

# RESIDUE MANAGEMENT

Crop residues are those parts of the crop plants that remain in the field following harvest.

Managed properly, residues from the previous year's crop will:

- ▶ protect soil from erosion
- ▶ improve seedbed quality, by adding organic matter
- ▶ increase soil moisture, by trapping precipitation.

Managed poorly, residue can:

- ▶ delay seedbed warming and cause uneven drying
- ▶ interfere with seed and input placement
- ▶ inhibit seedling emergence.

Most fine-tuning of no-till systems involves improvements to residue management.

Each type of residue presents its own management challenges. Corn stalks will require equipment that will cut through, move aside and work remaining residue into the seedbed. Straw and chaff have to be managed at harvest to encourage even distribution throughout the field.

Besides type, the amount of residue must be considered.

The average percent residue cover after harvest for various crops is grain corn 85%, winter wheat 95%, soybeans 30% and silage corn 5%. The tables on page 17 of *Field Crop Production* (Best Management Practices) show the straw-to-grain ratio for some crops and the amount of corn stalks and straw for various yields. A 130 bu/ac corn crop would generate 8 tonnes of residue.

The amount of residue depends on previous crop, the yield, and treatment of the residue. Grain corn will leave much more residue than silage corn or soybeans.



Residue Management



**When going to the field to harvest a crop, consider that you are not only harvesting that crop, but you are actually preparing your seedbed for the following year.**

**Wilf Riddell, Middlesex County**

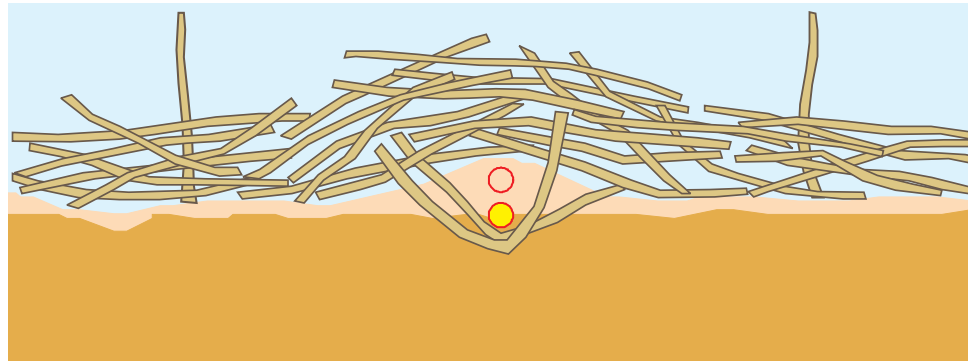


**Crop residues help keep the moisture in the seedbed. Emerging seedlings can benefit during drought years.**



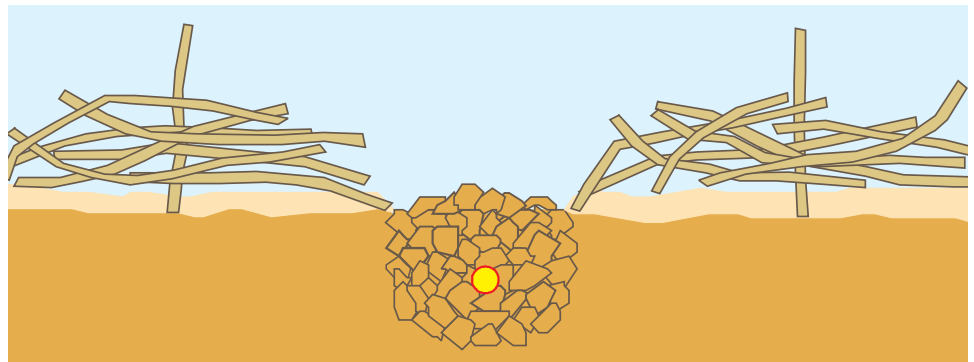
**No-till fields provide habitat for all kinds of wildlife.**

## RESIDUE MANAGEMENT



Poorly distributed residue can impede germination in two ways. It can:

- prevent the accurate placement of seed (seed depth) and,
- create a cool, moist, pest-infested environment in the seedbed.



Coulters and row cleaners can move residue off crop row and reduce the impact of poorly distributed residue.

### KEYS TO SUCCESSFUL RESIDUE MANAGEMENT

Managing residue effectively is an absolute necessity to make no-till work.

This requires:

- an understanding of the effects of crop residues on the seedbed
- practical experience with no-till equipment, and
- the ability to adjust your residue management practices to suit the conditions you may encounter.



Uneven distribution of chaff may cause cold seedbeds, poor seed-to-soil contact, uneven emergence, and weed escapes – leading to yield loss.



Residue Management

Residue management is the one part that made the most significant improvement in our system. The only modification we made to our combine was to add a chaff spreader so cereal chaff is spread over a wider area.

Bruce Shillinglaw,  
Huron County

## RESIDUE MANAGEMENT

Know the amount of residue you will be dealing with:

- ▶ was the previous crop a high yielding/high residue crop?
- ▶ was any tillage done to the residue?

