

No-Till Notes:

Weed Control in No-Till

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Weed control in no till is not as simple as spraying a wide variety of herbicides to control every weed that's out there to contend with. The use of herbicides is way down the list on practices we use in no till to control weeds in our fields. Cultural practices are much more effective than herbicides in reducing weed pressure in the growing crop. Herbicide use in no till is to control the small fraction of weeds that escape the cultural practices that are in place. Herbicides are expensive and not always reliable if the weed pressure is too severe. Their use is kept to a minimum in no till to help lower the overall cost of production in no till farming. In long term no till our overall use of herbicides has been reduced as cultural practices have been in place to help with weed control.

Let's examine the cultural management practices we use in no till to control weeds in our fields. These management decisions are critical to weed control and overall plant and soil health. The management decisions involve selection of tillage practices, or lack of in no till, row width spacing of planting equipment and minimum disturbance of the soil with this equipment, crop rotations, residue management, and selection of herbicides.

Each of these management decisions will effect the overall weed population in your fields. It's important to remember that weeds are opportunistic. If there are consistent weed problems in your fields it is because you have given these weeds the opportunity to thrive. Changing a management practice or combinations of practices will go a long way in eliminating the opportunity for the weed species to thrive in your field. The reliance on technology to keep your fields weed free is placing too much pressure on these technologies and setting you up for problems down the road such as herbicide resistant weed populations. Remember to use cultural practices as a front line defense against weed populations and use herbicides to help control the weeds that persist despite good management.

Most weed species seed germinates within the top 1-2 inches of the soil surface. This top couple of inches is the weed bank which causes the weed pressure in your field. If you can control the germination of the seeds within this layer, you can gain control of the majority of the weed seeds within your field. Weed seed which is buried below this layer are not in a position to germinate unless they are moved to the soil surface by tillage. Every time you perform a tillage operation you change the weed bank by moving additional seed which was buried into this "germination layer" where weed seeds can germinate. In a no till farming system the tillage practices are stopped which eliminates moving buried seed into this upper layer. Controlling the weed seed in this upper layer allows a no till farmer to gain some control over the number of weed seeds which are viable in the field.

Research performed at Dakota Lakes Research Farm in Pierre, SD has shown if you can control viable weed seed in this germination layer for a period of 2 years, you

can eliminate 87% of the viable weed seed for weed species. The control of this weed seed within the top layer of this germination zone will go a long way in controlling weed populations in the field for years to come. Eliminating tillage allows you to control this layer of soil and the viable seed within this layer.

Weed Control in No-Till, Part 2

In the first article on controlling weed populations in a no till farming system I talked about the "weed bank" or the top layer of soil where weed seed is in a position close enough to the soil surface to germinate. This is the layer of soil where we need good cultural practices to minimize weed pressure in the field. By stopping tillage we no longer pull up seed into this weed bank, thus controlling any buried weed seed. Stopping tillage is the first cultural practice in gaining control of weed populations in a no till farming system.

Another important cultural practice is management decisions involving planting equipment and how this equipment is operated when planting the crop. An important decision to make with planting equipment is the row spacing or row width you choose to plant a crop. As a rule of thumb, the narrower the row spacing the better the weed control will be. Developing a crop canopy which will shade the soil surface is an effective means of controlling weed populations in the field. The narrower the row spacing, the quicker the crop will canopy and provide weed control through shading of the soil surface.

On our farm we use a grain drill with a row spacing of 7 1/2 inches. With this narrow row spacing we are able to achieve faster crop canopy with the crops we drill. This works well with our winter wheat, proso millet, chickpea, and field pea plantings. We even used the drill on pinto beans this past year with good results as far as crop canopy to help with weed control. The drawback to this pinto bean planting is we weren't real happy with our crop stand in certain parts of the field. We plan this year to use a split row planter with 15 inch row spacing. Our thinking is we will still have the advantage of narrower rows for weed control, 15 inch vs. the typical 30 row spacing. We also feel we will get a better overall crop stand by using a planter for seeding as opposed to the grain drill. We also feel we will get a better overall yield with these narrower rows. It will be interesting to see our results this coming growing season with the edible beans.

