

## Weed Management in No-Till

Weed management in no-till planted crops depends almost entirely on foliar and surface applied herbicides because seedbed preparation is eliminated and incorporated herbicides and cultivation cannot be used. In no-till cropping systems a mixture of a contact herbicide plus a residual herbicide is necessary. The contact herbicide kills grass or broadleaf weeds and any cover crop present at planting while the residual herbicide controls germinating weed seeds. To complete the herbicide program, a postemergence herbicide may also be needed for additional control of broadleaf and/or grass weeds.

### Weed Management Tools

#### Rotations

Rotations can play an important role in no-till as well as conventionally planted crops, for a weed may be easier to control in one crop than another. In corn or grain sorghum you can control weeds which are more difficult and/or expensive to control in soybeans. In corn, for example, cocklebur, morning glory and Pennsylvania smartweed can be controlled at three different times-preemergence, early post-emergence and layby, using different herbicides. Thus, in corn you have greater flexibility in time of application, number of applications, and herbicide selection.

For economical control of these weeds in soybeans, timing of postemergence applications is very critical and some injury may occur. Also, the control of perennial weeds such as trumpetcreeper, horse-nettle, and bigroot morning glory can only be done effectively in corn with 2,4-D amine.

Rotating both herbicides and crop may reduce the potential buildup of problem weeds and harmful herbicide residues. A good multiple cropping system with three crops in 2 years which aids in weed control is corn and small grain followed by double-crop soybeans. The corn and soybeans are no-till planted and the small grain is conventionally planted.

The cropping system may effect the herbicide choice or rate. If a winter small grain is to be fall seeded after corn harvest, Bladex would be best in the tank-mix combination for broadleaf weed control instead of Atrazine or Princep.

#### Competition

A competitive crop which provides shade to weeds aids the overall weed management in no-till crops and especially double-crop soybeans and late-planted grain sorghum. These later plantings should be in narrow rows, 15 to 20 inches, to give quick shade.

Follow recommended production practices-lime, fertilizer, proper stand, insect and disease control, etc.-to encourage a vigorous crop which has a competitive edge in shading out weeds. Since stand establishment is more difficult in no-till planting, special care should be given to planting rates and depth for weeds will come into plant skips within the row. Heavy mulch covers left from cover crops also aid in weed control. Dense small grain stands can also reduce the potential weed infestation and weed size at planting time for double-crop no-till soybeans or grain sorghum.

### Cultivation and Seedbed Preparation

If the weeds present dictate cultivation and/or plowing or disking for seedbed preparation, then no-till is not the planting system to choose. For example, johnsongrass, bermudagrass and yellow and purple nutsedge are difficult to control in a no-till system. However, certain preplant soil incorporated herbicides can control these perennial weeds.

In no-till double-crop soybeans, our experience indicates that small grain should be planted in a conventional seedbed rather than over-seeding in the previous crop. The stand of small grains has been better and hence better yields. Also, weed control and yield of the no-till planted soybeans have been greater following small grain which is conventionally planted. When fields are fall tilled and planted to small grain, cutleaf evening primrose, horseweed, whiteheath aster, and wild lettuce-which are difficult to control with Paraquat-are not a problem. In addition, perennial weeds such as trumpet-creeper, horsenettle, and briars, are less prevalent where fields have been tilled in the fall.

Effects of tillage in weed control is one reason we do not advocate continuous no-till planting but do suggest no-till as one alternative planting system within a total crop management system.

### Herbicides

To select the proper herbicide for no-till planted crops, you must know the weeds present in the field, the soil organic matter and texture, and the capabilities of herbicides labeled for no-till crops. The first step in any weed control program is to identify the weeds. There are several helpful weed identification manuals available. Scout or survey fields each summer or fall and record weeds present. These will most likely need to be controlled the following year.

The existing weeds will indicate whether or not to no-till plant. Next, they aid in selecting the herbicide to provide residual weed control and in determining

possible needs for additional postemergence applied herbicides.

### **Weed Management Programs**

The herbicide combination for no-till planted crops contains a contact herbicide for control of existing vegetation plus a surface applied residual herbicide for the control of germinating weeds. Specific herbicide mixtures for no-till are listed in Table 1. Discussion on herbicides and weed management programs in corn, soybeans, and grain sorghum follows.

#### **Control of Existing Vegetation**

Paraquat or Roundup in the tank mix control emerged annual grass and broadleaf weeds and small grain cover crops. Paraquat rates are 1 to 2 pt/A. Use the lower rate when emerged annual weeds are small-1 to 3 inches tall. Increase to 2 pt/A when weeds are 4 to 6 inches tall. Add Ortho X-77 Spreader to Paraquat tank mixtures.

