



Current Report

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Weed Control in Pecans, Apples and Peaches

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A weed can be defined as any plant growing where it is not wanted. Weeds compete with desired plants for water and nutrients. Some weeds exude alleopathic compounds that are harmful to the roots of trees, reducing growth and eventually yields. Especially during establishment, weed control can be the most important aspect of orchard management.

Each orchard or grove will have many factors that need to be considered when designing the weed control program. The overall strategy will have to fit into the individual needs of each operation. A newly established pecan orchard may have very different needs compared to a well established native grove. Soil types, erosion potential, irrigation systems, cattle grazing, and weed species are all important factors in the weed control plan.

Several weed control options can be considered. The oldest method is tillage. Although it leaves a weed-free environment for a short time, clean cultivation is detrimental to tree health and growth. Feeder roots that supply the tree with water and nutrients are shallow and can be damaged by tillage. Soil-borne diseases can be spread throughout the orchard. Soil erosion is usually increased with clean cultivation. Cultivation can also create a hard pan below the disked area, restricting water and root penetration. Clean cultivation also makes orchard access more difficult than a cover crop or sod middles.

Mowing is commonly used in pecan groves to maintain the vegetation. To keep undergrowth at the desired height, mowing will need to be performed on a regular basis. Labor, fuel and equipment upkeep can be expensive and will not be sufficient in newly planted orchards to facilitate growth and early production.

Cover crops are another option. Annual ryegrass as a cover crop in a peach orchard aids soil water retention and suppressed weeds in test plots. Ryegrass is allowed to grow until it begins competing for water in June, and then killed in place to create a mulch. This seems to be an easy and inexpensive weed control method. In pecans, research has shown many positive aspects of legume groundcovers in orchards. Legumes fix nitrogen sufficient to meet most if not all the nitrogen needed by the trees, and the legumes attract beneficial insects which may reduce the need for some pesticide applications. Refer to HLA-6250, Use of Legumes in Pecan Orchards, for complete information.

The most widely used orchard weed control method includes a combination of herbicide strips in the tree row with

mowed sod middles. A strip 3 to 8 feet wide on each side of the tree is kept weed free and the vegetation in the row-middles is mowed. Maintaining the row-middles in sod improves orchard access, and mowing maintains a suitable surface for orchard access and harvest. Herbicide strips reduce weed competition thus improving tree growth and yield, plus aid in irrigation line upkeep. In native groves or new plantings, herbicide circles around the base of individual trees can be used. On young trees, a trunk protector may be used to eliminate the herbicide from contacting susceptible green bark.

Weed control starts before planting your orchard. Identify perennial weed problems and eliminate them before the trees are in place. Start the year prior to planting to eradicate perennial weeds such as bermudagrass or Johnsongrass. Control will be less costly and more effective if weeds are eradicated before tree establishment.

Federal and state laws and regulations pertaining to the use and application of herbicides are frequently revised. Always **check on the status of label clearances for herbicides before use**. Labels on the container give information on application restrictions, common rates, timing, directions for use and other facts which will allow for the most efficient use of these herbicides. Remember the label is the law. Always apply herbicides as the label instructs. This protects consumers, growers, the environment and the health of the orchard.

Principles in Using Herbicides

The following basic principles are important in using herbicides for weed control:

1. Identify the weed before choosing the herbicide. The susceptibility of weeds to different herbicides varies with the weed species.
2. Read the label for registration approval, precautions, limitations and directions for use. The rate varies with crop, target weed, soil type, etc. Call your county extension educator or chemical supplier for help in determining proper rates of application.
3. Choose the type of herbicide that will do the most good for the weed problem and the crop system you have. In pecans, grazing often must be considered. If the area will be grazed, only herbicides that are labeled for grazing areas can be used.

