

Weed Management in Pome Fruit (Apple and Pear)¹

Peter J. Dittmar and Jeffrey G. Williamson²

Weeds compete with pome fruit 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 and pear are included in Tables 1 and 2. Because soil types in Florida vary, consult the labels for application rate restrictions based on soil type. Bearing trees are trees that are currently producing fruit. Nonbearing trees are trees that will not produce fruit for a year after application. The tables include preharvest intervals (PHI).

All herbicides should be directed to the base of the trees; this method provides coverage of the weeds while minimizing the contact to the trees. Young trees should be protected with nonporous wraps or growth tubes to minimize uptake of the herbicide. This is especially important for systemic postemergence herbicides (for example, glyphosate) and

contact burndown herbicides (for example, paraquat, diquat, and glufosinate).

Tank mixing can broaden the spectrum of weed control. A preemergence herbicide may only control the most problematic weed in the orchard and leave some weed species unaffected. A preemergence herbicide can be tank mixed with another preemergence herbicide that controls several weed species but not the most problematic weed in the orchard.

The most common method of tank mixing is a postemergence herbicide with a preemergence herbicide. This method provides control of the weeds that are above the soil surface and controls weeds for a longer period. Consult the label for compatible tank mixing partners. If concerned, use a jar filled with the herbicides and water then agitate the jar to see if the herbicides mix.

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 break the soil surface. Postemergence herbicides control weeds that have emerged through the soil surface.

1. This document is HS88, one of a series of the Horticultural Sciences Department, UF/IFAS Extension. Original publication date October 1993. Revised June 2015. Visit the EDIS website at <http://edis.ifas.ufl.edu>.

2. Peter J. Dittmar, assistant professor; and Jeffrey G. Williamson, professor, Horticultural Sciences Department; UF/IFAS Extension, Gainesville, FL 32611.

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U.S. Department of Agriculture, UF/IFAS Extension Service, University of Florida, IFAS, Florida A & M University Cooperative Extension Program, and Boards of County Commissioners Cooperating. Nick T. Place, dean for UF/IFAS Extension.

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 nozzle types or applications of a certain number of gallons per acre (GPA) or nozzle types to ensure 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.

Herbicide Resistance

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

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 herbicides. It is often suggested that preemergence herbicides be tank mixed with a postemergence herbicide. This method controls weeds that will emerge as well as both weeds that have already and have not yet emerged.
3. **Managing known resistance.** If an area of the field is known to have a resistant weed species, use mechanical weed removal and prevent the weed from producing seeds or other methods of propagation or otherwise propagating itself. Please contact your county Extension agent to have the weed resistance confirmed and documented.

Table 1.

Common name (lb. a.i./acre)	Trade name (product/acre)	MOA	Registered crops	Crop age	Comments
Dichlobenil 4-6 1.96-3.92	Casoron® 4G 100-150 lb. (Casoron®) 1.4 CS 1.4-2.8 gal.	20	Apple Pear	Bearing/ nonbearing	<ul style="list-style-type: none"> Annual and some perennial weeds Do not use on St. Lucie fine sand, Arzell fine sand, or other light, sandy soil. 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.
Diuron 0.75-1.5	(Diuron, Karmex®, Karmex® XP) 80 WDG 2-4 lb. (Direx®) 4 L 1.2-1.6 qt.	7	Apple Pear	Bearing/ nonbearing	<ul style="list-style-type: none"> Annual broadleaf and grass weeds Do not apply in soils with less than 1% organic matter. Do not apply to varieties grafted to full-dwarf rootstocks. Do not apply until 1 year after planting. Apply as a split application after harvest and before bud break with 90 days between applications; no more than 2 applications per year. Do not apply more than 6.4 pt./acre per year.
Flumioxazin 0.188-0.38	Chateau® 51 WDG 6-12 oz.	14	Apple Pear	Bearing/ nonbearing	<ul style="list-style-type: none"> Broadleaf and annual grass weeds PHI 60 days. A maximum of 6 oz./acre per application in trees less than 3 years of age. A maximum of 12 oz./acre per application in older trees. Do not apply more than 24 oz./acre per 12 mo. period. Apply between final harvest and pink bud in apple or bud break in pear. Do not apply until 1 year after transplanting. Do not apply in non-dormant pears.
Halosulfuron 0.02-0.05	(Sanda®) 75 WDG 0.5-1 oz.	2	Apple	Bearing/ nonbearing	<ul style="list-style-type: none"> Broadleaf and nutsedge weeds PHI 14 days 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. Sequential application may be required, but do not exceed 2 oz./acre per season.
Indaziflam 0.065	Alion™ 3.5-5 fl. oz.	29	Apple Pear	Bearing	<ul style="list-style-type: none"> Broadleaf and grass weeds Allow 90 days between applications. Do not exceed 10.3 fl. oz./yr.
Isoxaben 0.5-1.0	(Gallery®, Gallery® T&V) 75 DF 0.66-1.33 lb.	12	Apple Pear	Nonbearing	<ul style="list-style-type: none"> Certain broadleaf weeds 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.
Norflurazon 1.97-3.93	(Solicam®) 78.6 DF 2.5- 5.0 lb.	12	Apple Pear	Bearing/ nonbearing	<ul style="list-style-type: none"> Small seed broadleaf and annual grass weeds PHI 60 days In apples, can be applied after soil has settled; in pear, wait 12 months. Temporary loss of pigment (whitening) in leaf veins may occur with normal use. Consult label for rate based on soil type. Can be applied as a sequential application, but do not exceed 1.97-2.95 lb. a.i./acre per year.