Crabgrass, fall panicum and lambsquarter over 3 inches tall are difficult to control with Paraquat. In this case Roundup is better. Also, legumes (alfalfa, clover and vetch, for example), cutleaf evening primrose, wild lettuce and larger plants of some weeds such as Pennsylvania smartweed, ragweed, common lambsquarters and horseweed are more effectively controlled with Roundup.

Roundup used in no-till plantings is primarily for the control of annual weeds. We have noted that it gives improved suppression of perennial weeds over Paraquat. However, in most cases corn is planted too early for perennial weeds to be at the proper stage of growth for most effective control with Roundup. For annual weeds less than 6 inches tall use 1 quart of Roundup per acre. To control larger annual weeds increase the rate to 1.5 quart/A. There is considerable evidence from research in North Carolina that Roundup at 1.5 to 2.0 qt/A has economically increased yields in no-till corn planted into a green small grain cover crop and in soybeans if planted into weeds.

Paraquat or Roundup may be used to control winter small grain cover crops. Use 1 pt/A of Paraquat for rye and 2 pt/A for wheat, oats or barley plus Ortho X-77 surfactant. It takes 1.5 quarts/A of Roundup to kill cover crops.

Frequently, in earlier planted corn, summer annual grass weeds have not emerged. The weeds present may consist of winter annual broadleaf weeds and a few summer annual broadleaf weeds plus weeds which are difficult to control with Paraquat, such as, cutleaf evening primrose, horseweed, wild lettuce, plantains, and dock. Many no-till farmers are

treating these weeds with 2,4-D amine prior to applying a residual herbicide. As planting is delayed the potential for emergence of annual grass weeds increases, which means that either Paraquat or Roundup needs to be used.

In double-crop no-till soybeans, planting and herbicide application should immediately follow small grain harvest. Weeds at this time are smaller and easier to control. Furthermore, because of the competition provided by a properly managed small grain crop, the weed seedlings are frequently small, spindly and succulent. Given a few days after small grain harvest, these weeds develop rapidly and become more difficult to control with foliar applied herbicides.

If tall weeds are present at small grain harvest, set the combine header as high as possible to save the foliage of the weeds in order to have a greater contact area for the foliar applied contact herbicide. Weed stubble or stems will not be controlled and resprouting usually occurs.

If a field has a severe infestation of existing weeds at small grain harvest, you should consider conventional tillage rather than no-till planting for your double-crop soybeans. This is particularly true when annual grass and broadleaf weeds, for example, common ragweed, common lambsquarters and pigweed, exceed 8 to 10 inches in height.

Using ground application equipment, apply tank mixtures with Paraquat or Roundup in 20 to 60 gallons of water per acre immediately before, during, or after planting, but before the crop emerges. Paraquat and Roundup may be applied in water or clear fertilizer solutions. However, do not apply in muddy water or fertilizer suspensions. To Paraquat tank mixtures, add Ortho X-77 Spreader at 1 pint per 100 gallons of spray solution. Do not add additional surfactant to Roundup tank mixtures.

Thoroughly cover the live vegetation with spray. The amount of spray solution per acre should be increased as the density of stubble, crop residues or weeds increases. We suggest at least 40 gallons of spray solution per acre applied at a minimum of 40 psi through flat fan nozzles.

When double cropping, if the small grain straw has been left in a windrow and has not been removed or baled, it may trap the spray, lessening kill of existing vegetation and residual weed control. When no-till planting double-crop soybeans or grain sorghum use a straw shredder on the combine. This not only aids in improved weed control but also in increased ease of planting.

In spray mixtures the addition of Atrazine or Bladex in corn and Lorox, Lexone or Sencor in soybeans assist in killing existing vegetation in addition to providing residual weed control.

## Corn-Residual Weed Control

1. *Crabgrass, fall panicum, goosegrass, foxtails, and annual broadleaf weeds.* For the control of crabgrass, fall panicum, goosegrass, and foxtails, select either Dual or Lasso. Rates are slightly higher for no-till than conventional planted corn. The minimum rate for Dual 8E should be 2 lb active/A and for Lasso 4EC 2.5 lb active/A. These herbicides provide excellent grass control and adequate control of some broadleaf weeds. However, for additional broadleaf control tank mix AAtrex, Atrazine, Bladex, or Princep as indicated in Table 1. Follow labels.

If you are concerned about herbicide carry-over affecting crops following no-till corn such as fall planted small grains, select the Lasso + Bladex combination for residual control because this combination does not have any label restrictions on fall planted or spring planted crops.