4. If the herbicide is new, try it on a small acreage the first time. Even though research has shown the herbicide to be effective, field use by growers on small areas is suggested before the herbicide is used on a large acreage. This gives the grower a chance to learn how to properly use the herbicide and to determine if there are any adverse effects from use of the chemical.
5. Time of application is very important in herbicide usage. Check the label to determine when the herbicide should be used in relation to crop growth, fruiting and weed growth.
6. Calibrating the sprayer annually is necessary to apply the herbicide accurately and at a uniform rate. Care should be used to apply the herbicide such that drift is minimized.

Preemergence Herbicides

Preemergence herbicides are applied to the soil surface and must be activated by rainfall. They must be applied to a clean soil before the weeds germinate or be applied with a postemergence herbicide that kills existing weeds. When the preemergence herbicides are activated by rainfall, they are taken up from the soil and kill weed seeds as they germinate.

Preemergence herbicide rates are based on soil type. Clay soils or soils high in organic matter require more herbicide to control weeds than sandy soils. Labels usually specify the appropriate rate for each soil type. Do not exceed the rate specified on the label or trees may be injured. Some herbicides cannot be used on sandy soils, so be sure to consult the label before applying these chemicals.

No one preemergence herbicide will control all weed species, as each herbicide differs in the species it will control. Complete reliance on only one material year after year will result in a buildup of the weeds that are resistant to that material. It is important to rotate herbicides from year to year to avoid this weed buildup, and to prevent herbicide accumulation in the soil. Rotate herbicides with different mode of action numbers to help prevent developing resistances.

Two preemergence herbicides are often applied as a tank mix to broaden the range of weed species controlled. In general, any herbicide may be legally used in a tank mix, as long as the timing, rates, soil conditions, etc., do not violate the label instructions for each of the materials in the tank mix. However, **the user assumes all risks associated with tank mixes not specifically mentioned on the labels for the materials in the mix.**

Postemergence Herbicides

Postemergence herbicides are effective after the weeds have germinated and started to grow. The chemical must contact the leaf of the target plant.

There are two basic types of postemergent herbicides – systemic and contact. Systemic herbicides like glyphosate are applied to weed foliage and are translocated throughout the plant. It is necessary for the weeds to be growing at the time of application for effective control. If this herbicide can get to the cambium layer of the trees, it will translocate and injure the trees. Addition of ammonium sulfate to the spray solution improves effect on perennial grasses.

Some systemic herbicides only affect broadleaves and others only grasses. 2,4-D formulations are available for post-emergence control of broadleaf weeds. Extreme care should be exercised to avoid damage to the orchard. Follow label directions carefully.

Poast and Fusilade are translocated postemergence grass herbicides. Like glyphosate, they will kill roots as well as top growth. In many respects they can be considered 'reverse 2,4-D' since they will kill grasses but leave broadleaves unharmed.

Contact herbicides such as paraquat** work best when applied at relatively high temperatures and in large gallonage per acre so that good coverage of the weeds is obtained. A non-ionic surfactant should be added to get maximum results. It is important not to allow the spray to contact green stems, fruit, or foliage of the trees. Paraquat** kills by contact and should be used on small weeds for best results. It kills the top growth, but does not affect the roots, so repeat applications on perennial weeds are required for season-long control.

Tank Mixes

The preemergence herbicides in a tank mix may be used each at full rate, but many growers get good control by using 1/2 to 3/4 of the recommended rate of each. While this can reduce costs, **the user assumes all risks for reduction in weed control from reducing application rates.** Combinations of either Surflan or Solicam, which are more effective on annual grasses, with either Princep or Karmex, which are more effective on broadleaf weeds, are popular tank mixes.

Other Tree Fruits

Herbicides are approved for use in other tree fruits such as pears and plums but are not discussed here. If you have other tree fruits, check the labels of the herbicides discussed for apples and peaches to determine if these chemicals are approved for your crop.

