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## G89-899 Weed Control in No-Till Corn, Grain Sorghum and Soybean Production

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## Weed Control in No-Till Corn, Grain Sorghum and Soybean Production

Tips for successful no-till weed control, weed control principles for no-till row crop production, and no-till row crops planted into legume or small grain residues are covered here.

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- [Tips for Successful No-Till Weed Control](#)
- [Weed Control Principles for No-Till Row Crop Production](#)
- [No-Till Row Crops Planted into Legume or Small Grain Residues](#)

Soil erosion by wind and water is a strong societal concern in our state and nation. Current estimates are that more than 100 million tons of topsoil are eroded annually in Nebraska, with 75 percent of that coming from row crop areas. Nebraska farmers have been implementing changes in their crop production practices to reduce soil erosion.



**No-till crop production is possible under various residue situations.**

Maintenance of residue on the soil surface through conservation tillage is the most effective and least costly method of reducing soil erosion. Among conservation tillage systems, no-till eliminates seedbed tillage and provides excellent erosion control. No-till planting is well suited to many Nebraska soils having good internal drainage.

Weed control may be the biggest challenge in no-till row crop production. Following are several suggestions that should improve weed control in no-till.

### **Tips for Successful No-Till Weed Control**

1. ***Distribute crop residue uniformly over the field.*** Large capacity combines equipped with 24 to 30 foot grain platforms or eight to 12 row corn heads concentrate a large amount of residue, weed seed and lost grain in a small area. Equipping the combine with a chopper and spreader is critical with soybean, grain sorghum and small grain residues. Distribution of crop residues over the entire soil surface is necessary for uniform herbicide application and good planter operation to attain consistent seed placement and germination. Refer to NebGuide G86-782, *Distribution of Crop Residue -- A Requirement for Conservation Tillage*, for a more detailed discussion on residue distribution.
2. ***Precise herbicide application is required.*** Access to a heavy duty, properly equipped sprayer is essential for successful weed control in no-till farming. Consult NebGuide G80-500, *Ecofarming -- Selection of Tractor Mounted or Pull-Type Sprayer*, for more detail on sprayers.

In addition to herbicides which are applied with a tractor mounted or pull-type sprayer, herbicides also can be row banded with the planter. Herbicides should be delivered in 10 to 30 gpa solution. Consult product labels for specific recommendations. One exception is Roundup, which in some cases should be applied in three to 10 gal/A spray solution.

If relying on a commercial applicator, try to get a firm commitment that timely spraying will be done. Incorrect timing of herbicide applications can be costly in no-till row crop production.

All spray equipment must be calibrated to assure correct delivery of the herbicide solution. NebGuide G88-865, *Fine Tuning a Sprayer with the Ounce Calibration Method*, is a useful publication for help with calibration procedures for band and broadcast applications.

3. ***Select a well-drained field with low weed density.*** Freedom from perennial weed problems also is desirable when starting in no-till. Careful assessment of potential weed problems will help achieve initial success with no-till.
4. ***Fertilizer applications should be planned for no-till.*** If anhydrous ammonia is to be used as the preplant nitrogen source for no-till corn or grain sorghum, it should be knifed into the soil before broadcast application of herbicides. Otherwise severe displacement of herbicide-treated soil will occur and allow weeds to become established in the seedbed. This is especially true with early preplant application of herbicides.

Dry or liquid nitrogen fertilizers can be surface applied in no-till, but some volatilization losses can occur from non-incorporated urea-based products or by runoff with heavy rainfall. Nitrogen can be applied through irrigation systems or side-dressed for no-till corn or grain sorghum. Starter fertilizers are best applied in a band with the planter.

5. ***Soil disturbance by the planter can reduce weed control.*** Many no-till planters use coulters in front of the seed furrow openers. Smooth or narrow ripple coulters cause minimal soil disturbance. Wider fluted coulters till the soil more than is necessary and often throw soil from the row area when operated at more than four miles per hour.

Use of wide-fluted coulters may displace herbicide-treated soil and allow weed growth in the crop

row. The same is true with disk furrow openers, that if used, should be set to only remove residue, not soil, from the crop row. Wide-fluted coulters and disk-furrow openers should not be used after application of early preplant herbicides unless additional herbicide is banded at planting for in-row weed control.

## **Weed Control Principles for No-Till Row Crop Production**

No-till implies that no tillage will be done for seedbed preparation before crop planting. This means that herbicides will be used for weed control, supplemented with cultivation when necessary. Herbicide applications in no-till may be made before planting (preplant), at crop planting, or postemergence.

**Preplant.** With this method, herbicides are applied before crop planting when weed seed is ready to germinate or when a few weed seedlings have emerged from the soil. The objective is to prevent weeds from becoming established in the seedbed. Since herbicides will be applied on last year's crop residue, it is important that the residue be properly managed.

Soybean, field bean, or small grain residue that has been chopped and uniformly spread will not interfere with application or performance of herbicides. Corn or grain sorghum residue is more difficult to manage.