High rates of animal manure or decomposed crop residues will reduce the effectiveness of surface applied herbicides. Residual herbicides tend not to persist as long under no-till conditions as conventional.

When the corn is 12 inches tall, scout or check the corn field for presence of grass weeds. If there is a considerable number of grass weeds 1 to 3 inches tall, a layby treatment will be beneficial. When the corn is 15 to 20 inches tall, postdirect Evik + surfactant or Lorox + surfactant. Addition of the surfactant is critical for success of the layby herbicide, whether applied in water or in nitrogen solution.

Grass weeds up to 3 inches tall can be effectively controlled with minimum rates of 1 lb active/A of Evik or 0.75 lb active/A of Lorox. These herbicides will also control small annual broadleaf weeds. Post-emergence herbicides are more effective on actively growing young weeds than mature weeds or those growing under stress. If the problem is only broadleaf weeds at layby, postdirect 2,4-D amine (0.5 lb active/A) or Banvel (0.25 lb active/A).

2. *Broadleaf signalgrass, Texas panicum and annual broadleaf weeds.* For the preemergence control of broadleaf signalgrass and Texas panicum, use Dual or Lasso. Under adequate rainfall these two herbicides perform very similarly and control broadleaf signalgrass from 5 to 6 weeks after application. More rainfall is required for activating Dual than Lasso. On the other hand, under heavy rainfall conditions for several weeks following application, Dual will give longer weed control.

To improve broadleaf weed control, tank mix AAtrex, Atrazine, Bladex, or Princep according to the combinations listed in Table 1.

A layby application, in addition to the at-planting treatment, is usually necessary in controlling these two grass weeds. Apply Lorox + surfactant or Evik + surfactant when the corn is 15 to 20 inches tall. Direct the spray solution to the lower one-third of the corn

stalk. Make sure the weeds are adequately covered. Lorox + surfactant at 0.75 lb active/A or Evik + surfactant at 1.0 lb active/A gives excellent control of broadleaf signalgrass and Texas panicum less than 4 inches tall; Lorox or Evik may be applied in nitrogen solution or water.

3. *Yellow Nutsedge.* If a field is severely infested with nutsedge, we suggest not planting no-till. However, light infestations of yellow nutsedge can be controlled with Dual at a minimum rate of 2 lb active/A. Atrazine and Princep may also be tank mixed with Dual for additional broadleaf weed control. If nutsedge has emerged at time of planting, use Roundup in the tank mixture. If a planting treatment of Dual has not been used, Basagran may be used for treating infested spots of yellow nutsedge within a field. When the yellow nutsedge is 6 to 8 inches tall, apply Basagran over the top of corn at 0.75 qt/A. It will take 2 applications spaced 7 to 10 days apart to do the job. Treat only the infested areas to cut cost.

Scout the corn field when corn is 12 to 15 inches tall. If there is considerable nutsedge present, a layby postdirected application of Lorox + surfactant will give additional control. In most cases, however, if the planting treatment has performed satisfactorily the addition of a layby treatment has not proven beneficial.

## Soybeans-Residual Weed Control

1. *Annual small-seeded broadleaf weeds plus moderate infestation of annual grass weeds.* Tank-mix combinations with Lorox, Lexone or Sencor provide grass and broadleaf weed control for a short duration-3 to 4 weeks. Control may be long enough for no-till double-crop soybeans planted in narrow rows but too short for full-season soybeans. These herbicides assist in killing existing vegetation in addition to providing residual weed control. Do not select these treatments if fall panicum or broadleaf signalgrass is a problem.

Lorox should not be used on sand or loamy sand soils nor on any soil with less than 1/2 percent organic matter for it may injure the soybeans. Five percent organic matter is the upper limit for use of Lorox, because organic matter ties it up, reducing the amount available for adequate weed control.

Do not use Lexone or Sencor on sandy loam or loamy sand soils with less than 2 percent organic matter. In these soils, Lexone or Sencor may injure soybeans, particularly under heavy rainfall which moves the herbicide into the soil where it is absorbed by the soybean roots and moved into the top of the plant. Plant soybean seed at least 1.5 inches deep on flat or raised seedbeds to reduce potential injury from Lorox, Lexone or Sencor.

2. *Annual small-seeded broadleaf weeds plus control of annual grass weeds including fall panicum and*

*broadleaf signalgrass*. For improved annual grass weed control, Dual, Lasso or Surflan should be added to the tank-mix combination. Dual will also control yellow nutsedge. Lasso is a consistently effective preemergence grass control herbicide since very little rain is required for its activation. It usually provides control for approximately 6 weeks. Surflan, on the other hand, requires more water for activation but offers the advantage of longer grass control. Dual appears to require a little more water for activation than Lasso but under heavy rainfall it provides longer control than Lasso. Often rainfall is less reliable following application for no-till double-crop soybeans and consequently weed control from Surflan is less favorable.

