TILLAGE & RESIDUE MANAGEMENT

PRESEASON

TILLAGE OPTIONS AND ALTERNATIVES

Heavy residue is managed in corn on corn systems depends on soil conditions and available equipment.

TILLAGE OPTION	DESCRIPTION	PROS	CONS
Conventional	Traditional two-pass system for continuous corn production Fall — Deep chisel or ripper. Spring — Secondary pass with a field cultivator or soil finisher.	Burial of residue and warmer, drier soil environment.	Fuel and labor intensive; increased risk of soil erosion.
Spring One Pass	Generally done with a soil finisher; implement with a row of disk gangs followed by up to six rows of field cultivator shanks and a finishing attachment such as a harrow or rolling basket.	Less fuel and labor intensive, generally good seedbed preparation while leaving a lot of residue on soil surface for erosion control and moisture capture.	May not be aggressive enough for heavy residue environments; does not promote residue breakdown over winter months; can lead to yield robbing soil compaction problems in some soils, especially when wet.
Vertical	Vertical tillage implements commonly have a set of straight blades, aligned vertically that are designed to size residue and break up the soil surface to allow for drying and warming of the seedbed. Fields with compaction problems and hard, clay soils can benefit from this type of tillage.	Residue is left on the surface to aid in erosion control while also mixed in the top few inches of soil to aid in residue decomposition.	Vertical tillage implements are heavy and require significant horsepower to pull them at intended speeds. This can actually result in compaction problems if soils are too wet at the time of operation.
Strip-Till	Combines the best aspects of vertical tillage and no-till. Typically, 4- to 5-inch-wide strips are cleared and approximately 4-inch-tall berms are built in the fall while fertilizer is applied below the surface. Strip-till operations can also be conducted in the spring, however, a rolling basket is likely needed to crumble clods and firm the seedbed behind the unit prior to planting. Applying fertilizer in close proximity to the seed can also be risky due to increased chances for seedling injury or death.	Combines the benefits of no-till with vertically-tilled strips that reduce residue interference with planting operations and allow soils to warm and dry faster for earlier planting.	Requires specialized equipment and precise planting to ensure planted rows fall within the prepared strips. Minimal residue sizing and incorporation results in slower decomposition.
No-Till	By definition, tillage is not conducted with the exception of knives or shanks to apply fertilizer. Row cleaners are often used ahead of coulters and disk openers to help clear residue from the furrow and warm soils. Not unlike planting into a tilled seedbed, successful no-till planting involves waiting for proper soil conditions such as temperature and moisture levels. Often, if a field is dry enough for tillage it is dry enough to plant.	Crop residue reduces soil erosion and fertilizer losses while often improving soil structure and microbe populations over time. Crop residue can also help conserve soil moisture and keep soil temperatures cooler for improved crop growth in dry spring and summer conditions.	No-till soils are slower to warm and dry in the spring which can delay planting and emergence. Residue may also affect planter performance and seed placement. No-till comes with a learning curve of what practices work best and a transition period for yields to reach optimum levels.
Crop Rotation	Crop rotation to low residue alternative crops such as soybeans, sunflowers, safflowers, peas, lentils or flax can help manage the amount of crop residue present for future crops. Crop rotation can also help increase the diversity of soil macroorganisms and microorganisms and decrease the impact of disease and insect pests.		
Cover Crops	Cover crops can be grown for seasonal cover and conservation purposes to increase soil and water retention, organic matter levels and soil productivity. Farmers adopt cover crops because their use is linked to soil and water conservation, soil health, crop yield sustainability, enhanced crop performance, and livestock production. Environmental benefits of cover crops include reduced erosion and protection of water quality. Cover crops can also increase long-term profitability and the ability of a cropping system to rebound from intensive farming programs.		

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SEEDBED PREPARATION & PLANTING

CREATING AN IDEAL SEEDBED

Row cleaners are mounted on the planter ahead of the planting unit and are designed to move residue and clods to the side thus clearing path for disk openers to create a true "V" seed trench.

NOT IDEAL

Uneven emergence in a field of corn planted after corn.

IDEAL

Properly adjusted row cleaners remove residue from the row and can lead to more consistent planting depth and spacing.

By moving residue and exposing bare soil, row cleaners can help increase soil temperatures in the seed zone and reduce hair-pinning of residue in the seed furrow. Yield increases, reduced barrenness and reduced moisture at harvest were also attributed to this type of strip preparation.

HARVEST

TIMELY RESIDUE MANAGEMENT

Clear management practices for decomposing residue may improve the ability of the corn crop to overcome challenges of heavy residue.

HARVEST CORN-ON-CORN FIRST

Harvest fields to be planted back to corn next year first to help maximize the amount of time for residue decomposition prior to cold winter temperatures which limit soil microbial activity.

STALK CHOPPER

Chopping stalks into smaller pieces can aid in residue break down, but having a mat of residue may make planting more difficult.

COMBINE SPREADERS

Combine spreaders can help distribute residue evenly.

VERTICAL / AGGRESSIVE TILLAGE

“Vertical” tillage, not subsoiling but rather a tool comprised of disks with notches that runs parallel with the tractor can be used to “mulch” residue. Aggressive tillage can help maximize contact of residue and soil. Tilling, aggressive or “vertical”, as soon as possible after harvest can help take advantage of warmer weather and increased microbial activity. Often tillage can be done in the fall and the spring. To prevent plugging or clogging, the implement should be set properly and the soil should not be too wet.