

# Weed Management in Pecans

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An effective weed management program is a necessary part of any pecan production enterprise. Weeds compete with pecans for water and nutrients, and may have allelopathic effects on pecan growth. However, weed management is only a part of the production system and must fit into the overall program.

There are many considerations to take into account when designing a weed management program to fit an individual operation. For example, are the pecans native trees in a grove or an improved orchard? The random pattern and variable tree size that occur in native groves present logistical problems that do not occur in improved orchards that are planted in straight, orderly rows.

If the trees are in an orchard, is it new or well established? Weed control is particularly important during orchard establishment, not only to encourage survival of young trees, but also to help hasten them into production. Even after the trees are well established, weeds can compete for water and nutrients, reduce yields, and interfere with harvest.

Although managing weeds is important, it is also usually important to have some type of orchard floor cover crop to reduce erosion potential and provide support for spraying and harvesting activities. Often, the orchard floor is a sod-forming grass, such as bermudagrass, but interest in using clovers or other legumes is increasing due to the high cost of nitrogen fertilizers. The weed management programs required for these two systems are quite different.

To complicate weed manage-



*Cattle grazing in a native pecan grove.*

ment, many pecan producers utilize a two-story production system and allow livestock to consume the cover crop. Many herbicides labeled for use in pecans restrict or do not allow livestock grazing.

Irrigation capabilities can somewhat simplify the weed management program because they can eliminate or reduce competition for water. Depending on the type of irrigation system, it can also improve the odds of success of preemergence herbicides.

While all the above items must

be considered, perhaps most important is what types of weeds are present. Weeds can be annuals, biennials or perennials; grasses or broadleaves; or warm-seasons or cool-seasons; and each requires a different management strategy.

All these factors must be considered to develop a weed management plan that fits into the overall production system. In most situations, no one approach is entirely successful and the weed management plan must employ a combination of approaches to be successful. ►

### Weed management without herbicides

A common method of managing the orchard or grove floor is regular mowing. Although this method can be effective at keeping the vegetation at the desired height and reducing competition with pecans, there are significant drawbacks to this approach. To maintain the desired height, the orchard floor will have to be mowed several times per year. The labor, fuel, and wear and tear on equipment involved with mowing can be very expensive. In addition, the movement of mowing equipment around pecan trees and irrigation equipment often results in physical damage.

Another management method to keep the orchard floor free of vegetation is shallow tillage. The main benefit of shallow tillage is that it eliminates competition with the pecan trees from actively growing weeds for moisture and nutrients. Shallow tillage also eliminates a potential refuge for insect pests. The drawbacks are similar to mowing. To maintain the orchard floor free of vegetation requires multiple tillage passes per year. Again, the labor, fuel, and wear and tear on equipment involved with mowing can be very expensive. The movement of tillage equipment around pecan trees and irrigation equipment can often result in physical damage. In addition, each tillage pass damages the feeder roots in the tillage zone. These feeder roots absorb the majority of water and nutrients the tree requires. The bare soil is also more susceptible to water or wind erosion than a vegetated orchard floor. Finally, a clean-till orchard floor is inaccessible longer after rainfall or irrigation than one with an established cover crop. For these reasons, shallow tillage is more common in the west where rainfall is less frequent.



*Clover growing as a green manure, or mulch, crop in a native pecan grove*

Green manure, or mulch, crops can also be used to aid in weed management. The ideal system is one where the green manure crop is a cool-season plant that produces its biomass when the pecans are not actively growing. This limits competition for moisture and nutrients with actively growing pecans. As pecans break dormancy, the green manure crop dies or goes dormant, and leaves thick mulch that prevents light from reaching the soil surface. This mulch prevents, or at least delays, weeds establishing. As this mulch decomposes, it releases nutrients it has stored back into the soil where they are available to the pecans. Cool-season legumes and winter annual grasses have been used with

some success as green manure crops. Probably the biggest weakness of this system is the risk of manure crop failure due to environmental conditions. If irrigation is available, the risk of failure is less, but the added costs of running the irrigation system must be considered. The green manure crop can also complicate herbicide selection if chemical control is a part of the overall program.

### Weed management with herbicides

Herbicides can be a valuable tool in a weed management program. In order to be used effectively, one must know what weeds they are effective on and how to apply them. The following table lists herbicides labeled for weed control in pecans, their applica-



*A herbicide-treated strip with sod between the tree rows. Tree protectors protect the young trees from herbicide injury.*

tion timing in relation to the weeds, a broad description of the types of weeds they will control or suppress, and their Mode of Action group number. It is important to refer to the actual herbicide labels for more information on specific weeds they control or suppress, application rates, approved tank mixes, necessary precautions, pre-harvest intervals, grazing restrictions, etc. Remember, it is a violation of federal law to use a herbicide in a manner inconsistent with its labeling.

There are several methods for applying herbicides in pecan orchards or groves. They can be applied broadcast, to individual trees or in weed-free strips down the tree rows.

Broadcast applications are applied across the entire orchard or grove

floor. Either a specialized boom or careful operator is required to avoid damage to the tree trunks. On young trees with immature bark, tree protectors may be necessary to prevent herbicide contact with the trunk. Avoid using sprayers with boomless or brush-buster-type spray tips since the risk of drift or direct spray onto pecan foliage is significantly higher when using these types of sprayers.

