Weed Management

Chapter 8

Successful weed control for no-till production systems will ensure:
- A healthy, actively growing crop.
- Timely applications of an appropriate herbicide.

getting a no-till system off to a good start, in terms of proper adjustment of soil pH and nutrients, will benefit the health of a crop and also improve weed management success. A healthy crop is more likely to out-compete weeds than a crop lacking proper fertility.

Small Changes May Drastically Ease Weed Control

Narrower row spacing and higher seeding rates result in quicker canopy closure and a denser crop canopy, which enables the crop to shade out weeds. Likewise, planting into good soil moisture, at uniform depths across the field, and closing the seed furrows ensures uniform crop emergence. This also lessens the chances of herbicide injury to the crop. These factors improve crop competitiveness and weed control.

Crop Rotations Complement Weed Control Strategies

Crop rotations work by allowing the use of a different suite of weed control chemistry in alternating seasons or years to improve the spectrum of weeds that can be effectively managed. For example, a summer rotational crop will help control populations of winter annual grasses that may have

Introduction

Switching from a conventional tillage weed control system to a no-till weed control system is similar to a mechanic losing their open-end adjustable wrench (i.e. Crescent® wrench). The open-end adjustable wrench is the wrench of choice for many jobs and losing it can make your toolbox look bare if you come upon a job where it would be particularly useful. Likewise, tillage is a reliable method to combat weed populations regardless of the species and regardless of what chemical control options exist. But there are many other tools in our weed management toolbox including cultural and chemical control practices. Reliance on these methods will increase in no-till crop production systems where conventional tillage is lost as a weed management tool.

Major considerations to examine when switching from a conventional to a no-till system are the potential for shifts in weed populations. A shift can occur in just one or two seasons after implementing no-till practices and the weeds you are used to dealing with in a conventional system may change once you implement no-till. Increases in and build-up of perennial weeds is most notable. There is also potential for increases in small seeded annual and biennials weeds (Ross and Lembi 2009). But cultural and chemical control practices can be used to effectively manage these weeds in a no-till system.

Cultural Control Practices

A Healthy Crop is a Competitive Crop

Cultural weed management should not be overlooked when planning for a crop. Too often, producers forget the basics of ‘crop health,’ which leads to weed problems. The best weed control tool we have is a healthy, actively growing crop. Therefore,
been problematic in winter wheat production. Similarly, rotating to a summer broadleaf crop may help address the control of summer annual grasses that may infest corn or grain sorghum planned the following year.

Winter rotations should also be a consideration. Canola has gained ground in Oklahoma and canola rotations with winter wheat can significantly improve control of weedy grasses which are difficult to control in wheat. In no-till production, the more diversified you can make your rotations the more able you will be to address existing and emerging weed problems.

**Cover Crops for Weed Control**

Cover crops are another good strategy for weed management. Cover crops work to maintain soil cover during fallow periods, preventing erosion and conserving soil moisture. By choosing the right cover crop, you may also be able to graze it or cut it for hay before moving into the next season of production. Legume cover crops can add nitrogen back to the soil and all cover crops will increase the overall organic matter content of your soils. These factors improve soil conditions, allowing your crop to be competitive and aid in preventing weeds. Cover crops also occupy the space in your field while you are between crops, providing some level of weed control. See Table 1 for a summary of winter and summer cover crops and their reported weed control potentials. Keep in mind that a weed control potential listed as “fair” may be increased by using a mixed cover crop. Many cover crops, including foxtail millet, rye, sudangrass, and hairy vetch are allelopathic. Compounds which leach from their residues can suppress weeds (Creamer et al. 1996) in the next rotation. Sorghum and sunflower as summer crops can also leave allelopathic compounds in the soil, providing residual broadleaf weed control for a winter grain crop (Einhellig and Rasmussen 1989). For additional discussion of cover crops and their benefits in no-till systems see Chapter 12.

“Probably the greatest obstacle is weed control...it is hard when your fields look like they are full of trash, plus the neighbors want to know if you have quit farming...strange thing is the ones that gave me fits are now beginning to do the same thing!”

David Shultz
Altus, OK

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**Table 1. Summary of cover crops for utilization in Oklahoma.** Weed control potential is given as good=80-99%, fair=60-79%, poor=60% or less. Each cover crop was evaluated based on two or more sources.

