

# Weed Management in Stone Fruit Tree Crops (Nectarine, Peach, and Plum)<sup>1</sup>

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Proper weed management is important for a healthy stone fruit orchard. Stone fruit trees and weeds compete for water, nutrients, and light. North Carolina State University reported that 12 weeks of weed control after bloom produced greater total yield and fruit diameter than that of a weedy plot (MacRae et al. 2007). Weeds serve as hosts for insects that cause catfacing and for nematodes that carry viral diseases.

Stone fruit growers use a system of turf and weed-free strips under the trees (Figure 1). A weed-free zone under the trees reduces the impact of weeds on peach tree growth. For the first 2–3 years, a strip 4–6 ft. wide is maintained weed free. After 3 years, the weed-free strip is widened to 10–12 ft. Turf strips are mowed or growth is chemically controlled on a regular basis. The turf minimizes erosion and provides an area for machinery and picking crews.

Nonchemical weed management practices are part of a complete weed management program. Cultivation was once a common practice for weed management in peaches. This management practice is not as widely used now because of tree root pruning, erosion, and reduced radiant heat in the spring. Reduce the spread of weed species by controlling the plants before seeds are produced and by cleaning mowing equipment. Mulches provide weed control but can be cost prohibitive.



Figure 1. Weed-free strip under peach trees and grass strips between rows

Credits: Peter J. Dittmar

## Chemical Control

Herbicides available for weed control in stone fruit 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).

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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.
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.

## Reference

MacRae, A. W., W. E. Mitchem, D. W. Monks, M. L. Parker, and R. K. Galloway. 2007. "Tree growth, fruit size, and yield response of mature peach to weed-free intervals." *Weed Technol.* 21 (1): 102–105.

Table 1. Preemergence chemical weed control in stone fruit crops (peach, nectarine, plum)

Common name (lb. a.i./acre)	Trade name (product/acre)	MOA	Registered crops	Crop age	Comments
<b>Diuron</b> 1.6-2.2	(Diuron, Karmex®, or Karmex®XP) 80 WDG 2-2.75 lb. (Diuron, Direx®) 4 L 4.4 qt.	7	Peach	Bearing	<ul style="list-style-type: none"> <li>Annual broadleaf and grass weeds</li> <li>PHI 20 days for Karmex® DF; PHI 3 mos. for Diuron 4 L</li> <li>Use in established orchards at least 3 years of age. Do not apply more than 4.4 pt./acre per application. Do not use on soils with less than 0.5% organic matter.</li> </ul>
<b>Flumioxazin</b> 0.19-0.38	(Chateau®) 51 WDG 6-12 oz.	14	Peach Nectarine Plum	Bearing / nonbearing	<ul style="list-style-type: none"> <li>Broadleaf weeds</li> <li>PHI 60 days</li> <li>A maximum of 6 oz./acre per application in soils with a sand plus gravel content greater than 80% on trees less than 3 years of age. Do not apply more than 24 oz./yr. Best results if applied as a split application with a minimum of 30 days between applications. Avoid direct or indirect spray contact with foliage and green bark. Do not apply after flowering unless using a shielded sprayer. Do not apply to trees established less than 1 year unless trees are protected from spray.</li> </ul>
<b>Indaziflam</b> 0.065	(Alion™) 5 fl. oz	29	Peach Nectarine Plum	Bearing	<ul style="list-style-type: none"> <li>Broadleaf and grass weeds</li> <li>PHI 14 days</li> <li>Trees must have been established for 3 years. Rate is dependent on soil type. Allow 90 days between applications. Do not exceed 10.3 fl. oz./yr.</li> </ul>
<b>Isoxaben</b> 0.5-1.0	(Gallery® or Gallery® T&V) 75 DF 0.66-1.33 lb.	12	Peach Nectarine Plum	Nonbearing	<ul style="list-style-type: none"> <li>Certain broadleaf weeds</li> <li>Direct spray solution to the base of the tree. Apply after a rain event or irrigation to settle soil around newly transplanted trees. Within 21 days of application, 0.5 in. or more of rainfall or irrigation is required for activation. Consult label for herbicides that can be tank mixed to broaden spectrum of weed control.</li> </ul>
<b>Norflurazon</b> 1.25-1.50 lb.	(Solicam®) 80 WDG 1.25-1.50 lb.	12	Peach Nectarine Plum	Bearing / nonbearing	<ul style="list-style-type: none"> <li>Small-seed broadleaf and annual grass weeds</li> <li>PHI 60 days</li> <li>Do not apply until 6 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. Can be applied as a sequential application, but do not exceed 1.97 to 3.93 lb. a.i./acre per year.</li> </ul>
<b>Oryzalin</b> 2-6	(Oryzalin, Surflan®) 4 AS 2-6 qt.	3	Peach Nectarine Plum	Bearing / nonbearing	<ul style="list-style-type: none"> <li>Certain annual broadleaf and grass weeds</li> <li>Apply as a sequential treatment with 2.5 months. between applications. Do not exceed 12 lb. a.i./acre per yr. Irrigation or a rain event of 0.5-1 in. is required within 1 week of application. Consult label for herbicides that can be tank mixed to broaden spectrum of weed control.</li> </ul>
<b>Oxyfluorfen</b> 1.25-1.5	(Goal® 2 XL or Galigan®) 2 EC 5-8 pt. (GoalTender®) 4E 2.5-4 pt.	14	Peach Nectarine Plum	Nonbearing	<ul style="list-style-type: none"> <li>Broadleaf and grass weeds</li> <li>Apply after dormancy is initiated and before bud break. Do not apply more than 1.5 lb. a.i./acre per year in broadcast applications and 2 lb. a.i./acre per year in banded applications. Direct spray solution to the base of the tree using a shielded sprayer.</li> </ul>

