UF IFAS Extension UNIVERSITY of FLORIDA

HS88

Weed Management in Apple[1]

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Weeds compete with apple trees for light, nutrients, and water. Weed interference can be minimized with proper cultural practices and herbicides. General maintenance, such as controlling weeds in adjacent areas (i.e., nearby fields, ditches, and driving paths), preventing weeds from producing seeds, and cleaning mowing equipment of weed seed, will prevent weeds from becoming a serious problem. Cultivation can be used but should be shallow to prevent root pruning and soil erosion.

Chemical Control

Herbicides available for weed control in apple are included in Tables 1 and 2. Table 1 lists herbicides that control weeds before they emerge (preemergence). Table 2 lists herbicides that control weeds after they emerge (postemergence). Because soil types in Florida vary, consult the labels for application rate restrictions based on soil type. Bearing trees are apple trees that are currently producing fruit. Nonbearing trees are apple trees that will not produce fruit for a year after application. The tables include preharvest intervals (PHI) and restricted-entry intervals (REI).

Practices for improving weed control with herbicides are as follows:

1. **Herbicide selection.** Preemergence herbicides control the weeds before they emerge from the seed or soil surface. Postemergence herbicides control weeds that have emerged through the soil surface.

2. **Optimal timing.** Preemergence herbicides should be applied in the early spring or fall before annual weeds emerge. Postemergence herbicide efficacy decreases as weeds grow. Consult the label for the correct size of weed to control.

3. **Sufficient coverage.** Herbicide labels require certain gallons per acre (GPA) or nozzle types for proper coverage. Before spraying, check that all nozzles have a correct spray pattern and correct output.

4. **Adequate activation**. Preemergence herbicides require rainfall or irrigation to move the herbicide into the soil profile where the weed seeds are present. Postemergence herbicides require a nonionic surfactant, crop oil concentrate, or methylated seed oil for increased herbicide uptake.

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Herbicide Resistance

Herbicide-resistant weeds are a continuous and growing concern for farmers. Methods for reducing the chances of herbicide resistance include:

1. **Rotate herbicide's mode of action**. Each herbicide's mode of action (MOA) is assigned a numerical group. Tables 1 and 2 list the MOA for each herbicide. Rotate between modes of action/numerical groups.

2. **Include multiple MOA.** Many herbicides allow for tank mixing. It is often suggested that preemergence herbicides be tank mixed with a postemergence herbicide. This method controls weeds that will emerge as well as weeds that have already emerged.

3. **Managing known resistance**. If an area of the field is known to have a resistant weed species, use mechanical weed removal to prevent the weed from producing seeds or other methods of propagation.

Table 1. Preemergence weed control in apple.