Herbicide application under individual trees is common in native groves or in newly established orchards. This method entails spraying only the area around the base of the tree. During establishment, maintaining a 5- to 6-foot diameter bare soil area around trees improves survival and growth rates, and reduces the

time until production begins. Again, tree protectors may be necessary to prevent herbicide contact with the immature bark on the trunk. For established native groves, a weed-free area beneath the dripline improves production potential and helps facilitate harvest activities.

Herbicide application in weed-free strips down the tree rows is probably the most common method in improved orchards. This method entails spraying a 3- to 5-foot strip on either side of the tree row, resulting in a 6- to 10-foot-wide strip with no vegetation. The herbicides may be non-selective, postemergence herbicides used alone or in combination with preemergence herbicides to reduce the frequency of spraying. Again, if the orchard is newly established, tree protectors may be necessary to prevent herbicide contact with the immature bark on the trunk. Sod or a cover crop is grown in alleys (the areas between the tree rows). These alleys facilitate spraying or other orchard maintenance activities. A sod-forming cover crop like bermudagrass is most common and is managed with a combination of mowing and/or selective herbicides.

The repeated use of any single herbicide or one mode of action on a single weed population can eventually lead to selection of resistant plants. These resistant plants can then become the dominant part of the population, at which point the herbicide is no longer effective. Although this mechanism for resistance development has long been known, the extensive use of glyphosate on a wide number of crops and the subsequent increase in glyphosate-resistant weeds has brought the problem into the spotlight. While herbicide resistance in scattered pecan orchards is not as likely to develop as in thousands of adjacent

# SOILS

Herbicides labeled for use in pecan production.				
Chemical family / Active ingredient(s)	Trade name(s)	Application timing to weeds	Weeds controlled or suppressed*	MOA group
Dinitroanilines: trifluralin pendimethalin oryzalin	Treflan, etc. Prowl, etc. Surflan, etc.	Preemergence	Annual grasses and small-seeded broadleaves	3
Pyridazinone: norflurazon	Solicam	Preemergence	Annual and perennial grasses, broadleaves and sedges	12
Alkylazine: indaziflam	Alion	Preemergence	Annual broadleaves and grasses	29
Acetamide: napropamide	Devrinol	Preemergence	Annual grasses and broadleaves	15
Benzamide: isoxaben	Gallery, etc.	Preemergence	Annual broadleaves	21
Triazine: simazine	Princep, etc.	Preemergence	Annual broadleaves and grasses	5
Urea: diuron	Karmex, etc.	Preemergence and early postemergence	Annual broadleaves and grasses	7
Sulfonylureas: rimsulfuron halosulfuron-methyl	Matrix, etc. Sanda	Preemergence and early postemergence	Annual grasses, broadleaves and sedges	2
Diphenylether: oxyfluorfen	Goal, etc.	Preemergence and early postemergence	Annual broadleaves	14
N-phenylphthalimide: flumioxazin	Chateau	Preemergence and early postemergence	Pre on annual broadleaves and grasses Post on annual broadleaves	14
Glycine: glyphosate	Roundup, etc.	Postemergence	Annual and perennial grasses, broadleaves and sedges	9
Phosphinic acid: glufosinate-ammonium	Rely	Postemergence	Annual and perennial grasses, broadleaves and sedges	10
Bipyridyliums: paraquat diquat	Gramoxone, etc. Diquat, etc.	Postemergence	Annual and perennial grasses, broadleaves and sedges	22
Phenoxy: 2, 4-D amine	Weedar 64, etc.	Postemergence	Annual and some perennial broadleaves	4
Triazolinone: carentrazone-ethyl	Aim	Postemergence	Annual broadleaves	14
Phenylpyrazole: pyraflufen-ethyl	Venue	Postemergence	Annual and perennial broadleaves	14
Aryloxyphenoxypropionate: Fluazifop-p-butyl	Fusilade	Postemergence	Annual and perennial grasses	1
Cyclohexanediones: clethodim sethoxydim	Select, etc. Poast, etc.	Postemergence	Annual and perennial grasses	1
Carboxylic acid: Pelargonic acid	Scythe	Postemergence	Annual and perennial grasses and broadleaves	26

Source: Labels obtained from [www.cdms.net/LabelsMsds/LMDefault.aspx](http://www.cdms.net/LabelsMsds/LMDefault.aspx) May 4, 2012.  
\*Refer to individual labels for actual species controlled or suppressed.

acres of cropland sprayed with the same herbicide, it is still possible. Consider that the weeds in an orchard or native grove are a single population and resistance may develop if repeatedly exposed to the same mode of action. Refer to the table at the left for the Mode of Action group number, and, when possible, rotate among different numbers or combine them in tank mixes to avoid repeated exposure a single mode of action. Although this approach may not be the most inexpensive in the short term, it can help maintain the efficacy of our current herbicides.

Regardless of what herbicide program is implemented, proper herbicide application is important for success. The first step is an accurate calibration of the herbicide applicator. Many different calibration methods are available. One simple method for calibrating boom sprayers can be found at [www.noble.org/ag/tools/soils/boom-sprayer-calibration-calculator](http://www.noble.org/ag/tools/soils/boom-sprayer-calibration-calculator).

In summary, an effective and economically viable weed management program is necessary for successful pecan production. In most cases, the weed management program will include elements of several different management approaches. The challenge for each pecan producer is to select the approach or combination of approaches that best fits their overall production system. ■

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