Common name (lb. a.i./acre)	Trade name (product/acre)	MOA	Registered crops	Crop age	Comments
<b>Pendimethalin</b> 1.9–6.0	(Prowl® H <sub>2</sub> O) 3.8 2.0–6.3 qt. (Prowl®, Pendulum®) 3.3 EC 2.3–7.3 qt	3	Peach Nectarine Plum	Bearing / nonbearing	<ul style="list-style-type: none"> <li>Broadleaf and grass weeds</li> <li>PHI 60 days</li> <li>Apply during the dormant period. Apply 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 soil has settled around the roots. Prowl® H<sub>2</sub>O is registered for bearing and nonbearing. Prowl® is nonbearing only.</li> </ul>
<b>Pronamide</b> 1–2	(Kerb®) 50 W 2–4 lb.	3	Peach Nectarine Plum	Bearing / nonbearing	<ul style="list-style-type: none"> <li>Broadleaf and grass weeds</li> <li>Do not apply until 1 year after fall transplanting or 6 months after spring transplanting. Direct spray solution to the base of the tree after fruit harvest. Apply in the fall when temperatures are below 55°F and before soil freezes. Do not apply more than 4 lb. a.i./acre or more than one application per year.</li> </ul>
<b>Rimsulfuron</b> 0.03–0.06	(Matrix® FNV, Matrix® SG) 25 WG 2–4 oz.	2	Peach Nectarine Plum	Bearing/ nonbearing	<ul style="list-style-type: none"> <li>Broadleaf, grass, and nutsedge weeds</li> <li>PHI 14 days</li> <li>Apply after trees are 1 year old. Broadcast application is limited to one application per year at 4 oz./acre per year. Banded application may be applied twice a year with 30 days between applications, not to exceed 4 oz./acre per year. Direct spray solution to the base of the tree, avoiding contact with foliage and fruit.</li> </ul>
<b>Simazine</b> 1.6–4	(Princep®, Simazine) 90 WDG 1.77–4.4 lb. (Princep®, Simazine) 4 L 1.6–4 qt.	5	Peach Plum	Bearing / nonbearing	<ul style="list-style-type: none"> <li>Annual broadleaf and grass weeds</li> <li>Do not apply more than 4 lb. a.i./acre per year. Apply half the maximum in the fall and the other half in the spring before weed emergence. Apply in late fall to early spring prior to weed emergence. Consult label for herbicides that can be tank mixed to broaden spectrum of weed control.</li> </ul>
<b>Terbacil</b> 0.4–1.6	(Sinbar®) 80 WP 0.5–2 lb	5	Peach Plum	Bearing / nonbearing	<ul style="list-style-type: none"> <li>Broadleaf and grass weeds</li> <li>PHI 60 days</li> <li><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.</li> <li><i>Nonbearing trees:</i> Apply to newly planted trees after a soil has settled around the tree base. Make one to two applications per season; do not exceed 1 lb./acre.</li> <li><i>Bearing trees:</i> Apply 2 lb./acre. Direct spray to the base of the tree and minimize contact with foliage and fruit. PHI 60 days.</li> </ul>
<b>Trifluralin</b> 0.5–2	(Triflurex®, Treflan®, Trust®) 4 EC 1–4 pt. (Treflan®) 10 G 5–20 lb.	3	Peach Nectarine Plum	Bearing / nonbearing	<ul style="list-style-type: none"> <li>Broadleaf and grass weeds</li> <li>PHI 60 days</li> <li>Apply 0.5–0.75 lb. a.i./acre for newly transplanted trees after soil has settled. Apply 1–2 lb. a.i./acre for established trees. Within 3 days of application, 0.5–2 in. of rainfall or irrigation are required for activation. Consult label for restriction based on soil type.</li> </ul>