If the corn or sorghum residue has been grazed heavily, herbicides can be applied on unshredded stalks. Position the spray boom to clear standing residue but maintain 100 percent spray coverage. Residue still anchored to the soil may give less problems at planting than shredded residue. For producers who prefer to shred stalks, this operation should be done at least a week ahead of herbicide application. This will allow the loose residue to stabilize over the soil surface before herbicide application.

If herbicides are applied immediately after stalk shredding and before rainfall, the loose residue with attached spray particles may blow around and result in uneven herbicide distribution and movement into the soil.

Preplant herbicide applications are often referred to as: 1) early preplant (EPP) treatments which are made 14 to 30 or more days before planting; 2) preplant surface applied (PPSA) treatments which are made zero to 14 days before planting.

1. **Early preplant (EPP).** Weed seed germination will not occur on a fixed calendar date but will depend upon soil temperature. Field scouting will have to be done periodically, starting about April 5, to determine when weed seed is germinating. The earliest germinating weed species are usually broadleaves, such as kochia, Russian thistle, and Pennsylvania smartweed. Grass weeds germinate seven to 10 days later than broadleaves.

Monitoring germination of grass weed species is most important since emerged grasses are more difficult to remove with early preplant herbicide programs than are broadleaves. Early preplant treatments must be applied without delay as summer annual grass weed seed begins to germinate.

Soybean and grain sorghum planting usually follows corn by 10 to 30 days. Use of an early preplant program to prevent weeds from becoming established in the seedbed is more important for soybeans and grain sorghum than for corn.

Winter annual weeds like field pennycress, marehail and mustard species often are present in no-till fields at planting time. To control these weeds in corn and sorghum, 1 to 1.5 pt/A of 2,4-D ester can be tank-mixed with a soil residual herbicide. 2,4-D ester also can be used in no-till soybeans if the herbicide is applied at least 30 days before planting.

In selecting herbicides for early preplant application, choose those that have longer soil life. This will be more important if a later planting date is anticipated. Split applications of the early preplant herbicide should be considered, especially for grain sorghum and soybeans. While herbicide labels vary, the label often states that for early preplant treatments applied more than 15 to 20 days before planting, 2/3 of the product should be applied EPP and the balance at planting time.

To be effective, early preplant herbicides must be moved into the soil by rainfall. Rainfall usually is frequent enough in April for good herbicide activation. Excessive rainfall may cause soluble herbicides to move beyond the surface soil where optimal weed control occurs.

Refer to the annual edition of Extension Circular EC 130, *A Guide for Herbicide Use in Nebraska*, for a listing of herbicides which may be applied early preplant. For corn and sorghum, atrazine, Bladex, Bullet, Dual, Extrazine II, Lariat, and Lasso MT are registered for early preplant use. In soybeans, Command or Lexone/Sencor with Dual, Lasso MT, or Prowl can be used. Turbo, a package mix containing Dual and Sencor, is registered for EPP use. EPP Prowl treatments are most effective if rain falls within seven days.

2. **2. Preplant surface applied (PPSA).** By zero to 14 days before crop planting, weeds of varying sizes will emerge in the seedbed. Therefore, preplant surface herbicide treatments must have foliar activity to remove emerged summer and winter annual weed seedlings. PPSA herbicides will not always be effective in removing winter annual species.

For **no-till corn**, build the PPSA program around Bladex or atrazine. Both these triazine herbicides are active on emerged annual broadleaf and grass seedlings up to 1.5 inches in height, as well as providing residual weed control. Crop oil, surfactant, or 28 percent nitrogen should be added to the herbicide solution for maximum foliage burn on emerged weed seedlings. 2,4-D ester at 1 to 1.5 pt/A can be added to improve broadleaf weed control. Lasso MT or Dual can be tank-mixed with either Bladex or atrazine but they do not have activity on emerged weeds.

Bicep, Bullet, Extrazine II, and Lariat are package-mix herbicides which contain Bladex and/or atrazine, all of which can be used as PPSA treatments for no-till corn.

For PPSA applications in **no-till grain sorghum**, atrazine can be used to provide activity on emerged grass seedlings up to 1.5 inches in height, plus giving residual weed control. Because of potential sorghum injury, Bladex should not be used in PPSA programs within 14 days of planting. Lasso MT or Dual can be tank-mixed with atrazine but the sorghum seed must be treated with Concept II or Screen for crop safety. Bicep, Bullet and Lariat are package mixes of Lasso or Dual with atrazine which can be used for sorghum. Crop oil, surfactant, or 28 percent nitrogen can be added to the herbicide solution to increase activity on emerged weeds. 2,4-D ester at 1 to 1.5 pt/A can be added for additional broadleaf weed control.

If grass weeds are greater than 1.5 inches tall and rainfall predictions are unfavorable, add Gramoxone Super (paraquat) to the herbicide solution.