Common name lb a.i. / A	(Trade name) formulation amount of product / A	Weeds controlled
Dichlobenil, MOA 20 4–6 1.96–3.92	(Casoron®) 4G 100–150 lb. (Casoron®) 1.4 CS 1.4–2.8 gal.	Annual and some perennial weeds
Remarks: Apply to bearing and nonbearing trees. Higher rates required for perennial weed control. Casoron® 1.4 CS should not be applied until 1 year after transplanting. Casoron® 4G should not be applied until 4 weeks after transplanting. Tank mix with postemergence herbicides for broader spectrum of weed control. Casoron® 4G REI 12 hours. Casoron® 1.4 CS REI 24 hours.		
Diuron, MOA 7 1.2–3.2	(Diuron, Karmex®, Karmex® XP) 80 WDG 2–4 lb. (Direx®) 4 L 1.6–3.2 qt.	Annual broadleaf and grass weeds
Remarks: Bearing and nonbearing trees. Do not apply to varieties grafted to full-dwarf rootstocks. Do not apply to newly transplanted trees until 1 year after planting. A rainfall event or irrigation of 0.5–2 in. is required within 2 weeks of application. Apply as a split application after harvest and before bud break with 90 days between applications. REI 12 hours.		
Flumioxazin, MOA 14 0.188–0.38	(Chateau®) 51 WDG 6–12 oz.	Broadleaf and annual grass weeds
Remarks: Bearing and nonbearing trees. A maximum of 6 oz./A per application in soils with a sand plus gravel content greater than 80% on trees less than 3 years of age. Apply between final harvest and pink bud. Reduce contact to foliage and green bark. Do not apply until 1 year after transplanting. PHI 60 days. REI 12 hours.		
Halosulfuron, MOA 2 0.02–0.05	(Sandea®) 75 WDG 0.5–1 oz.	Broadleaf and nutsedge weeds
Remarks: Bearing and nonbearing trees. Do not apply until 1 year after planting and soil has settled around the tree roots. Direct spray solution to the base of the tree and minimize contact with trunk, stems, roots, and foliage. Do not apply when orchard temperatures exceed 85°F. May be tank mixed with glyphosate to broaden spectrum of weed control. Sequential application may be required, but do not exceed 2 oz./A per season. PHI 1 day. REI 12 hours.		
Indaziflam, MOA 29 0.065	(Alion™) 5 fl. oz.	
Remarks: Bearing trees only. Allow 90 days between applications. Do not exceed 10.3 fl. oz. per year year. REI 12 hours.		
Isoxaben, MOA 12 0.5–1.0	(Gallery®, Gallery® T&V) 75 DF 0.66–1.33 lb.	Certain broadleaf weeds
Remarks: Nonbearing trees. Direct spray solution to the base of the tree. A rainfall event or irrigation of 0.5 in. or more must occur within 21 days after application. Consult label for herbicides that can be tank mixed to broaden spectrum of weed control. REI 12 hours.		
Isoxaben, MOA 12 + **Oryzalin**, MOA 3 2.0–4.0 + 0.5–1	(Snapshot®) 2.5 TG 100–200 lb.	Certain broadleaf and annual grass weeds
Remarks: Apply to nonbearing trees. Apply with a drop or rotary spreader. Requires 0.5 in. or more of rainfall or irrigation within 3 days of application for activation. Do not exceed 600 lb./A per year. REI 12 hours.		
Norflurazon, MOA 12 0.98–1.18	(Solicam®) 80 WDG 1.25–1.50 lb.	Small-seed broadleaf and annual grass weeds
Remarks: Bearing and nonbearing plants. Do not apply before 12 months after planting. Temporary loss of pigment (whitening) in leaf veins may occur with normal use. Rainfall or irrigation is required within 4 weeks of application. Consult label for postemergence herbicides that can be tank mixed to broaden spectrum of weed control. Can be applied as a sequential application, but do not exceed 1.97–2.95 lb. a.i./A per year. PHI 60 days. REI 12 hours.		
Oryzalin, MOA 3 2–6	(Oryzalin, Surflan®) 4 AS 2–6 qt.	Certain annual broadleaf and grass weeds
Remarks: Bearing and nonbearing trees. Apply as a sequential treatment with 2.5 months between applications. Do not exceed 12 lb. a.i./A per year. Irrigation or rain event of 0.5–1 in. must occur within 1 week of application. Consult label for herbicides that can be tank mixed to broaden spectrum of weed control. REI 24 hours.		
Oxyfluorfen, MOA 14 1.25–2.0	(Goal® 2XL, Galigan®) 2 EC 5–8 pt. (Goal Tender®) 4 E 2.5–4 pt.	Broadleaf and grass weeds

Common name lb a.i. / A	(Trade name) formulation amount of product / A	Weeds controlled
Remarks: Bearing and nonbearing trees. Must be applied when trees are dormant. Direct spray solution to the base of the tree. Broadcast application cannot exceed 1.5 lb. a.i./A, and banded application cannot exceed 2.0 lb. a.i./A. Apply to healthy, growing trees. Consult label for herbicides that can be tank mixed to broaden weed control. REI 24 hours.		
Pendimethalin, MOA 3 1.9–6.0	(Prowl®H_2O) 3.8 2.0–6.3 qt. (Prowl®, Pendulum®) 3.3 EC 2.3–7.3 qt.	Broadleaf and grass weeds
Remarks: Nonbearing trees. Direct spray solution to the base of the trees. Apply during the dormant period as a single application or sequential application with 30 days between applications. After application, 1–2 in. of rainfall or irrigation are required for activation. For newly transplanted trees, apply after a rain or irrigation event settles soil around the roots. PHI 90 days. REI 24 hours.		
Pronamide, MOA 3 1–2	(Kerb®) 50 W 2–4 lb.	Certain broadleaf and grass weeds
Remarks: Apply to bearing and nonbearing trees. Do not apply until 1 year after fall transplanting or 6 months after spring transplanting. Apply in the fall when temperatures are below 55°F and before soil freezes. Do not apply more than 2 lb./A per year. REI 24 hours.		
Rimsulfuron, MOA 2 0.03–0.06	(Matrix® FNV) 25 WG 2–4 oz.	Certain broadleaf weeds and annual grasses
Remarks: Bearing and nonbearing trees. Do not treat trees until 1 year after planting. Rainfall or irrigation required within 2–3 weeks of application. Do not apply within 7 days of harvest. If application is made to 50% of orchard floor, use a split application not exceeding 0.063 lb. a.i./A. Allow 30 days between applications. Consult label for herbicides that can be tank mixed to broaden weed control. PHI 7 days. REI 4 hours.		
Simazine, MOA 5 2–4	(Princep®, Simazine) 90 WDG 2.2–4.4 lb. (Princep®, Simazine) 4 L 2–4 qt.	Annual broadleaf and grass weeds
Remarks: Apply to bearing and nonbearing trees. Direct spray solution to the base of the trees and avoid contact with fruit, foliage, and stems. Do not apply more than 4 lb. a.i./A per 12-month period. Do not apply until 1 year after transplanting. Do not irrigate more than 0.5 in. PHI 150 days. REI 48 hours.		
Terbacil, MOA 5 0.4–1.6	(Sinbar®) 80 WP 0.5–2 lb.	Annual broadleaf and grass weeds
Remarks: Nonbearing trees: Apply to newly planted trees after a significant rainfall or irrigation that will allow soil to settle around the tree base. Make one to two applications per season and do not exceed 1 lb./A. *Bearing trees:* Apply 2 lb./A. Direct spray to the base of the tree and minimize contact with foliage and fruit. PHI 60 days. *Bearing and nonbearing:* Do not apply to soils containing less than 1% organic matter. Approximately 0.5–1.0 in. of rainfall or irrigation is required within 2 weeks of application. Consult label for herbicides that can be tank mixed to broaden spectrum of weed control. REI 12 hours.		