Table 2. Postemergence chemical weed control in stone fruit crops (peach, nectarine, plum)

Common name (MOA) lb. a.i./acre	Trade name (product/acre)	MOA	Registered crops	Crop age	Comments
<b>2,4-D</b> 1.43	Drexel De-Amine	4	Peach Nectarine Plum	Bearing / nonbearing	<ul style="list-style-type: none"> <li>Broadleaf weeds</li> <li>PHI 40 days</li> <li>Consult individual labels for amount of formulation to include in spray solution. Do not apply during bloom. Trees must be at least 1 year old. Prevent drift from contacting foliage, fruit, stems, and trunk of the tree. Do not apply more than 2 lb. a.i./acre per application, and do not make more than two applications in a growing season. Allow 75 days between applications.</li> </ul>
<b>Carfentrazone</b> Up to 0.031	(Aim®) 2 EC Up to 2.0 fl. oz. (Aim®) 1.9 EW Up to 2.0 fl. oz.	14	Peach Nectarine Plum	Bearing / nonbearing	<ul style="list-style-type: none"> <li>Broadleaf weeds.</li> <li>PHI 3 days.</li> <li>Consult label for appropriate rate based on weed species. Do not apply more than 0.124 lb. a.i./acre in a growing season. Apply with a hooded sprayer directly to the base of the tree to reduce contact with green stem tissue, desirable fruit, blooms, and foliage. Applications must be 14 days apart. Include a nonionic surfactant at 0.25% v/v or crop oil concentrate at 1% v/v.</li> </ul>
<b>Clethodim</b> 0.14–0.25	(Arrow®, Select®) 2 EC 6–8 fl. oz. (Select Max®) 1 EC 9–16 fl. oz.	1	Peach Nectarine Plum	Nonbearing Bearing (Select Max only)	<ul style="list-style-type: none"> <li>Annual and perennial grass weeds</li> <li>PHI 14 days</li> <li>Direct the spray to the base of the tree. Do not apply more than 16 fl. oz./acre in a single application and no more than 64 fl. oz./acre per season. Include a nonionic surfactant at 0.25% v/v.</li> </ul>
<b>Clopyralid</b> 0.12–0.25	(Clopvr AG) 3 EC 0.33–0.66 pt.	4	Peach Nectarine Plum	Bearing / nonbearing	<ul style="list-style-type: none"> <li>Broadleaf weeds</li> <li>PHI 30 days</li> <li>Do not exceed 0.25 lb. a.i./acre in a single application. Apply one to two broadcast applications per year.</li> </ul>
<b>Diquat</b> 0.7–0.9	(Diquat) 2 L 1.5–2.0 pt.	22	Peach Nectarine Plum	Nonbearing	<ul style="list-style-type: none"> <li>Broadleaf and grass weeds</li> <li>A maximum of 6 oz./acre per application in soils that have a sand plus gravel content greater than 80% on trees less than 3 years of age. Do not apply more than 24 oz. per year. Best results if applied as a split application with a minimum of 30 days between applications. Avoid direct or indirect spray contact to foliage and green bark. Do not apply after flowering unless using a shielded sprayer.</li> </ul>
<b>Fluazifop</b> 0.25–0.38	(Fusilade® DX) 2 EC 16–24 fl. oz.	1	Peach Nectarine Plum	Bearing / nonbearing	<ul style="list-style-type: none"> <li>Annual and perennial grass weeds</li> <li>PHI 14 days</li> <li>Direct spray solution to the base of the tree to minimize contact with leaves. Do not apply more than 72 fl. oz./acre per season. Include nonionic surfactant at 0.25%–0.5% v/v or crop oil concentrate at 1% v/v. Do not apply when harvestable fruit are on the ground.</li> </ul>
<b>Glufosinate</b> 0.88–1.50	(Rely®, Cheetah™) 48-82 fl. oz./A	10	Peach Nectarine Plum	Bearing / nonbearing	<ul style="list-style-type: none"> <li>Broadleaf and grass weeds</li> <li>PHI 14 days</li> <li>Rate is dependent on the size of weeds. Do not exceed 164 fl. oz./acre per 12 months. Minimum of 28 days between sequential applications. Apply only to trees with mature brown bark or those protected by nonporous wrap or grow tubes.</li> </ul>

