

Ecofarming

Spring Row Crop Planting and Weed Control in Winter Wheat Stubble

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Weed control, stubble management, and planters for planting in winter wheat stubble are covered.

Planting corn, sorghum, or soybeans into untilled, weed-free winter wheat stubble that is 10 months old is an accepted practice in the Central Great Plains. In Nebraska, this system is known as ecofallow. Ecofarming and ecofallow are systems of no-till or reduced tillage. Ecofarming is defined as a system of controlling weeds and managing crop residues throughout a crop rotation with minimum use of tillage so as to reduce soil erosion and production costs while increasing weed control, water infiltration, moisture conservation, and crop yield (*Figure 1*).

Treating the stubble with herbicides following wheat harvest (ecofallow) offers several advantages:

1. Weeds and volunteer wheat can be eliminated. Weed growth robs valuable moisture that could be used by next year's crop. This reduces or eliminates diseases such as wheat streak mosaic.
2. Standing stubble provides an excellent snow trap during the winter. Snow melt can provide moisture for next year's crop.
3. Stubble on the soil surface can insulate soil to reduce evaporation of moisture that accumulates in the profile. It also protects the soil from wind and water erosion. Wind velocity at the surface is reduced by wheat stubble, and stubble absorbs the impact of raindrops and slows runoff, which reduces erosion and increases infiltration.
4. Long-term no-till, especially with controlled traffic, increases the water infiltration rate of the soil.

Weed Control

The ecofallow period in a three-year rotation of winter wheat-row crop-fallow is the period between harvest of wheat or another small grain and the planting of corn, sorghum, or soybeans. Energy requirements are much lower for ecofallow than conventional fallow. Weed control depends



Figure 1. Ecofarming is the practices of planting corn or sorghum directly into wheat stubble, which lowers evaporation and assists in weed management.

on good cultural practices and herbicides. Good herbicide application and performance is essential for any conservation cropping system.

Most of the failures of no-till planting are associated with poor weed control and poor crop residue distribution. Plan ahead to take care of weed problems early. Your goal should be total weed control throughout the crop rotation. Don't plant into a weed problem unless you have a solution for killing the weeds.

Spray as soon after wheat harvest as possible with appropriate herbicides, considering the row crops to be planted the following spring. Also apply atrazine in September if corn and/or grain sorghum will be planted the next spring. Apply glyphosate plus other herbicides for fields going into soybeans and to control weeds including emerged volunteer wheat. Select the herbicides for the row crops to be planted the following spring — herbicides that can be used preplant or preemergence. Apply appropriate postemergence herbicides if weeds are present. More effective herbicides are available for corn and soybeans than for sorghum. See EC130, *A Guide for Weed Management in Nebraska*, for the latest recommendations to help plan a weed management program to deal with herbicide-resistant weeds.

In undisturbed fields treated with herbicides prior to row crop planting, weeds often emerge in areas disturbed by the planter units and the marker. It is best to use a Global Positioning System (GPS) instead of a physical marker. A band application of an appropriate preemergence herbicide may be necessary to control these weeds in the crop row and marker track.

Wheat Stubble Management

Weed-free stubble undisturbed from harvest in July until the next May will have undergone limited decomposition. Most of the stubble is attached to the ground during the critical erosive period.

Most no-till planters have a row spacing of 30 or 36 inches, so planters equipped with rolling coulters have few problems with planting in heavy residues. Potential planter clogging problems come mainly from the straw and chaff that passes through the combine and is left loose in the windrow or in piles.

It is important to spread the straw as evenly as possible with the combine. Avoid piling the straw, for example, when the combine unloads grain. These piles and windrows are difficult to plant through. The fines or chaff must be spread. If the combine is not equipped with a chaff spreader, install one. Good spreading of the fines also will aid in volunteer wheat control. The amount of wheat straw can be reduced by selecting semi-dwarf winter wheat varieties and reducing the amount of nitrogen used. You need 4,000 to 6,000 lb/ac of wheat stubble to provide cover for maximum corn or sorghum yields.

The stripped header eliminates the need for straw distribution but a chaff spreader is still needed. The stripper header is a real plus in areas unable to produce enough crop residue to maximize the benefits of crop residues to the crops that follow. The crop residue also lasts longer because the straw that goes through the combine becomes fragile residue and the reduction in crop residue occurs at a much higher rate.

Another cause of planter clogging comes from weeds that blow into the field. Keep field borders weed-free to minimize this problem. Weed-free stubble in the spring is important because weed growth can dry out the surface soil, making depth adjustment on the planter difficult.

The insulating effects of stubble are quite pronounced. In the spring, the soil under the stubble is slower to dry and cooler than bare soil. This insulating effect carries into the growing season, which is an important water conservation benefit of the ecofallow system. It may, however, also delay planting and slow germination, emergence, and early growth of the crop. Consider medium-season hybrids instead of full-season varieties for ecofallow.

