Matrix (PRE)	Princep, Simazine (PRE)	Sinbar (PRE)
Bahiagrass	0	0	1	0	0	1	1	0
Bermudagrass	0	0	0	0	0	0	0	0
Blackberry	0	2	1	0	0	1	1	0
Crabgrass	7	5	8	0	8	6	8	7
Florida Pusley	7	8	8	6	9	1	9	7
Goosegrass	6	4	8	0	8	0	8	5
Lambsquarter	8	9	9	9	9	6	8	8
Morningglory	0	8	5	5	7	1	7	2
Nutsedge	4	0	0	0	3	6	0	2
Pigweed	8	9	9	9	9	8	9	8
Prickly Sida	8	8	4	6	9	1	9	4
Ragweed	8	9	8	9	9	0	8	8
Texas Panicum	3	1	4	0	5	0	4	3
Surface-Loss Potential²	M	M	M	S	M	M	M	M
Leaching Potential³	M	S	M	S	L	S	M	L

continued

¹ Ratings are based on observations of research plots and field use under average weather conditions for several years by weed control workers in Alabama and the South. Leaching and surface-loss potentials are based in part on herbicide chemical characteristics and pesticide behavior models developed by USDA scientists as well as on field experience.

² The surface-loss potential indicates the tendency of the pesticide to move with sediment in runoff.

³ The leaching potential indicates the tendency of the pesticide to move in solution with water and to leach below the root zone.

KEY TO CONTROL RATINGS AND ABBREVIATIONS

Ratings on a scale of 0 to 10: 0 = No control; 10 = 100% control.

PRE = Preemergence. S = Small; M = Medium; L = Large.

Table 3. Estimated Effectiveness of Recommended Herbicide Treatments on Important Weeds Infesting Apples in Alabama and Properties That May Affect Water Quality¹ (cont.)

WEEDS	HERBICIDES							
	Prowl, Surflan (PRE)	AIM (POST)	Fusilade, Select (POST)	Poast (POST)	Gramoxone (POST)	MSMA (POST)	Rely (POST)	Roundup, Touchdown (POST)
Bahiagrass	0	0	8	5	3	5	7	8
Bermudagrass	0	0	8	5	3	0	7	8
Blackberry	0	1	0	0	3	2	4	7
Crabgrass	8	0	8	9	7	7	7	9
Florida Pusley	8	1	0	0	6	3	8	9
Goosegrass	8	0	9	9	8	5	8	9
Lambsquarter	5	8	0	0	8	4	8	9
Morningglory	0	9	0	0	8	7	--	9
Nutsedge	0	0	0	0	4	6	6	7
Pigweed	9	7	0	0	9	4	7	9
Prickly Sida	0	1	0	0	6	3	--	9
Ragweed	4	1	0	0	7	6	8	9
Texas Panicum	7	0	9	8	9	5	7	9
Surface-Loss Potential²	L	S	M	M	S	M	S	S
Leaching Potential³	M	S	S	S	S	S	S	S

¹ Ratings are based on observations of research plots and field use under average weather conditions for several years by weed control workers in Alabama and the South. Leaching and surface-loss potentials are based in part on herbicide chemical characteristics and pesticide behavior models developed by USDA scientists as well as on field experience.

² The surface-loss potential indicates the tendency of the pesticide to move with sediment in runoff.

³ The leaching potential indicates the tendency of the pesticide to move in solution with water and to leach below the root zone.

KEY TO CONTROL RATINGS AND ABBREVIATIONS

Ratings on a scale of 0 to 10: 0 = No control; 10 = 100% control; -- = Information not available.

PRE = Preemergence; POST = Postemergence. S = Small; M = Medium; L = Large.

PESTICIDE TOLERANCES AND RESTRICTIONS

Many pesticides presently used in commercial orchard programs are hazardous to the operator unless proper precautions are followed. This is especially true of parathion, azinphosmethyl (Guthion), dimethoate (Cygon), and demeton (Systox). Always read the label when using pesticides and observe the recommended precautions.

Pesticides are relatively safe when used as recommended, but they are a potential liability in the hands of a careless operator. Therefore, the orchard owner or the manager is directly and legally responsible for the effective and safe use of all pesticides.

Important Precautions to Observe When Handling Pesticides

1. Read all labels and recommendations before using pesticides. Avoid breathing wettable powder while opening the bags or putting it in the spray tank; avoid inhaling the spray mist during the spraying operation. While handling the wettable powder and when spraying or entering sprayed areas, wear a respirator recommended for protection against parathion and Guthion.

2. Wash your hands, arms, and face after handling pesticides and especially before eating or smoking. Bathe and change your clothes immediately after finishing spraying. Change clothes daily during sustained spraying periods.

3. If you are working where there is considerable spray drift or dust, wear protective covering. A light plastic raincoat gives good protection. A cellophane sheet also gives protection; cut a hole large enough for your head in the center of the sheet and then simply drape it over your shoulders. Wear a washable rubber or plastic rain hat.