WEEDS	TIME OF APPLICATION	HERBICIDE(S) * USE LABEL RATE	MODE OF ACTION	COMMENTS
Annual grasses and broadleaf weeds	Preemergence	Alion (indaziflam) 0.045-0.85 lb/ai/A	29	Age Restriction: Trees must be established at least three years. Apply to dry soil followed by 48 hours without irrigation or rainfall and then adequate moisture within 21 days prior to germination. Avoid direct or indirect spray contact with crop foliage, green bark, roots, or fruit. Allow at least 90 days between applications. Do not apply within 25 feet of ponds, rivers, streams, or wetlands. Spot spraying is not allowed. PHI=14 days.
Annual and perennial grasses & broadleaves	Preemergence	Casoron 4G (dichlobenil) 4-6 lbs ai/A	20	Apple only. Apply from Nov 15 to Feb 15 as a soil surface application. No need to remove old weed growth. May be incorporated in late fall or early spring before May 1 and incorporated immediately. For annuals, apply in early spring after cultivation before weeds emerge. Rain or irrigation is needed for activation. Shallow incorporation is recommended. Apply 4 weeks after transplanting when soil has completely settled.
Annual and perennial grasses & broadleaves		Casoron CS (dichlobenil) 1.98-3.92 lbs ai/A	20	Apple only. Apply in early spring before weeds germinate or after cultivation and incorporate thoroughly. Do not apply to new plantings less than one year old.
Annual broadleaves and suppression of perennials	Preemergence Postemergence	Chateau SW (flumioxazin) 0.188-0.38 lb ai/A Other names: Tuscany Flumi51, Varsity	14	Age Restriction: Do not apply to trees established less than 1 year unless protected from spray contact by non-porous wraps. Do not apply after bud break on apples and peaches. Do not apply to fine textured soils. Do not make more than two applications in a growing season or a sequential application within 30 days of first application. Do not apply when plants are under stress. Do not incorporate. Do not allow drift to contact foliage or green bark. Maximum is 24 oz per season. PHI- 60 days.
Annual grasses and broadleaves	Preemergence	Devrinol DF-XT (napropamide) 4 lbs ai/A	15	Pecans only. Apply to weed free soil surface. May be applied to newly planted pecan. Do not allow spray to contact fruit or foliage. Do not apply within 50 days of harvest. Do not graze. If no rainfall within 24 hours, cultivate or irrigate 1 inch to activate. Pecans only.
Broadleaf weeds	Preemergence	Gallery 75DF (isoxaben) 0.5-1.0 lb ai/A	21	Non-bearing only. May only be used on crops that will not be harvested within one year of application. Apply before germination of broadleaf weeds or immediately after cultivation. Can be tank mixed with Surlflan to control grasses. Do not apply to newly transplanted trees until rainfall settles soil.
Annual broadleaves	Preemergence Postemergence	Goal 2XL (oxyfluorfen) 0.5-2 lbs ai/A Other names: Goaltender Galigan, Collide	14	Dormant application. Effective as preemergence or postemergence as directed spray on weeds larger than 4 inches. Do not apply after bud swell until harvest completion. Can be mixed with other pre- or post-emergent herbicides. Maximum rate is 8 pt per year. Do not graze.
Annual grasses and broadleaves	Preemergence Postemergence	Karmex (diuron 80%) 1.6-3.2 lbs ai/A Other names: Diuron	7	Age Restriction: Use as a single application directed spray in the spring under trees established one year or more for apples or three years or more for peaches and pecans. Apply to a clean soil before the weeds germinate. Do not apply to soils with less than 1/2% organic matter for pecans or 1 percent for peaches and apples. Do not treat apple cultivars grafted on full-dwarfing rootstocks. Do not use Karmex within 20 days of harvest on peaches or Diuron within 3 months of harvest on peaches. Avoid contact with fruit or foliage. Do not graze. Do not use where subsoil or roots are exposed.
Winter annual grass and broadleaf weeds, some perennials	Preemergence Postemergence	Kerb SC' (pronamide) 1-2 lbs ai/A	3	Apples and peaches only. Apply in late fall after the fruit is harvested but prior to leaf drop and soil freeze up. Age Restriction: Do not apply to trees less than one year old or within six months of spring transplanting or within one year of fall transplanting. See label. Do not graze or feed forage.