Any of these three herbicides in tank mixes is a good candidate for full-season or double-crop no-till soybeans. One of these three herbicides in combination with Lorox, Lexone or Sencor will provide good control of annual small-seeded broadleaf weeds such as pigweed, lambsquarter and ragweed and only partial control of larger seeded weeds such as cocklebur, jimsonweed and morning glory.

3. *Postemergence weed control*. Frequently it is necessary to apply additional herbicides for the control of large-seeded broadleaf weeds such as cocklebur and sicklepod. These weeds usually do not emerge as readily in no-till as tilled fields and are less of a problem in late planted no-till soybeans than in early planted conventional soybeans. Also, in no-till these applications may be more expensive because the potential for band application plus cultivation does not exist.

Scout the field a few weeks after planting. If cocklebur or ragweed are present apply Basagran over-the-top of the soybeans before the cocklebur or the ragweed reaches 4 inches tall. If morning glory and cocklebur are present, apply Blazer when both the cocklebur and morning glory are still small, cocklebur no more than 2 inches tall, and morning glory not running. Attac plus oil concentrate controls sicklepod only in the cotyledon stage. We do not suggest the use of Dyanap or Premerge in no-till double-crop soybeans because these herbicides have the potential of delaying the development of the crop.

Another approach to postemergence control of weeds is a postdirected application of Lorox + 2,4-DB (Butoxone or Butyrac). This treatment is effective on sicklepod, morning glory and many annual grass and broadleaf weeds. Add surfactant to spray mixture according to label directions. Soybeans must be at least 8 inches tall and weeds no bigger than 2 inches in height. Do not spray higher than 3 inches on the soybean stem or crop injury may result. Shielded sprayers are suggested in no-till to reduce potential crop injury, particularly in the presence of small grain stubble. Do not use if the soil has been wet for 2

**Table 1**  
**Herbicide Tank Mixtures for No-Till Crops**

<b>Contact Herbicide</b>		<b>Residual Herbicide</b>
<b>Paraquat</b>	<b>Roundup</b>	
<b>CORN</b>		
<b>X</b>	<b>X</b>	AAtrex + Princep
<b>X</b>	<b>X</b>	Dual + AAtrex
<b>X</b>	<b>X</b>	Dual + Princep
<b>X</b>	<b>X</b>	Lasso + Atrazine
	<b>X</b>	Lasso + Bladex
	<b>X</b>	Lasso + Princep
<b>SOYBEANS</b>		
<b>X</b>		Lorox
<b>X</b>		Lexone or Sencor
<b>X</b>	<b>X</b>	Dual + Lorox
<b>X</b>	<b>X</b>	Dual + Lexone or Sencor
<b>X</b>	<b>X</b>	Lasso + Lorox
<b>X</b>	<b>X</b>	Lasso + Lexone or Sencor
<b>X</b>		Surflan + Lorox
<b>X</b>		Surflan + Lexone or Sencor
<b>GRAIN SORGHUM</b>		
<b>X</b>		Atrazine

(Add Ortho X-77 Spreader to tank mixes with Paraquat)

or 3 days.

For suppression and control of light infestations of seedling and rhizome johnsongrass, Vistar may be applied over-the-top of soybeans. Soybeans should have at least two trifoliate leaves and the johnsongrass should be less than 15 inches tall. Roundup may be used in recirculating sprayers and in wick applicators to control johnsongrass once it has grown taller than the soybeans.

### Grain Sorghum-Residual Weed Control

The only labeled, tank mixture for no-till grain sorghum is Paraquat plus Atrazine. However, Atrazine may be used only on silt loam, clay loam and loam soil with more than 1 percent organic matter. Another approach is to apply Paraquat or Roundup to control existing vegetation. Then follow this with a preemergence application of Bicep or Milocep in fields planted only with Concept treated grain sorghum seed. Do not use Bicep on sand, loamy sand or sandy loam soils or on any soil with less than 1 percent organic matter. Milocep should not be used on sand and loamy sand soils.

Narrow rows, 14 to 20 inches, help in weed control for the plants shade out later germinating weeds.

When grain sorghum is 10 inches tall check for the presence of weeds. If needed, apply Lorox + surfactant as a postdirected spray for additional grass and broadleaf control or 2,4-D amine or Banvel for broadleaf control.