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Estimating Winter Wheat Residue Cover

By Drew J. Lyon, Extension Dryland Crops Specialist and
Ralph A. Christiansen, Area Resource Conservationist, Soil Conservation Service

This publication presents the line-transect, calculation, and photo-comparison methods for determining amounts of winter wheat residue. Photographs of standing and flat winter wheat residues are included as an aid in the assessment of residue levels in the field.

The effectiveness of ground cover depends on the amount, distribution, and orientation (standing or flat) of crop residue. Standing residue is more effective in controlling wind erosion than flat residue.

Estimating winter wheat residue is important in planning field operations to control soil erosion. Knowledge of field residue levels insures that adequate residue remains to meet residue requirements for the Food Security Act. Three commonly used methods to estimate crop residues are:

1) the line-transect method
2) the calculation method
3) the photo-comparison method.

The line-transect method is an easy and reliable method to estimate percent cover. This method of measuring the percentage of crop residue ground cover is done with a 50-foot-tape. This tape is stretched perpendicular to the wheat rows.

On a 50-foot-tape there will be 100 points, one every six inches. Percent residue cover is calculated by dividing the number of points hitting residue by 100. A point is over residue if one end of the point touches the residue. The observer needs to use the same side of the tape in counting the points that intersect residue.

This method works very well for measuring winter wheat residue that is randomly distributed and lying flat on the ground. It is difficult, however, to obtain accurate estimates of percent cover in standing winter wheat residue using this method.

The line-transect method is inappropriate for estimating the amount of standing residue in the field. Refer to the following University of Nebraska publications for more information.

Estimating Residue Cover (G86-793)

Using the Line-Transect Method to Estimate Percent Residue Cover (G90-981)

The calculation method gives a rough approximation of residue remaining in a field by using estimates of amount of residue loss with each tillage and field operation. Estimates of remaining residue are made by multiplying the initial cover by the percentage loss for each operation. The variables in this method make it difficult to accurately determine residue cover on a specific field. This method is a valuable tool, however, to use in planning tillage operations. It will provide a good idea of how different tillage operations will effect the amount of residue in the field. For estimates of the effect of different tillage implements on the loss of crop residue, refer to the publication entitled "Estimates of Residue Cover Remaining After Single Operation of Selected Tillage Machines", developed jointly by the Soil Conservation Service, U.S.D.A., and the Equipment Manufacturers Institute and available at your local Soil Conservation Service office.

The photo-comparison method provides a quick estimate of residue cover, but is less accurate than the line-transect method in measuring flat, randomly distributed straw. The photo-comparison method will give better estimates of percent cover than the line-transect method in standing wheat stubble.

To properly use this method stand in the wheat field, look straight down and compare the observed residue cover with that in the photographs. This method does not work well when the estimates are made from the road. Remember, it is easy to overestimate residue levels by looking out across a field. From that perspective, residue appears to cover most of the ground.

The following photographs can be used to estimate percent ground cover in your winter wheat fields. All of the photographs were taken in western Nebraska and should represent situations encountered in this region. Be sure to use the photo-comparison method properly, as described in the preceding paragraph.

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Figure 1. Standing winter wheat stubble in the fall before tillage with 25% ground cover and 1,200 pounds of residue per acre.

Figure 2. Standing winter wheat stubble in the fall before tillage with 46% ground cover and 1,200 pounds of residue per acre.

Figure 3. Standing winter wheat stubble in the fall before tillage with 63% ground cover and 1,900 pounds of residue per acre.

Figure 4. Standing winter wheat stubble in the fall before tillage with 73% ground cover and 2,200 pounds of residue per acre.

Figure 5. Standing winter wheat stubble in the fall before tillage with 92% ground cover and 3,700 pounds of residue per acre.

Figure 6. Flat winter wheat residue after spring tillage with 15% ground cover and 50 pounds of residue per acre.

Figure 7. Flat winter wheat residue after spring tillage with 21% ground cover and 90 pounds of residue per acre.

Figure 8. Flat winter wheat residue after spring tillage with 34% ground cover and 290 pounds of residue per acre.

Figure 9. Flat winter wheat residue after spring tillage with 40% ground cover and 260 pounds of residue per acre.

Figure 10. Flat winter wheat residue after spring tillage with 86% ground cover and 950 pounds of residue per acre.