WEEDS	TIME OF APPLICATION	HERBICIDE(S) * USE LABEL RATE	MODE OF ACTION	COMMENTS
Annual grasses and broadleaf weeds	Preemergence	Matrix FNV (rimsulfuron) 0.0625 lb ai/A Other names: Solida, Grapple, Pruvin,	2	Age Restriction. Apply only to crops that have been established for one full year and in good health. Weeds are controlled for 60 -90 days after application. Matrix will burn down small actively growing weeds less than 1 inch in height. Avoid direct or indirect contact with crop foliage or fruit, except undesirable suckers. pH solution must be between 4.0 – 8.0. Best results are obtained when the soil is moist at the time of application and ½ inch of rainfall or sprinkler irrigation occurs within 2 weeks of application. PHI=7 days for apple & 14 for peach & pecan.
Annual grasses and broadleaf weeds	Preemergence Postemergence	Pindar GT (penoxslam & oxyfluorfen) See label for rates	(2, 14)	Pecan label only – do not apply to pecan established less than 9 months. Direct sprays to the soil and base of dormant trees. Avoid direct plant contact. Use trunk guards to protect plants until adequate mature bark has developed. Only use on trees in good health and vigor. Make applications after harvest up to budbreak in pecans.
Annual grasses and broadleaf weeds	Preemergence	Princep Caliber 90 (simazine) 1.6-3.96 lbs ai/A Other names: Simazine 4L, Sim-trol	5	One application per year. Age Restriction: Use as a directed spray in the spring to orchards established one or more years for apple and peach; two years for pecan. Do not graze or apply when pecans on ground. Do not apply within 150 days of harvest on apple. Apply before weeds germinate, or tank mix with paraquat to kill germinated weeds. Do not use on gravelly, sand or loamy sand soils. Avoid contact with fruit, foliage, or stems.
Annual grasses and some broadleaf	Preemergence	Prowl 3.3 EC (pendimethalin) 1.98-3.96 lbs ai/A	3	Non-bearing only. May only be used on crops that will not be harvested within one year of application. Apply directly to ground under trees. Can be used on newly transplanted trees after ground has settled. Do not apply within one year of harvest. Rate determines duration of control. Do not graze or feed forage. Do not apply on top of tree leaves or buds.
Annual grasses and some broadleaves	Preemergence	Prowl H20 (pendimethalin) 1.9-5.9 lbs ai/A Other names: Satellite Hydrocap, Aquapen 3.8, Stealth	3	Apply to ground as a single application or after 30 day interval not to exceed 4.3 qts in peach and apple or 6.3 qts in pecan. Do not allow contact with leaves, shoots, or buds. Do not graze or feed forage. Consult label for additional application methods. PHI= 60 days.
Annual grasses and broadleaf weeds	Preemergence	Sinbar WDG (terbacil) Consult label	5	No pecan label. Rates are based on tree age and soil type. Please consult label for directions. May be used on newly planted apple and peach trees when soil is settled around base at lower rates. Higher rates require trees to be established for 3 years. Do not contact foliage or fruit with drift. PHI- 60 days.
Annual grasses and certain broadleaf weeds	Preemergence	Snapshot 2.5TG (isoxaben+trifluralin) 2.5-5 lbs ai/A	3, 21	Non-bearing only. May only be used on crops that will not be harvested within one year of application. Not effective on germinated weeds.
Annual grasses and broadleaf weeds	Preemergence	Solicam DF (norflurazon) 1.97-3.93 lbs ai/A	12	Directed spray in late fall to early spring prior to weed emergence or tank mix with paraquat to control germinated weeds. May be used in newly planted apple orchards. Age Restriction: Pecan and peach trees must be established at least 18 months before use. Avoid contact with fruit or foliage. Do not apply when nuts or fruit are on the ground at harvest or within 60 days of harvest. Must have rainfall or irrigation within 4 weeks of application.
Annual grasses and broadleaf weeds	Preemergence	Surflan AS Agricultural (oryzalin) 2-6 lbs ai/A Other names: Fugitive,	3	Work all trash and established weeds into the soil before applying Surflan. Apply the spray directly to the ground prior to weed emergence or tank mix with paraquat to kill germinated weeds. Do not graze or feed forage. MAY BE USED IN NEWLY PLANTED ORCHARDS. Requires rainfall.