Table 2. Postemergence weed control in apple.

Common name lb. a.i. / A	(Trade name) formulation amount of product / A	Weeds controlled
2,4-D, MOA 4 0.95–1.4	(Various formulations) 3.8 SL 2–3 pt.	Broadleaf weeds
Remarks: Bearing and nonbearing trees. Some labels restrict application to 0.95 lb. a.i./A per application. Do not apply during bloom. Trees must be at least 1 year old. Do not apply more than twice per year; allow 75 days between applications. PHI 14 days. REI 48 hours.		
Carfentrazone, MOA 14 0.016–0.031	(Aim®) 2 EC 1–2 fl. oz. (Aim®) 1.9 EW 1–2 fl. oz.	Broadleaf weeds
Remarks: Apply to bearing and nonbearing trees. Direct spray solution to the base of the tree with a hooded sprayer to minimize contact with green stems, foliage, blooms, and fruit. Include a nonionic surfactant at 0.25% v/v or methylated seed oil or crop oil concentrate at 1%–2% v/v. Do not apply within 3 days of harvest. Consult label for herbicides that can be tank mixed to broaden weed control. PHI 3 days. REI 12 hours.		
Clethodim, MOA 1 0.09–0.125	(Select®, Select Max®) 2 EC 6–8 fl. oz. (Select Max®) 1 EC 9–16 fl. oz.	Annual and perennial grass weeds
Remarks: Apply to nonbearing trees. Include a nonionic surfactant at 0.25% v/v. Direct the spray to the base of the tree. REI 24 hours.		
Diquat, MOA 22 0.7–0.9	(Diquat) 2 L 1.5–2.0 pt.	Broadleaf and grass weeds
Remarks: Apply to nonbearing trees. Direct spray to the base of the tree to minimize contact with green stems and foliage. Include a nonionic surfactant at 0.06%–0.5%. REI 24 hours.		
Diuron, MOA 7 1.2–1.6	(Diuron, Karmex®, Karmex® XP) 80 WDG 1.5–2 lb. (Direx®) 4 L 1.2–1.6 qt.	Annual broadleaf and grass weeds
Remarks: Apply to bearing and nonbearing trees. DO NOT apply to varieties grafted to full-dwarf rootstocks. Do not apply to newly transplanted trees until 1 year after planting. Apply as a split application after harvest and before bud break with 90 days between applications.		
Flumioxazin, MOA 14 0.188–0.38	(Chateau®) 51 WDG 6–12 oz.	Broadleaf weeds
Remarks: Apply to bearing and nonbearing trees. Apply only between final harvest and pink bud. Reduce contact with foliage and green bark. Do not apply until 1 year after transplanting. Include a nonionic surfactant at 0.25% v/v or crop oil concentrate at 1 qt./A. Do not apply within 60 days of harvest.		
Fluazifop, MOA 1 0.25–0.375	(Fusilade® DX) 2 EC 16–24 fl. oz.	Annual and perennial grass weeds
Remarks: Apply to nonbearing trees. Direct the spray solution to the base of the trees and avoid contact with foliage. Include a nonionic surfactant at 0.25% v/v or crop oil concentration at 1% v/v.		
Glufosinate, MOA 10 0.75–1.25	(Rely® 200) 1.67 SL 58–96 fl. oz. (Reckon™, Rely® 280) 2.34 SL 48–82 fl. oz.	Broadleaf and grass weeds
Remarks: Apply to bearing and nonbearing trees. Direct the spray solution to the base of the trees and avoid contact with green, noncallused bark on young trees. Do not apply until 1 year after transplanting unless protected by nonporous wraps, grow tubes, or waxed containers. Consult label for herbicides that can be tank mixed to broaden weed control. Do not apply within 14 days of harvest.		
Glyphosate, MOA 9 0.5–1.5	(Various formulations) Read label for amount	Broadleaf and grass weeds
Remarks: Apply to bearing and nonbearing trees. Direct spray solution to the base of the trees to minimize contact with green bark, foliage, and fruit. Consult label for herbicides that can be tank mixed to broaden weed control. Do not apply within 1 day of harvest.		
Halosulfuron, MOA 2 0.02–0.05	(Sandea®) 75 WDG 0.5–1 oz.	Broadleaf and nutsedge weeds
Remarks: Bearing and nonbearing trees. Do not apply until 1 year after planting and soil has settled around the tree roots. Direct spray solution to the base of the tree and minimize contact with trunk, stems, roots, and foliage. Do not apply when orchard temperatures exceed 85°F. Include a nonionic surfactant at 0.25% v/v. May be tank mixed with glyphosate to broaden spectrum of weed control. Sequential application may be required, but do not exceed 2 oz./A per season. Do not apply within 1 day of harvest. REI 12 hours.		