Even with limited moisture in the spring, there is always sufficient moisture close to the soil surface for good germination. The exception would be when there is a small amount of crop residue and a dry fall, winter, and spring. At the surface, damp stubble can be tough and hard to cut with the disks on the planter. Planters have less difficulty

planting into undisturbed soil than into soil that has been sweep plowed or disked. Planter-depth adjustment and straw cutting are more difficult in tilled loose soil than in untilled soil.

Planter Characteristics and Performance

Manufacturers have developed planter attachments to handle crop residues, including wheat stubble. The most effective have been the spider wheel residue movers. These attachments should be used only to remove large amounts of residue that cannot be planted through before the disk seed-furrow openers. Crop seed must be placed in firm moist soil, not into hairpinned crop residue. Stubble-handling attachments may move the stubble a few inches from the row.

A bare soil area around the seed furrow may promote faster soil warming and seed germination, but the bare area may increase soil water evaporation, promote weed growth, and crop residue may blow back over the row (*Figure 2*). Planters should be set to avoid moving preplant herbicides or soil away from the seed furrow. An alternative is to apply herbicides in a band over the row at planting, or broadcast after planting.

Planters with sharp larger coulters can aid in planting in crop residue. Avoid coulters that are fluted or rippled. Straw mixed into the soil above the seed may cause seedling emergence problems. Disks should be rust-free and sharp.



Figure 2. Wheat residue moved with residue cleaners creates undesirable effects of destroying residue, increasing evaporation, and creating weed problems in the row.

Seed Furrow Openers

Usually double-disk, seed furrow openers open a seed-vee at a uniform depth. A disk-type furrower should not be set to move soil, which could cover the straw between rows, or be deep enough to cut a furrow that water runs down the row. Removing soil containing the herbicides allows weeds to develop in the row.

Seed Depth

Depth control is critical since planting too deep into cooler soils slows emergence, and planting too shallow may

cause problems with covering the seed properly and rooting. Good depth control on a planter starts with independent flexible row units, which are essential. Shallow-planted corn (1.5 inches or less) may have trouble developing secondary roots important in anchoring the plant so it doesn't lodge. There must be sufficient weight on the planter units to ensure uniform penetration to the desired seeding depth. Seed tubes may have to be lengthened to ensure sorghum is planted at the bottom of the groove. Seed firming devices to firm the seed in the bottom of the seed furrow help with germination and even crop emergence. When planting into wet soils, seed-furrow openers can cause problems by "slicking" the sides of the seed-vee. Upon drying, the nodal roots cannot penetrate the sides of the groove. Severe lodging may occur that resembles rootworm damage.

Overpacking the soil above the seed can be a problem when soil moisture extends to the surface. The soil must be pressed firmly enough to seal the seedbed but not hard enough to crust the soil upon drying. A seed press wheel can help set the seed firmly in contact with moist soil. Seed firming devices can help place the seed in the bottom of the seed furrow. Some soils become cloddy or have a tendency to crust if they are pressed firmly when wet. Usually these problems can be reduced by waiting for more favorable planting conditions and by leaving residue over the row.

Starter Fertilizer Application

Fertilizer attachments must be mounted in such a manner so as not to collect straw. Some fertilizer openers place liquid fertilizer below the seed. Worn openers may allow fertilizer to come within 1 inch of the seed and damage the seedling. Sorghum seedlings are damaged more easily than corn seedlings. The starter attachment is best placed at least 2 inches from the row. Placement of the fertilizer attachment should be to avoid soil build-up on the planter's depth gauge wheels. Narrow gauge wheels are preferred and destroy less crop residue. A limited amount of starter fertilizer can be placed directly with the seed. When fertilizer is placed with the seed, the risk of salt damage increases substantially. The total N plus K₂O rate should not exceed 8 pounds per acre. A sandy soil with a low cation exchange capacity (CEC less than 7), increases salt damage risk and rates should be reduced to a total maximum of only 5 pounds per acre N plus K₂O. Ammonium thiosulfate (12-0-0-26S) must not be placed with the seed because of the potential for seed germination damage.

These problems with planting into untilled wheat stubble can be solved. Farmers have successfully used conventional surface planters equipped with rolling coulters and added weight or specially designed no-till slot planters to plant into undisturbed wheat stubble.

It takes careful management to get the straw spread at harvest and complete weed control soon after harvest. Be prepared to plant early when surface soil is dry or delay planting if soil is wet. Also consider changing to medium- or short-season hybrids, or changing from corn to sorghum.

Planters Available

Most of today's planters can plant no-till and have been used successfully for stubble planting in Nebraska. Move the residue only when necessary to prevent hair-pinning the crop residue into the seed furrow. Several companies manufacture attachments that move stubble away from the seed furrow. Farmers have also modified their planters to aid in planting in heavy crop residues. The common characteristics of all of these planters is the use of double disk seed furrow openers. Beyond this, there are many differences in features. Planters are designed to plant under a wide set of conditions, and some slight modifications may need to be made to fit local situations. With proper setting, modifications and care, all these planters have been made to work in stubble planting.

If you have problems planting, check the operator's manual or contact the dealer for assistance.

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**Index: Crop Production/Field Crops
Cropping Practices**
1983, 1989, 2006, Revised August 2012

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