<table>
<thead>
<tr>
<th>Cover Crop</th>
<th>Allelopathic</th>
<th>N-fixing</th>
<th>Season</th>
<th>Weed Control Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cowpea</td>
<td>Yes</td>
<td>Yes</td>
<td>Summer</td>
<td>Good</td>
</tr>
<tr>
<td>Mungbean</td>
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<td>Yes</td>
<td>Summer</td>
<td>Good</td>
</tr>
<tr>
<td>Sudangrass</td>
<td>Yes</td>
<td>No</td>
<td>Summer</td>
<td>Good</td>
</tr>
<tr>
<td>Rye</td>
<td>Yes</td>
<td>No</td>
<td>Winter</td>
<td>Fair</td>
</tr>
<tr>
<td>Oats</td>
<td>Yes</td>
<td>No</td>
<td>Summer or Winter</td>
<td>Fair</td>
</tr>
<tr>
<td>Crimson clover</td>
<td>Yes</td>
<td>Yes</td>
<td>Winter</td>
<td>Poor</td>
</tr>
<tr>
<td>Soybean</td>
<td>No</td>
<td>Yes</td>
<td>Summer</td>
<td>Poor</td>
</tr>
<tr>
<td>Wheat</td>
<td>Yes</td>
<td>No</td>
<td>Winter</td>
<td>Poor</td>
</tr>
<tr>
<td>Hairy Vetch</td>
<td>Yes</td>
<td>Yes</td>
<td>Winter</td>
<td>Fair</td>
</tr>
<tr>
<td>Rapeseed</td>
<td>Yes</td>
<td>No</td>
<td>Winter</td>
<td>Good</td>
</tr>
<tr>
<td>Radish</td>
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<td>No</td>
<td>Winter</td>
<td>Good</td>
</tr>
<tr>
<td>Buckwheat</td>
<td>Yes</td>
<td>No</td>
<td>Summer</td>
<td>Fair</td>
</tr>
<tr>
<td>Sorghum</td>
<td>Yes</td>
<td>No</td>
<td>Summer</td>
<td>Good</td>
</tr>
<tr>
<td>Sunflower</td>
<td>Yes</td>
<td>No</td>
<td>Summer</td>
<td>Good</td>
</tr>
<tr>
<td>Millet</td>
<td>No</td>
<td>No</td>
<td>Summer</td>
<td>Good</td>
</tr>
</tbody>
</table>
Chemical Control Practices

Burndown Programs For a Good Start

Planting a crop into an actively growing weed population is not a good practice. Significant crop competition occurs when crops and weeds emerge at the same time; however, the crop is damaged even more if the weeds are established prior to planting the crop. Using appropriate burndown herbicides prior to planting is essential for early-season weed management in no-till systems. Burndown applications are also prescribed to effectively terminate certain cover crops used in the no-till system. Too often rainfall, mechanical problems, or other issues delay burndown efforts and the crop is planted into actively growing weeds. This results in early-season weed competition and the use of more expensive and often, less efficacious herbicides for early in-season weed control. For a good start, burndown herbicide applications are a must for effective weed management in no-till systems.

Consider Soil Residual Herbicide Programs

The use of soil residual herbicides is another way to decrease the potential of early-season weed competition and help manage weeds, which are difficult to control with current postemergent herbicide options. If planned appropriately, these soil residual herbicides will diversify the herbicide chemistry in the field and delay weed resistance from developing. One downside to using residual herbicides is potential herbicide carryover into the following crop.

Herbicide Selection can Impact Crops Planted up to Three Years Later

Chemical carryover occurs when an herbicide applied during the crop season or the fallow period remains active in the soil long enough to impact the growth of the following crop(s). For this reason, one must consider not only the crop to plant, but also the herbicides that will be sprayed to control the major weed pests in the field. It is always important to read herbicide labels and determine rotational intervals prior to residual herbicide applications.

Timely Herbicide Applications are Critical

Early season weed interference can significantly lower crop yields and make chemical control of weeds much more difficult. To maximize your yield, weeds that emerge with the crop should be controlled during the third to fifth week after crop emergence. In order to achieve acceptable control, postemergent herbicides should be applied to small, actively growing weeds. The application timings should correspond to weed height ranges indicated on the herbicide labels. Consider purchasing your own sprayer if timely application from your commercial applicator has been a problem. Another consideration is to purchase one with a neighbor and share the cost.

Some Misperceptions to be Avoided

No-till Will Save me a lot of Money

Perhaps the most common misperception is, “changing to no-till will save a lot of money.” Although changing to no-till should not increase your expenses drastically, the money you may save in fuel costs will likely be used in chemical weed control during both the crop and fallow periods. Time savings will be the greatest benefit from switching to a no-till management system.

Going No-till is Simple With the Use of Herbicide-resistant Crops

Herbicide-resistant crops (HRC) (i.e. Roundup Ready®, Liberty Link®, and Clearfield® crops) have made the conversion from conventional tillage to no-till production systems a lot easier, but there are still pitfalls to avoid. Several weeds in Oklahoma have become resistant to one or more of the...
“The additions of herbicide-tolerant soybeans and corn have greatly aided in dealing with undesirable vegetation in the fields, but it still presents a challenge.”

Brent Rendel
Miami, OK

herbicides used in these HRC. Alternating herbicide modes of action may prevent or at least delay the development of herbicide resistance. Where resistance has already developed, rotating modes of action will help manage resistant weed populations. Avoid sole reliance on an herbicide resistant cropping system where the same mode of action is used application after application. It is important to incorporate other herbicide modes of action to compliment this program and have more activity on potential problematic weeds (e.g. Palmer amaranth, horseweed, Italian ryegrass, tall waterhemp, etc.).

Any Field can be Switched to No-till

Although this is a correct statement, one should also consider the expense it will take for each field. Fields with excessive weed pressure may be more trouble to convert to no-till. One should first concentrate on the cleaner fields before tackling the weediest areas. When the decision to convert a problematic field has been made, try to get perennials and other difficult weed populations under control for a couple of years prior to conversion to no-till.

Also, one should consider any herbicide resistant weeds you or your neighbors may have and whether or not these can be effectively managed in the no-till cropping system you are planning.

References