

Chapter 6

Weed Management

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Weed management in conservation tillage systems can be vastly different than traditional conventional tillage systems. Managing weeds in conservation tillage requires a planned and systematic approach.

Prior to implementing a conservation tillage system, producers should identify the specific weed species and their densities present in the field(s), determine the weeds' growth habit (annual or perennial) and whether the weeds have developed resistance to herbicides based on past experiences in a specific field and surrounding areas. Scouting an area to determine the weed populations present (herbicide resistant or not) is very important in conventional tillage systems, as well, but knowing the specific weed populations and densities is

more critical in conservation tillage systems due to the desire to eliminate or reduce tillage.

Producers have to be flexible and have foresight concerning current or future weed problems to implement a successful conservation tillage weed management program.

A characteristic of many weeds is their ability to invade and succeed under almost any environmental conditions. Certain habitats favor certain weeds, and conservation tillage provides a specific habitat.

Since tillage is eliminated or greatly reduced in conservation tillage, weed species that require burial for germination may become less prevalent. Conservation tillage tends to favor small-seeded annuals and perennial weeds. Examples of small-seeded annual weeds include grasses (barnyard grass, broadleaf signal grass, browntop millet, Texas millet and many others), pigweeds (redroot pigweed, Palmer amaranth and waterhemp), prickly sida, and hophornbeam copperleaf (Figures 6-1 and 6-2). Dewberry, redvine, rhizome Johnson grass, and trumpet creeper are some examples of perennial weeds (Figure 6-3).



Figure 6-1. browntop millet; a small-seeded grass weed



Figure 6-2. Palmer amaranth; a small-seeded broadleaf weed



Figure 6-3. Rhizome johnsongrass; a perennial weed

Weed issues will change over time once a conservation tillage program is implemented. Therefore, an effective weed control program must change as well.

Crop row spacing and plant population, crop rotation, cover crops and herbicides are important components of a successful conservation tillage weed management program. Use of methods to enhance the competitiveness of a crop with weeds is critical in conservation tillage. Narrow row spacing and high plant populations will increase the shading effect, which helps inhibit weed germination and subsequent growth. Crop rotation and use of a cover crop can disrupt the life cycles of weeds and prevent a specific weed from becoming dominant. Crop rotation allows for the use of herbicides with different modes of action and reduces the possibility of developing herbicide resistance.

Cover crops aid in weed control by competing for sunlight and moisture when the primary crop is not present. In addition, most cover crops release allelopathic chemicals that aid in weed suppression.

There are challenges, however, if cover crops are used for weed management in a conservation tillage system. It is extremely important to terminate a cover crop using a nonselective herbicide such as glyphosate or paraquat four to six weeks prior to planting so soil water will not be depleted by the still-growing cover crop. If broadleaf cover crops (Brassica species, lupin, hairy vetch, crimson clover, or Austrian winter pea) are used, co-applying 2,4-D or dicamba with the nonselective herbicide is needed to ensure effective termination.

In addition, the allelopathic effect provided by many cover crops may have a detrimental effect on the cash crop, but research has shown these effects usually are negligible if the cover crop is terminated at least four weeks prior to crop planting.

When deciding which cover crop to seed in the fall, a producer should check the crop rotation restrictions on the labels of pesticides they are applying in the current crop to prevent injury of the cover crop.

Herbicides should not be the primary tool used by a producer to control weeds in a conservation tillage system, but they play an important role. Herbicide-resistant technologies such as Roundup Ready corn, cotton and soybeans and Liberty Link corn, cotton and soybeans have provided producers with the tools to effectively control weeds in both conventional and

conservation tillage systems. But overuse of glyphosate in Roundup Ready crops has led to the development of glyphosate-resistant weeds. History has shown that overusing one herbicide will cause weed resistance, so relying upon only Ignite in Liberty Link crops may eventually lead to glufosinate-resistant weeds as well. To avoid this monumental problem in conservation tillage systems, it is important to use herbicides with different modes of action.

Considering the need to use multiple herbicides for weed management in a conservation tillage system, a producer should understand that many herbicides have soil activity, meaning they need to be moved to the soil for absorption by the weeds to achieve control. Examples of this type of herbicide are atrazine, diuron, Dual, Prowl, Staple LX, Treflan and others.

An important component to conservation tillage systems is the dead biomass or residue on the soil surface, however, and this stubble from past crops, weed vegetation following a burndown herbicide application or terminated cover crop residue on the soil surface unfortunately has the potential to intercept and adsorb the herbicide, thus preventing it from reaching the soil. This biomass or residue on the soil surface can greatly reduce the weed control activity of many herbicides, particularly Prowl and Treflan. Producers should contact their LSU AgCenter county agent or agricultural scientists when deciding which residual herbicide to use in a conservation tillage system.

Although conservation tillage systems also involve the significant reduction, or exclusion, of tillage, the presence of weeds that are resistant to herbicides, such as glyphosate-resistant Johnson grass, Palmer amaranth or giant ragweed, may require cultivation during the cropping season. Even in the absence of herbicide-resistant weeds, preplant, in-season cultivation or post-harvest tillage are excellent methods for managing weeds.

Prior to implementation of a conservation tillage system, a producer should give careful consideration to whether cultural practices (reduced row spacing, cover crops, etc.) and herbicide applications discussed above will provide the desired management of weeds to maximize crop yields.

True conservation tillage excludes preplant and post-harvest tillage, but in-season cultivation is possible due to high-residue row-crop cultivars that are available. These cultivators can be used to help manage an-

nual weeds. They are heavy and made to pass through larger amounts of surface residue between the crop rows without major disturbance of residue. Cultivation, along with herbicides containing different modes of action, are effective tools for management of weeds, whether the weeds are resistant to a herbicide or not.

A conservation tillage weed management program designed to provide season-long control of weeds in Louisiana includes at least four herbicide applications. The outline below assumes that a herbicide-resistant crop, such as Roundup Ready or Liberty Link ones, will be planted. If this program is followed, a producer will have applied five herbicides, with each herbicide having a different mode of action.

1. Preplant burndown:

- Four to six weeks before planting.
- Nonselective herbicide plus 2,4-D or dicamba

2. Pre-emergence:

- Residual herbicide applied after planting but prior to crop emergence.

3. Early post-emergence:

- Two to three weeks after crop emergence
- Nonselective herbicide plus a herbicide that provides residual control of weeds.

4. Mid- to late post-emergence:

- Three to four weeks following the early post-emergence application
- Nonselective herbicide plus a herbicide to target any weeds not effectively controlled by the nonselective herbicide

In summary, managing weeds in a conservation tillage system is challenging, but successful producers can anticipate potential problems through planning and field scouting, applying timely solutions and using crop rotation that provides alternative pest management strategies.

- Herbicide selection should be based on the weed spectrum known to exist in the field or present at the time of application.
- Follow herbicide labels and be aware of any restrictions prior to application.
- Refer to LSU AgCenter's Louisiana Suggested Chemical Weed Management Guide for specific herbicides to determine the herbicide that best fits your needs.