1981

G81-551 Ecofarming: Spring Row Crop Planting and Weed Control in Winter Wheat Stubble

Gail A. Wicks
University of Nebraska - Lincoln

Norman L. Klocke
University of Nebraska - Lincoln

G81-551-A
(Revised October 1989)

Ecofarming:
Spring Row Crop Planting and Weed Control in Winter Wheat Stubble

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

Gail A. Wicks, Extension Specialist-Weeds; and Norman L. Klocke, Extension Agricultural Engineer

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 States. In Nebraska, this system is known as ecofallow. Treating the stubble with herbicides following wheat harvest (ecofallow) offers several advantages:

1. Weed and volunteer wheat growth can be eliminated. Weed growth robs valuable moisture that could be used by the next year's crop.
2. Standing stubble provides an excellent snow trap during the winter. Snow melt can provide moisture for the 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 the raindrops and slows runoff, which reduces erosion and increases infiltration.

Weed Control

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.

The ecofallow period in a three-year rotation of winter wheat--row crop--fallow is the period between

wheat or other small grain harvest and the planting of corn, sorghum or soybeans. Energy requirements are much lower for ecofallow. Weed control depends 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. Plan ahead to take care of weed problems early. Depend on a total weed control program throughout the crop rotation. Don't plant into a weed problem unless you have a solution for killing the weeds.

Spray as soon after harvest as possible with appropriate herbicides for the row crops to be planted the following spring. Then select the herbicides for the row crops to be planted the following spring. Then select the herbicides that can be used preplant or preemergence for the selected crop. Apply appropriate postemergence herbicides if weeds are present. More effective herbicides are available for corn than for sorghum or soybeans. See *EC90-130, A Guide for Herbicide Use in Nebraska*, for latest recommendations.

If weeds are too large to kill with herbicides at planting, use shallow tillage to kill the existing weeds. Sweep plows, tandem disks or power driven rototillers have been used successfully. If used early, a no-till cultivator or power driven cultivator can save a field from weeds after crop emergence.

In the undisturbed fields treated with herbicides prior to planting, weeds often emerge in the disturbed areas of the row and the marker. A band application of an appropriate preemergence herbicide may be necessary to control these weeds.

Stubble Management

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

Most no-till planters have row spacing of 30 or 36 inches, so planters equipped with rolling coulters have little problems with plugging 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. (Also see *G86-782, Distribution of Crop Residue, Requirement for Conservation Tillage*.)

It is important to spread the straw as thinly as possible with the combine. Also avoid piling the straw, such as happens when the combine unloads grain. These piles and windrows are difficult to plant through.

Amount of wheat straw can be regulated by selecting semi-dwarf winter wheat varieties and reducing the amount of nitrogen used. You need 4,000 to 6,000 lb/A of wheat stubble for maximum corn or sorghum yields.

Another source of planter clogging comes from weeds that blow into the field. Weed-free stubble in the spring is important because weeds 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. At the surface, damp stubble can be tough and hard to cut with the rolling coulters on the planter. Farmers have less difficulty planting into undisturbed soil than into soil that has been sweep plowed or disked. More difficulty has occurred with depth adjustment and cutting the straw in tilled soil.

Planter Characteristics and Performance

Manufacturers have developed more planter attachments to handle crop residues, including wheat stubble. Rolling coulters, horizontal disks, and pairs of concave disks have been used alone or in combinations. These stubble-handling attachments must cut or move the stubble before the furrow openers place the seed. The seed must be in a clean furrow. These stubble handling attachments may or may not move the stubble a few inches from the row.

A bare soil area around the furrow may promote faster soil warming and seed germination, but the bare area may promote weed growth. Planter attachments should be set to avoid throwing preplant herbicides away from the seed furrow. Another alternative is to apply herbicides in a band over the row, or broadcast after planting.

Planters can be equipped with *rolling coulters* that are 18 inches in diameter or larger. Whether the coulters are fluted, rippled, notched, or smooth, they must be sharp, weighted or spring pressured, and set deep enough to cut cleanly through the stubble without punching it into the furrow. Straw mixed into the soil above the seed may cause corkscrewing of the seedlings. See *G83-684, Row Crop Planters,* for a detailed discussion on equipment, adjustment and performance in conservation tillage.

Coulters should be rust-free and sharpened with a disk roller. Smooth coulters give the best performance for stubble cutting. Fluted coulters provide more loose soil for better seed coverage. However, they do not scour properly when the soil is wet and they do not cut straw adequately if stubble is damp. Wide fluted coulters throw straw away from the row better than narrow fluted coulters, but require more weight for penetration. They also disturb the herbicide barrier more. By removing straw from the row, soil warms up faster, an advantage when soils are cold.

The *furrow openers*, whether double-disk, slot or runner type, must place the seed firmly into contact with moist soil at a uniform depth. Rolling disk type openers should not be set deep enough to cover the straw between rows or deep enough that water runs down the row. Removing soil containing the herbicides allows weeds to come in the row.

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. Good depth control on a planter starts with independent flexible row units, which are essential. Seed tubes may have to be lengthened to ensure sorghum is planted at the bottom of the groove.

Shallow-planted corn (I inch or less) may have trouble anchoring primary roots into the soil, which can lead to plant lodging.

Farrows openers used in wet soils can cause problems with slicking the sides of the groove. Upon drying, the nodal roots cannot penetrate the sides of the groove. Severe lodging may occur that resembles root worm damage.

Covering 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 wheels may pick up seed if soil is too wet. If this happens, remove the firming wheels until the soil dries.

Some soils become cloddy or have a tendency to crust if they are pressed firmly when wet. A short log chain or window weight pulled behind the planter unit can aid in covering the seed with sufficient soil and help reduce crusting. Usually these problems can be avoided only by waiting for more favorable planting conditions.

Starter fertilizer may be beneficial. Attachments must be mounted in such a manner so as not to collect straw. Some furrow openers place liquid fertilizer below the seed. Worn openers may allow fertilizer to come closer than 1 inch to the seed and damage the seedling. Sorghum seedlings are damaged more easily than corn.

The problems mentioned above can be solved. Farmers have successfully used conventional surface planters equipped with rolling coulters, and 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. Delay planting if soil is wet; also consider changing to medium or short season hybrids or changing from corn to sorghum.

Planters Available

Allis Chalmers, Case International, Fleischer, Dakon, Deere and Company, Hiniker, and White* have no-till planters available that have been used successfully for stubble planting in Nebraska. Several companies manufacture attachments that cut and/or move stubble away from the seed furrow. Farmers have also converted their own planters to no-till planters.

The common characteristics of all of these planters is the use of the rolling coulters. From there on, 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; also contact the dealer or your Extension agent, who can show you how to make the proper adjustments.

*Mention of manufacturers' names does not imply endorsement of any product by Nebraska Cooperative Extension. Any omission of any company is simply an oversight by the authors, and no discrimination is intended.

File G551 under FIELD CROPS
G-7, Cropping Practices
Revised October 1989; 8,000 printed.

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Elbert C. Dickey, Director of Cooperative Extension, University of Nebraska, Institute of Agriculture and Natural Resources.