WEEDS	TIME OF APPLICATION	HERBICIDE(S) * USE LABEL RATE	MODE OF ACTION	COMMENTS
Annual grasses and broadleaf weeds	Preemergence	Treflan HFP 4EC (trifluralin) 0.5-2 lbs ai/A Other names: Trifluralin, Trust	3	No apple label. Apply and incorporate prior to planting, or after establishment apply as a soil directed spray before weeds germinate. Rate depends on soil texture and amount of rainfall.
Broadleaf weeds	Postemergence	Aim (carfentrazone) 0.031 lb ai/A	14	Apply anytime during the season. Always add non-ionic surfactant or crop oil. Mix with glyphosate or gramoxone for broader weed control. Minimum 14 days between applications. PHI=3 days. Can be used for sucker control. Do not allow spray to contact fruit, foliage or green bark. Trees less than 2 years old should be wrapped or protected before application.
Annual and perennial grasses	Postemergence	Fusilade DX (fluazifop-butyl) 0.094-0.375 lb ai/A	1	For nonbearing apples. May only be used on crops that will not be harvested within one year of application. Peaches can be treated up to 14 days before harvest and pecans up to 30 days before harvest. No grazing. Apply as directed spray with crop oil or non-ionic surfactant. Two applications generally required for control of perennial grasses.
Annual grass and broadleaf weeds, suppression of perennials	Postemergence	Gramoxone (paraquat) **New training requirements 0.625-1 lb ai/A Other names: Devour, Quik-quat, Parazone 3SL	22	Use as directed spray with a nonionic surfactant to kill small emerged weeds. Read the label first for special precautions when using this compound. Up to three retreatments may be used in peach and 5 in apple and pecan. May be used as burn down with certain approved preemergents. Avoid contact with green tree stems, fruit, or foliage. Do not apply when nuts are on the ground or within 14 days of harvest on peaches. Do not graze. Restricted Use Pesticide.
Annual and perennial grasses	Postemergence	Poast (sethoxydim) 0.18-0.47 lb ai/A	1	Not within 14 days of harvest for apple or 15 days for pecan and 25 days for peach. Apply as directed spray with crop oil. Two applications generally required for control of perennial grasses. Do not graze.
Annual grasses and broadleaf weeds. Suppression of perennials	Postemergence	Rely 280 (glufosinate) 0.99-1.5 lbs ai/A Other names: Cheetah, Reckon 280L, Refer 280SL and many more	10	Only trunks with mature brown bark should be sprayed unless protected from spray contact by non-porous wraps, grow tubes, or waxed containers. Not within 14 days of harvest. Do not graze or hay. Directed spray. Avoid contact with desirable vegetation. Controls suckers on mature trees. Retreatment required to control perennials. Label specifies tank mixes. Label specifies time between sprays and maximum allowed.
Annual and perennial weeds	Postemergence	Roundup (glyphosate) 0.39-3.7 lbs ai/A Other names: Showdown, Buccaneer 5 Extra, Cornerstone Envy, Duramax, Durango, many more	9	Rate and time of application vary so consult the label. Avoid contact with foliage or green bark in apples and pecans. Age Restriction. Peaches must be planted a minimum of 2 years and then avoid contact with any part of the tree in peaches. Shielded boom sprayer or wiper application is advisable. The addition of 2% dry ammonium sulfate by weight or 17 lbs per 100 gal of water may increase performance. Preharvest interval pecan 3 days; peach 17 days; apple 1 day. See label.
Annuals and suppression of perennials	Postemergence	Scythe (pelargonic acid) 4.2 lb ai/A at 3 - 10% spray mix	27	For contact non-selective control or burndown of a broad spectrum of actively growing weeds. Use low rate for annual weed control and high rates for maximum vegetative burndown. Use as a directed or shielded spray.
Annual and perennial grasses	Postemergence	Stinger (clopyralid) 0.125-0.25 lbs ai/A	4	No pecan label. Make one or two applications per crop year. Avoid direct contact with foliage, fruit or tree trunks. Do not apply during bloom. PHI-30 days. Age restriction: Apple - 1-year-old trees.