Common name (lb. a.i./acre)	Trade name (product/acre)	MOA	Registered crops	Crop age	Comments
Oryzalin 2–6	Oryzalin, Surflan® 4 AS 2–6 qt.	3	Apple Pear	Bearing/ nonbearing	<ul style="list-style-type: none"> Certain annual broadleaf and grass weeds Apply as a sequential treatment with 2.5 months between applications. Do not exceed 12 lb. a.i./acre per year. Irrigation or rain event of 0.5–1 in. must occur within 1 week of application.
Oxyfluorfen 1.25–2.0	(Goal® 2XL, Galigan®) 2 EC 5–8 pt. (GoalTender®) 4 E 2.5–4 pt.	14	Apple Pear	Bearing/ nonbearing	<ul style="list-style-type: none"> Broadleaf and grass weeds 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./acre and banded application cannot exceed 2.0 lb. a.i./acre. Apply to healthy, growing trees.
Pendimethalin 1.9–6.0	(Prowl® H ₂ O) 3.8 2.0–6.3 qt. (Prowl®, Pendulum®) 3.3 EC 2.3–7.3 qt.	3	Apple Pear	Bearing/ nonbearing	<ul style="list-style-type: none"> Broadleaf and grass weeds PHI 90 days Not all formulations are registered for bearing and nonbearing; check the label before application. Apply during the dormant period before bud break. Apply as a single application or sequential application with 30 days between applications. Do not apply more than 1.98 lb. a.i./acre per year.
Pronamide 1–3	(Kerb®) 50 W 2–6 lb.	3	Apple Pear	Bearing/ nonbearing	<ul style="list-style-type: none"> Certain broadleaf and grass weeds Do not apply until 1 year after fall transplanting or 6 months after spring transplanting. Apply in the fall after harvest and before soil freezes. Do not apply more than 2 lb./acre per year.
Rimsulfuron 0.03–0.06	(Matrix® FNV) 25 WG 2–4 oz.	2	Apple Pear	Bearing/ nonbearing	<ul style="list-style-type: none"> Certain broadleaf weeds and annual grasses, nutsedge PHI 7 days Do not treat trees until 1 year after planting. Rainfall or irrigation required within 2–3 weeks of application. If application is made to 50% of orchard floor, use a split application not exceeding 0.063 lb. a.i./acre. Allow 30 days between applications.
Simazine 2–4	(Princep®, Simazine) 90 WDG 2.2–4.4 lb. (Princep®, Simazine) 4 L 2–4 qt.	5	Apple Pear	Bearing/ nonbearing	<ul style="list-style-type: none"> Annual broadleaf and grass weeds PHI 150 days 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./acre per 12-month period. Do not apply until 1 year after transplanting.
Terbacil 0.4–1.6	(Sinbar®) 80 WP 0.5–2 lb.	5	Apple	Bearing/ nonbearing	<ul style="list-style-type: none"> Annual broadleaf and grass weeds PHI 60 days <i>Bearing and nonbearing:</i> 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. <i>Nonbearing trees:</i> 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./acre. <i>Bearing trees:</i> Apply 2 lb./acre. Direct spray to the base of the tree and minimize contact with foliage and fruit.