4. Never handle wettable powders with bare hands. If you must handle them with your hands, wear natural rubber gloves – never synthetic rubber, leather, or cloth.

5. The symptoms of parathion or Guthion poisoning include blurred vision, weakness, nausea, cramps, diarrhea, and tightness or discomfort in the chest. If any of these symptoms occur while spraying with either of these pesticides, contact your doctor immediately and tell him or her what you suspect.

Follow all precautions on pesticide labels with reference to time, application rate, and total amount to apply per acre.

Nutritional Sprays

Foliar sprays of calcium and boron may be needed to prevent deficiencies. Problems related to calcium and boron deficiencies are cork spot and bitter pit of the fruit and “measles” in the bark of young trees.

Boron Sprays. Use foliar analysis to determine need for boron sprays. If the leaf level of boron is below 30 ppm, a spray using 2 pounds of Solubor per 100 gallons of water (3 pounds per acre) should be applied during October while leaves are still functional. If the Solubor spray is not used in the fall, it may be applied in the spring during bloom. No boron should be applied if the leaf level is above 45 ppm. Young trees may be sprayed with Solubor at 0.5 pound per 100 gallons of water in the first two cover sprays.

Calcium Sprays. Calcium sprays using 2 pounds of calcium chloride per 100 gallons of water (3 pounds per acre) should begin with the first cover spray. A total of three sprays should be applied at 2-week intervals. If a wetting agent is included in the cover sprays, no additional surfactants will be needed. For maximum benefit, apply a dilute spray when air temperature does not exceed 85°F. Growers having postharvest problems with bitter pit should consider using calcium chloride, as above, beginning the first week of June and continuing every 2 weeks until harvest. To minimize the russetting effect of sprays on Golden Delicious, do not apply during cool, moist weather or in the evening.

Table 4. Pesticide Tolerances and Restrictions

Material	Tolerance (ppm)	Restrictions
BAYLETON	---	DO NOT apply more than 24 ounces of Bayleton 50% Wettable Powder per season. No time limit. DO NOT graze livestock in treated orchards.
CAPTAN	25	DO NOT apply more than 80 ounces per acre per year. DO NOT graze livestock in treated orchard.
DITHANE	---	DO NOT apply after bloom. DO NOT graze livestock in treated areas. See label for season-long usage restrictions.
FERBAM	7	DO NOT use within 7 days of harvest.
FLINT	---	DO NOT use within 14 days of harvest. DO NOT apply more than 11 ounces per acre per season. DO NOT exceed more than five applications per acre per season. Use a maximum of two consecutive applications.
Lime Sulfur	EXEMPT	

Material	Tolerance (ppm)	Restrictions
NOVA	---	DO NOT use within 14 days of harvest. DO NOT apply more than 1.5 pounds per acre per year.
POLYRAM	---	DO NOT apply after bloom. DO NOT make more than four applications per season. DO NOT apply more than 24 pounds per acre per season.
PROCURE	---	DO NOT use within 14 days of harvest.
SOVRAN	---	DO NOT apply within 30 days of harvest. Make no more than four applications of 6.4 ounces per acre per season.
Streptomycin	0.25	DO NOT apply within 50 days of harvest. May cause allergic skin reactions. Limit to 48 ounces per acre per application.
SYLLIT*	5	DO NOT use within 7 days of harvest. DO NOT feed pomace to livestock.
TOPSIN-M	---	No time limit.
ZIRAM	---	DO NOT apply within 14 days of harvest. DO NOT apply more than 56 pounds per crop cycle.

* Follow all precautions given in schedule and on labels with reference to time and rate of application. Failure to do so may result in seizure of the crop by Food and Drug Inspectors, the EPA, or the U.S. Department of Health, Education, and Welfare. Read and observe precautions printed on all labels.

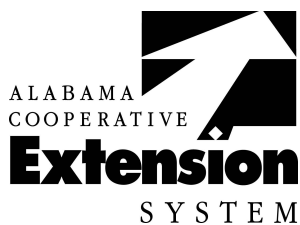
2011 IPM-0011

For more information, contact your county Extension office. Visit <http://www.aces.edu/counties> or look in your telephone directory under your county's name to find contact information.

Use pesticides **only** according to the directions on the label. Follow all directions, precautions, and restrictions that are listed. Do not use pesticides on plants that are not listed on the label.

The pesticide rates in this publication are recommended **only** if they are registered with the Environmental Protection Agency or the Alabama Department of Agriculture and Industries. If a registration is changed or canceled, the rate listed here is no longer recommended. Before you apply **any** pesticide, check with your county Extension agent for the latest information.

Trade names are used **only** to give specific information. The Alabama Cooperative Extension System does not endorse or guarantee any product and does not recommend one product instead of another that might be similar.



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