The other important management decision with planting equipment is soil disturbance when operating the equipment. The more the soil is disturbed at planting time will result in increased opportunity for weed seed to germinate. As with tillage, the more the soil is disturbed, the greater the risk of moving weed seed into the "germination zone". When operating the planting or drilling equipment, always think of minimum disturbance. You have to get the seed placed into the soil for good seed to soil contact, but always try to do so with minimum soil disturbance.

Weed Control in No-Till, Part 3

In the first few articles concerning weed control in a no till farming system we have looked at the soil "weed bank" and how we control this weed germination zone by stopping tillage operations and using minimum disturbance planting equipment so we don't disturb the top layer of soil any more than necessary to plant the crop. We also discussed the importance of achieving a rapid crop canopy to shade the soil surface and suppress weed seed germination.

Another key component of weed control in no till is residue management. The type of residue and amount of residue produced from the previous crop will help with weed control in the crop to be planted. Small grains such as winter wheat or proso millet produce large amounts of dense residue. I consider corn to be a moderate producer of residue even though the corn plant is much taller. Corn is planted typically in wider rows, leaving more soil surface exposed. Corn residue also has a tendency to move out of the field with wind or blow up in piles throughout the field exposing more bare soil. Legumes such as edible beans and peas produce the least amount of residue. Crops taken off as forage or residue baled and moved off the field also reduce the amount of residue left for weed control. The types of crops grown and the management of the residue produced will determine how effective the residue will be in suppressing weed populations in the following crop.

Large amounts of residue will do the best job of controlling weed populations in the following crop by providing the best mulch layer. The same concept is used in gardening in smaller garden plots. We have all hauled in some bales of wheat straw to spread around the flower or vegetable gardens to help with weed control and moisture savings. We are applying the same concept in our no till fields, only on a larger scale. Leaving the previous crops residue on the soil surface as mulch will help with weed control along with other numerous benefits like water infiltration, reducing soil surface evaporation, protecting the soils surface from driving rain, preventing wind and water erosion of the soil, increasing organic matter in the soil, and feeding the soil microorganisms. All these benefits result from leaving the residue on the soil surface and go a long way in promoting overall soil health and crop production. The more residue the better!

When making management decisions concerning crop rotations and residue keep in mind the benefits the residue will provide with weed control in the following crop year. Decisions you make will have ramifications towards the next crop's growing season. If you decided to remove the residue from the field, this may result in more weed pressure for the following crop.

Weed Control in No-Till, Part 4

Up to this point concerning weed control in a no till farming system we have looked at the soil "weed bank" and how we control this weed germination zone by stopping tillage operations and using minimum disturbance planting equipment so we don't disturb the top layer of soil any more than necessary to plant the crop. We also discussed the importance of achieving a rapid crop canopy to shade the soil surface and suppress weed seed germination. Residue management is also an important consideration in overall weed control. The types of residue and the amount of residue left in the field will determine how well residue can assist in weed control in the following crop.

Herbicides are another important consideration in no till farming systems when discussing weed control. There is a wide variety of herbicides available to producers to assist in weed control in their fields. This wide array of herbicides is often overwhelming to consider when making herbicide choices for your crop production. We are fortunate to have educated crop consultants at our disposal to help us with our herbicide selections. We are also fortunate to have researchers at the Panhandle Research and Extension Center to study and assist us with herbicide selections.

When looking at herbicides for no till farming there are a few important considerations. Obviously in no till farming we don't use herbicides that need to be incorporated. Herbicide cost is especially important in dry land cropping rotations. Whether to use a pre-plant herbicide as a single application for the growing season and whether that herbicide will have enough residual to carry weed control through the entire growing season. Post emergence herbicides often work well in controlling late emerging weeds and may be used in place of pre-emergence herbicides or in combination with the pre-emergence herbicide.

When considering which herbicide to use in a particular crop, herbicide carryover or long term residual herbicides are important considerations when designing your cropping rotations. On our farm we try to avoid herbicides with long residual carryover. We like to maintain flexibility in our cropping rotations and don't want long term herbicide carryover to interfere with any cropping rotation changes we may want to make.

Timely applications of herbicides can be very important in determining the effectiveness of herbicides. I strongly suggest that as you develop your farm into a no till farming system owning your own sprayer is a good idea. I like to do my own spraying of herbicides on our farm so I can apply the herbicides in a timely manner. I also like to know exactly what is going into the herbicide application so if problems arise I can look back and see exactly what was applied and correct the problem in future applications.