<i>WEEDS</i>	<i>TIME OF APPLICATION</i>	<i>HERBICIDE(S) * USE LABEL RATE</i>	<i>MODE OF ACTION</i>	<i>COMMENTS</i>
Broadleaf weeds	Postemergence	Embed (2, 4-D choline) 0.425 - 1.7 lbs ai/a	4	Apply when weeds are actively growing. Use low pressure to avoid drift. Use lower rates on small susceptible weeds, higher rates on perennial weeds. Age Restriction. Apply only after trees established one year and in good condition. PHI - apple: 14; peach: 40; pecan: 60 days. Do not cut for hay within 7 days. Do not allow to contact foliage, fruit, stems or trunk. Do not apply during bloom. Irrigation should be avoided for 2 days pre or 3 days post spray.
Broadleaf weeds	Postemergence	Weedar 64 (dimethylamine salt of 2, 4-D) 1.42 lbs ai/A Other names: Saber, Savage, Unison	4	Study label carefully for proper application methods and weather conditions. Age Restriction. Trees must be established for at least one year. Preharvest interval pecan 60 days; peach 40 days; apple 14 days. Do not graze or feed cover crops. Do not cut orchard floor forage for hay within 7 days of application.

* Read and follow label directions, precautions and limitations. If label information contradicts information presented here, the label information takes precedence. Most herbicides have grazing restrictions and should not be used in pecan orchards that will be grazed. In general, any herbicide may be legally used in a tank mix, as long as the timing, rates, soil conditions, etc. do not violate the label instructions for each of the materials in the tank mix. However, the user assumes all risks associated with tank mixes not specifically mentioned on the labels for the materials in the mix. It is advisable to check the compatibility of materials before application. Other brand names of several listed materials are available.

** Paraquat dichloride training for certified applicators: <https://www.epa.gov/pesticide-worker-safety/paraquat-dichloride-training-certified-applicators>

The following publications may be useful in planning a weed control program:

PSS-2750 Guide to Effective Weed Control

The Oklahoma Cooperative Extension Service

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Extension carries out programs in the broad categories of agriculture, natural resources and environment; family and consumer sciences; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

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- The federal, state, and local governments cooperatively share in its financial support and program direction.
 - It is administered by the land-grant university as designated by the state legislature through an Extension director.
 - Extension programs are nonpolitical, objective, and research-based information.
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- It utilizes research from university, government, and other sources to help people make their own decisions.
 - More than a million volunteers help multiply the impact of the Extension professional staff.
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 - The Extension staff educates people through personal contacts, meetings, demonstrations, and the mass media.
 - Extension has the built-in flexibility to adjust its programs and subject matter to meet new needs. Activities shift from year to year as citizen groups and Extension workers close to the problems advise changes.

The pesticide information presented in this publication was current with federal and state regulations at the time of printing. The user is responsible for determining that the intended use is consistent with the label of the product being used. Use pesticides safely. Read and follow label directions. The information given herein is for educational purposes only. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Cooperative Extension Service is implied.

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