Table 2. Postemergence chemical weed control in pome fruit crops (apple, pear)

Common name (lb. a.i./acre)	Trade name (product/acre)	MOA	Registered crops	Crop age	Comments
2,4-D (4) 0.95–1.4	(Various formulations) 3.8 SL 2–3 pt.	4	Apple Pear	Bearing / nonbearing	<ul style="list-style-type: none"> Broadleaf weed PHI 14 days Some labels restrict application to 0.95 lb. a.i./acre 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.
Carfentrazone 0.016–0.031	(Aim®) 2 EC 1–2 fl. oz. (Aim®) 1.9 EW 1–2 fl. oz.	14	Apple Pear	Bearing / nonbearing	<ul style="list-style-type: none"> Broadleaf weeds PHI 3 days 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. Do not apply more than 0.124 lb. a.i./acre per season.
Clethodim 0.09–0.125	(Arrow®) 2 EC 6–8 fl. oz. (Select Max®) 1 EC 9–16 fl. oz.	1	Apple Pear	Nonbearing	<ul style="list-style-type: none"> Annual and perennial grass weeds Include a nonionic surfactant at 0.25% v/v. Direct the spray to the base of the tree.
Diquat 0.7–0.9	(Diquat) 2L 1.5–2.0 pt.	22	Apple Pear	Nonbearing	<ul style="list-style-type: none"> Broadleaf and grass weeds 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%.
Diuron 1.2–1.6	(Diuron, Karmex®, Karmex® XP) 80 WDG 1.5–2 lb. (Direx®) 4 L 1.2–1.6 qt.	7	Apple Diuron	Bearing / nonbearing	<ul style="list-style-type: none"> Annual broadleaf and grass weeds 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.
Fluazifop 0.25–0.375	(Fusilade® DX) 2 EC 16–24 fl. oz.	1	Apple Pear	Nonbearing	<ul style="list-style-type: none"> Annual and perennial grass weeds 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 0.75–1.25	(Rely® 280) 2.34 SL 48–82 fl. oz.	10	Apple Pear	Bearing / nonbearing	<ul style="list-style-type: none"> Broadleaf and grass weeds PHI 14 days Direct the spray solution to the base of the trees and avoid contact with green, uncallused bark. Do not apply until 1 year after transplanting, unless protected by nonporous wraps, grow tubes, or waxed containers. Minimum of 14 days between applications.
Glyphosate 0.5–1.5	(Various formulations) Read label for amount	9	Apple Pear	Bearing / nonbearing	<ul style="list-style-type: none"> Broadleaf and grass weeds PHI 1 day Direct spray solution to the base of the trees to minimize contact with green bark, foliage, and fruit.

Common name (lb. a.i./acre)	Trade name (product/acre)	MOA	Registered crops	Crop age	Comments
Halosulfuron 0.02–0.05	(Sanda [®]) 75 WDG 0.5–1 oz.	2	Apple	Bearing / nonbearing	<ul style="list-style-type: none"> Broadleaf and nutsedge weeds PHI 14 days 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. Sequential application may be required, but do not exceed 2 oz./acre per season.
Paraquat 0.6–1	(Gramoxone Inteon [®]) 2 SL 2.5–4.0 pt. (Firestorm [®]) 3 SL 1.7–2.7 pt.	22	Apple Pear	Bearing / nonbearing	<ul style="list-style-type: none"> Broadleaf and grass weeds 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. Limit of 5 applications/year. Include a nonionic surfactant 0.25% v/v.
Pelargonic acid	(Scythe [®]) 3%–10% v/v	27	Apple Pear	Bearing / nonbearing	<ul style="list-style-type: none"> Broadleaf and grass weeds 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.
Rimsulfuron 0.063	(Matrix [®] FNV, Matrix [®] SG) 25 WG 4 oz.	2	Apple Pear	Bearing / nonbearing	<ul style="list-style-type: none"> Certain broadleaf weeds and annual grasses PHI 7 days 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./acre and allow 30 days between applications.
Saflufenacil 0.04	(Treevix [™]) 70 WG 1 oz.	14	Apple Pear	Bearing / nonbearing	<ul style="list-style-type: none"> Broadleaf weeds 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.
Sethoxydim 0.3–0.5	(Poast [®]) 1.5 EC 1.5–2.5 pt.	1	Apple Pear	Bearing / nonbearing	<ul style="list-style-type: none"> Annual and perennial grass weeds PHI 14 days Include a crop oil concentrate at 1.0% v/v. Do not apply more than 7.5 pt./acre per year.