Spread residue evenly behind the combine to eliminate windrows:

- ▶ add straw and chaff spreaders to the combine
- ▶ residue should be spread the full width of the combine header
- ▶ some combines may require straw choppers.

Modify or choose equipment to handle residue left on the soil surface:

- ▶ add coulters or row cleaners to cut or clear residue from the row
- ▶ a 15-20 cm (6-8") cleared strip is adequate for corn.

Choose residue levels that will reduce soil erosion:

- ▶ grow more high residue crops on soils that are prone to erosion.

### OTHER METHODS

#### CROP-ROW PRE-TILLAGE

To overcome problems with cold, damp soil at planting time, some farmers are doing a form of crop-row pre-tillage. Pre-tillage is usually used to improve growth in corn and occasionally soybeans. Most are performing this added field operation in early fall when the soil is dry and malleable.

Clear residue from the row area and till next year's seedbed strips 20-30 cm (8"-12") wide and at least 10 cm (4") deep. Farmers using this approach typically till 15 cm (6") deep in the fall and follow with shallow (4 cm [1½"]) tillage the following spring.

The implement must be equipped with markers so that it can till precisely where next year's crop row will be planted.

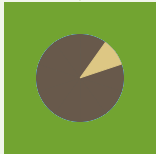
Some farmers incorporate fertilizer while preparing this strip.

Money spent on this implement is partially offset as the requirement for heavy-duty equipment on the planter can be reduced. Light spring strip tillage may be required.

A crop-row pre-tillage implement could serve the needs of several no-till farmers, who would each have a more modest investment in no-till planting equipment.



**John Munn, Huron County, removes the rear toolbar from the planter and uses the 3-coulters system/row cleaners to pre-till wheat straw prior to corn, soybeans or white beans and to apply phosphorus and potassium.**



Residue Management



Becker Farm Equipment

**Laurence Taylor, also from Huron County, does crop-row pre-tillage in the fall after wheat to help corn on clay ground. He uses:**

- 1 cutting coulters, followed by
- an adjustable depth chisel tooth, and
- 2 fluted coulters.

## RESIDUE MANAGEMENT

### TILLAGE ROTATION

Tillage rotation is the use of primary (e.g., chisel plow) or secondary (e.g., disks) tillage in a no-till system, usually before corn. It may be useful for one or more of the following:

#### MANURE MANAGEMENT

- helps fit solid manure application or emergency application of large volumes of liquid manure (or sludge) into no-till system
- helps fit knoll remediation into no-till system

#### FERTILIZER OR LIME APPLICATION

- incorporating lime is the quickest way to correct soil pH
- corrects a severe stratification problem

#### EXCESSIVE RESIDUE

- high yielding, high residue crops (wheat/rye) may at times benefit from residue incorporation

In no-till soils, tillage will:

- increase the likelihood of wind and water erosion
- destroy the continuity of macropores in the tilled zone
- cause the temporary loss of some soil life.



To make no-till work in horticultural crops, cover crops are killed with a burndown and areas in the field to be planted are "pre-tilled". Pre-tilling is necessary since coulters on a transplanter do not move fast enough to till the soil or clear residue.



Residue  
Management

# RESIDUE MANAGEMENT

## TROUBLESHOOTING

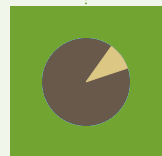
PROBLEM	CAUSES	BEST MANAGEMENT PRACTICES & TIPS
<p><b>UNEVEN CROP EMERGENCE</b></p> <ul style="list-style-type: none"> <li>• missing plants</li> <li>• poor crop vigour</li> <li>• insects feeding on seeds or seedlings</li> </ul>	<ul style="list-style-type: none"> <li>• uneven residue distribution at harvest (results in uneven warming and drying of seedbed)</li> <li>• residue piles (from stopping the combine or from water movement)</li> <li>• excessive residue</li> <li>• poor seed placement</li> <li>• feeding on seeds or seedlings</li> </ul>	<ul style="list-style-type: none"> <li>• use chaff spreaders</li> <li>• use straw spreaders</li> <li>• remove residue piles</li> <li>• use harrows to spread piles</li> <li>• when stopping the combine, back up a short distance to spread the residue</li> <li>• cut low, bale straw, and remove from field</li> <li>• to prevent movement by water, don't cut straw or chop stalks</li> <li>• cut low, bale straw, and remove from field</li> <li>• pre-till crop-row strips</li> <li>• adjust coulters and row cleaners or planting equipment</li> <li>• adjust or add coulters and row cleaner setup</li> <li>• pre-till crop rows</li> <li>• use a seed treatment to protect against insect feeding</li> <li>• move residue from the row to reduce slug damage</li> </ul>



**Chopped straw or stalks are more prone to runoff during storm events. Dense mats will prevent seedbed from warming and drying.**



**Set combine head to cut low. Bale straw and remove it.**



**Residue Management**