Common name lb. a.i. / A	(Trade name) formulation amount of product / A	Weeds controlled
Pelargonic Acid	(Scythe®) 3%–10% v/v	Broadleaf and grass weeds
Remarks: Bearing and nonbearing trees. Contact herbicide that should be applied with a shielded sprayer and direct spray to the base of the tree to minimize contact with foliage and green bark. Consult label for control of suckers. Should be tank mixed with preemergence herbicide to broaden spectrum of weed control. REI 12 hours.		
Paraquat, MOA 22 0.6–1	(Gramoxone Inteon®) 2 SL 2.5–4.0 pt. (Firestorm®) 3 SL 1.7–2.7 pt.	Broadleaf and grass weeds
Remarks: Apply to nonbearing and bearing trees. Do not apply within 1 year of transplanting unless young trees are shielded or wrapped. Direct spray solution to the base of the tree to minimize contact with green stems, fruit, and foliage. Include a nonionic surfactant 0.25% v/v. Consult label for herbicides that can be tank mixed to broaden weed control. REI 24 hours.		
Pyraflufen-ethyl, MOA 14 0.0013-0.0053	Venue® 1.0-4.0 fl. oz.	Broadleaf weeds
Remarks: Apply to bearing and nonbearing trees. Apply postharvest, dormant, or prebloom. Do not exceed 3 applications per season. Include REI 12 hours.		
Rimsulfuron, MOA 2 0.063	(Matrix® FNV, Matrix® SG) 25 WG 4 oz.	Certain broadleaf weeds and annual grasses
Remarks: Apply to bearing and nonbearing trees. Do not treat trees until 1 year after planting. Rainfall is required within 2–3 weeks of application. Include a nonionic surfactant 0.25% v/v. If application is made to 50% of orchard floor, use a split application not exceeding 0.063 lb. a.i./A and allow 30 days between applications. Consult label for herbicides that can be tank mixed to broaden weed control. Do not apply within 7 days of harvest. REI 4 hours.		
Saflufenacil, MOA 14 0.04	(Treevix™) 70 WG 1 oz.	Broadleaf weeds
Remarks: Bearing and nonbearing trees. Apply as a postdirected application to the base of the tree. Apply as a single application or three sequential applications with 21 days between applications. Include methylated seed oil at 1% v/v plus ammonium sulfate at 1%–2% v/v, or urea ammonium nitrate at 1.25%–2.5% v/v. Consult label for herbicides that can be tank mixed to broaden spectrum of weed control. REI 12 hours.		
Sethoxydim, MOA 1 0.3–0.5	(Poast®) 1.5 EC 1.5–2.5 pt.	Annual and perennial grass weeds
Remarks: Apply to nonbearing and bearing trees. Include a crop oil concentrate at 1.0% v/v. Do not apply more than 7.5 pt./A per year. Do not apply within 14 days of harvest. REI 12 hours.		
Fluroxypyr, MOA 4 0.35–0.70	(Starane® Ultra) 2.8 L 0.7–1.4 pt.	Certain broadleaf weeds
Remarks: Apply to nonbearing and bearing trees. Direct spray solution to the base of the tree and minimize contact with foliage. Do not apply to trees less than 4 years old. Do not apply during bloom. Do not make more than one treatment per year. Do not apply within 14 days of harvest. REI 24 hours.		