Common name (MOA) lb. a.i./acre	Trade name (product/acre)	MOA	Registered crops	Crop age	Comments
<b>Glyphosate</b> 0.47–4.5	(Various formulations)	9	Peach Nectarine Plum	Bearing / nonbearing	<ul style="list-style-type: none"> <li>• Broadleaf and grass weeds</li> <li>• PHI 17 days</li> <li>• Consult individual labels for rates. Do not exceed 9.6 lb. a.i./acre in a single season. Direct spray solution to the base of the tree to minimize contact with desirable vegetation.</li> </ul>
<b>Paraquat</b> 0.63–1	(Gramoxone SL®) 2 SL 2.5–4 pt. (Firestorm®) 3 SL 1.7–2.7 pt.	22	Peach Nectarine Plum	Bearing / nonbearing	<ul style="list-style-type: none"> <li>• Broadleaf and grass weeds</li> <li>• PHI 14 days</li> <li>• Use a shielded sprayer or wrap trees when spraying under young trees. Direct spray to the base of the trees to minimize drift to foliage, flowers, and fruits. Do not make more than three applications per year. Consult label for herbicides that can be tank mixed to broaden spectrum of weed control.</li> </ul>
<b>Pelargonic acid</b>	(Scythe®) 3%–10% v/v	27	Peach Nectarine Plum	Bearing / nonbearing	<ul style="list-style-type: none"> <li>• Broadleaf and grass weeds</li> <li>• Contact herbicide that should be applied with a shielded sprayer and directly sprayed 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.</li> </ul>
<b>Pyraflufen</b> 0.0013	(Venue®) 1.0 – 4.0 fl. oz.	14	Peach Nectarine Plum	Bearing / nonbearing	<ul style="list-style-type: none"> <li>• Broadleaf weeds</li> <li>• PHI 0 days</li> <li>• Do not apply after bloom. Do not exceed 6.8 fl. oz./season. Do not exceed 3 applications/season. Add a NIS at 0.5 to 2.0% v/v. Allow 30 days between applications.</li> </ul>
<b>Rimsulfuron</b> 0.03–0.06	(Matrix® FNV, Matrix® SG) 25 WG 2–4 oz.	2	Peach Nectarine Plum	Bearing / nonbearing	<ul style="list-style-type: none"> <li>• Broadleaf and annual grasses</li> <li>• PHI 14 days.</li> <li>• Apply after trees are 1 year old. Broadcast application is limited to one application per year at 4 oz./acre. Banded application may be applied twice a year with 30 days between applications, not to exceed 4 oz./acre per year. Use a nonionic surfactant at 0.125% v/v.</li> </ul>
<b>Sethoxydim</b> 0.3–0.5	(Poast®) 1.5 EC 1.5–2.5 pt.	1	Peach Nectarine Plum	Bearing / nonbearing	<ul style="list-style-type: none"> <li>• Annual and perennial grass weeds</li> <li>• PHI 25 days</li> <li>• Do not apply more than 2.5 pt./acre in a single application. Do not exceed 5.0 pt./acre per season. Include crop oil concentrate at 2 pt./acre or methylated seed oil at 1.5 pt./acre.</li> </ul>