Residue and Tillage Management No-Till/Strip-Till/Direct Seed (329)
Residue and Tillage Management Mulch-Till (345)
Residue and Tillage Management Ridge-Till (346)

Illinois Job Sheet – 329, 345, 346 ***September 2011***

Photos courtesy of NRCS

What is Residue Management?

Residue Management is leaving last year's crop residue on the soil surface by limiting tillage and other disturbances such as bailing and grazing. Residue tillage and management practices include no-till, strip-till, mulch-till and ridge-till.

Conservation Benefits

Crop residue and tillage management practices reduce soil erosion by wind and water. Crop residue can maintain or develop soil tilth, add organic matter, improve water infiltration, and reduce soil moisture loss when left at or near the soil surface. Less tillage reduces soil compaction.

Considerations

Crop selection, including variety will influence residue amounts produced. Higher plant population and narrower rows will increase residue distribution at harvest. Equally important is the crop rotation. Crop rotations that include high residue producing crops such as corn, sorghum (milo), and small grains maximize the benefits of crop residue tillage and management practices.

Planning for residue cover begins at harvest. Ensure the combine spreads ample residue evenly over the field. The amount of residue left on the surface determines the erosion reduction benefit.

Leave crop stubble as high as possible during harvest. Standing residue is most effective for reducing wind erosion.

Fragile residues (soybeans, sunflowers, sugar beets, etc.) are more easily buried with tillage.
Use straight points and sweeps on chisel plows instead of twisted points as twisted points can bury 20% more residue.

Set tillage tools to work at shallower levels.

Reduce speed – slower speeds leave more residues on the soil surface.

Implement dealers and manufacturers can provide information on how to adjust, modify and operate implements to leave more residues on the surface.

No-Till and Strip-Till

No-till and Strip-till crops are planted into the previous crop residue that has not been tilled (no-till) or into narrowly tilled strips that leave the rest of the field untilled (strip-till).

Fertilizer can be applied either in the fall or in the spring either in a band, broadcast, or injected. Weeds are typically controlled before planting with burn down and/or pre-emerge herbicides. Post emergence herbicides are often used during the growing season. Cultivation can also be used for emergency or rescue weed control only.

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Ridge-till

Crops are planted on ridges that are formed the previous year at the last cultivation using a specialized cultivator.

During the planting operation, crop residue is cleared from the row middles and moved to the furrow. The crop is planted in rows on a raised ridge. Fertilization and weed control are the same as for no-till and strip-till. A ridge-till system is limited to row crops.

Mulch-till

The entire soil surface is tilled, either in the fall and/or the spring. The crop residue is partially incorporated, but enough remains on the soil surface to protect the soil from erosion. The amount of residue buried depends primarily on the type of tillage implement, speed and depth of the operations. Residue type and degree of decomposition also influences burial depth during tillage. There are more options for weed control and fertilization with mulch-till systems. The possibility of burying too much residue and increasing erosion must be considered.

The photos are examples of what various amounts of residue looks like.

Corn 25% residue

Corn 50% residue

Corn 75% residue

Soybeans 25% residue

Soybeans 50% residue

Soybeans 75% residue

Crop residue and tillage management effects on soil erosion and organic matter can also be predicted using the Revised Universal Soil Loss Equation, Version 2 (RUSLE 2). RUSLE 2 is a software program available to the public. The software and database files can be obtained at the following website. http://fargo.nserl.purdue.edu/rusle2_dataweb/

Producer Name	**Date**
FSA Tract Number	**Fields**
Planned by	

Crop	Previous Crop	Tillage Method[1/]	% Ground Cover After Planting

[1/] NT=No-till, Strip-till MT=Mulch till RT= Ridge till

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Estimates of residue cover remaining after machinery operations.

Tillage operation	Corn/Small Grain	Soybeans
After harvest	.75 - .95	.65 - .80
Over winter decay	.80 - .95	.70 - .80
Moldboard Plow	.00 - .10	.00 - .05
Chisel – Sweeps*	.70 - .85	.50 - .60
Chisel – Straight Point*	.60 - 80	.40 - .60
Chisel-Twist Point*	.50 - .70	.30 - .40
Disk-Offset	.30 - .60	.20 - .40
Disk-Tandem(Primary.)	.70 - .80	.40 - .50
Disk-Tamdem(Secndry.)	.30 - .60	.20 - .40
Field Cult. (Primary)	.35 - .70	.50 - .70
Field Cult (Secondary)	.70 - .80	.50 - .60
Soil Finisher	.50 - .70	.30 - .50
Harrows	.70 - .90	.60 - .80
Drills-Hoe	.50 - .80	.40 - .60
Drills – double disk	.80 - .95	.60 - .80
Drills – no-till	.75 - .95	.60 - .85
Planter-double disk	.85 - .95	.75 - .85
Planter-row cleaners	.60 - .80	.50 - .60
Planter-no-till coulter	.75 - .95	.70 - .90
Planter – wide fluted	.65 - .85	.55 - .80
Planter-ridge-till	.40 - .60	.20 - .40
Anhydrous Applicator	.75 - .85	.45 - .70

• - Reduce values by .05 - .10 when chisel is equipped with cutting coulters or disks.

Use this method to calculate your estimated residue cover:

After harvest x operation x operation x operation x operation x operation x operation = % cover remaining
_____ x _____ x _____ x _____ x_____ x _____ x _____ = _____

Here is an example:
.95 (%after harvest) x .90 (over winter) x .60 (chisel – straight points) x .80 (field cultivate w/sweeps) x .90 (plating) = .37, or 37% ground cover remaining after planting. Check estimates by measuring residue.

The above chart has been developed from research data. For each machine listed, the numbers are the ranges of crop residue expected to be left after one pass with that piece of equipment. The actual residue level can vary widely and should be measured. You should make some test passes, check residue cover, and make needed adjustments to equipment or operation, such as speed and depth. Set equipment to work shallower, drive slower, and use tillage points that fracture the soil rather than turn or throw the soil.

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