For PPSA applications in **no-till soybeans**, build the program around Command, Lorox, Lorox Plus, Lexone, Preview or Sencor. These herbicides are active on small emerged weeds, as well as providing residual weed control. Lasso MT, Dual or Prowl can be tank-mixed with foliar-active herbicides but they do not have activity on emerged weeds. Turbo also can be used as a PPSA treatment. Emerged grass seedlings should be no more than 1.5 inches in height. Crop oil, surfactant, or 28 percent nitrogen should be added to the spray solution for maximum foliage burn on emerged weed seedlings.

Consult EC 130, *A Guide for Herbicide Use in Nebraska*, for a full listing of herbicides which can be used PPSA for no-till corn, sorghum and soybeans.

**Planting Time.** Herbicides also may be applied, during or after planting but before crop emergence. In most years, large weeds will be established in the seedbed, particularly with sorghum and soybeans. If the emerged grass weeds are larger than 1.5 inches, treatments containing the previously mentioned foliar-active herbicides may not give consistent control. These emerged weeds then must be removed with a mixture of a non-selective plus residual herbicides.

Gramoxone Super (paraquat) or Roundup are non-selective herbicides ordinarily used to bum down existing weeds. Gramoxone Super, Roundup or Bronco (Roundup + Lasso) can be tank-mixed with a number of residual herbicides to remove emerged weeds in no-till corn, sorghum or soybeans. Annual weeds must be four inches or less for reliable control. Weeds established in the seedbed use soil moisture, which may become a limiting factor for crop growth in low rainfall years.

Gramoxone Super works best tank-mixed with residual herbicides. Conversely, Roundup has a tendency to tie-up with hard water, fluid fertilizers and some herbicides, thereby reducing activity. In herbicide tank mixtures, Roundup must be applied at 1 to 1.5 qt/A for control of annual weeds.

Another less expensive option for using Roundup in no-till systems is to apply it separately as a low-volume broadcast application. Water carrier volumes should be three to 10 gal/A with ground equipment. Add a nonionic surfactant at 0.5 percent of total spray volume. The addition of dry, spray grade ammonium sulfate at 17 lb/100 gal of water may increase performance on annual weeds. Roundup rates for low gallonage applications are 12 to 16 ounces/A for weeds found in Nebraska. Check the Roundup label for rates for specific weed species and maximum heights.

2,4-D amine may be tank-mixed with Roundup for low gallonage applications in corn and sorghum, but soil residual herbicides should not be. Utilization of low rates of Roundup requires two trips over the field; one for Roundup and one for the soil residual treatment.

For no-till soybeans, several soil residual herbicides can be tank-mixed with Gramoxone Super or Roundup. For broadleaf control use Command, Lexone/Sencor, Lorox, Lorox Plus, Preview or Scepter. Add Lasso MT, Dual, or Prowl for grass control. Refer to the annual edition of Extension Circular EC 130, *A Guide for Herbicide Use in Nebraska*, for rates and appropriate restrictions when using these products. Lorox Plus, Preview and Scepter have geographic, soil type or recropping restrictions which limit their use in many situations.

**Postemergence.** Postemergence herbicides can either be utilized in no-till row crop production as supplemental or rescue treatments, or as part of a planned no-till weed control program. In **no-till corn and grain sorghum**, escaped broadleaf weeds can be controlled with Banvel, Basagran, Buctril, Buctril/atrazine, Laddok, Marksman or 2,4-D. Bladex, atrazine or Tandem + atrazine can be used for supplemental grass weed control in corn.

A large number of postemergence herbicides are available to develop several programs for use in no-till soybeans. For example, a basic early preplant (EPP) or preplant soil surface (PPSA) program could be used, followed as needed by postemergence herbicides to remove grass and broadleaves which escape the earlier treatment. Some producers may prefer to develop a total postemergence weed control program. Such a program is best suited for narrow-row soybeans, where the canopy closes more quickly to compensate for limited soil residual value of most postemergence herbicides.

A total postemergence weed control program may be more costly than using soil-applied herbicides. In

addition, soil moisture is used by weeds before they are killed. This should not decrease soybean yield potential in higher rainfall areas of the state, and when summer rainfall is normal.

Another option would be to remove the first weed flush with a low rate application of Roundup, followed by use of a residual herbicide at soybean planting time.

### **No-Till Row Crops Planted into Legume or Small Grain Residues**

Prior discussion has been directed to planting no-till corn, sorghum or soybeans in row crop residues. However, row crops often are planted into legume residues (alfalfa, clovers) or spring small grain residues (barley, oats, wheat). In addition, there is increasing interest in use of fall planted cover crops to reduce the soil erosion potential. Winter rye alone or with hairy vetch commonly is seeded by aircraft either in late summer in standing corn or fall drilled into various stubbles. Refer to the annual edition of Extension Circular EC 130, *A Guide for Herbicide Use in Nebraska*, for a listing of herbicides which may be used when no-till planting corn, sorghum or soybeans into these residues.

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