

Strip till does well in Minnesota test



Strip-till Focus

By LON TONNESON

RESearchers and farmers put strip till to the test in Minnesota in 2004 and 2005.

After years of small-plot trials, they set out field-scale trials on 10 farms across the southern part of the state. Soil varied from light, well-drained sandy loam to heavy, poorly drained glacial till soils.

They compared strip till to no-till, spring field cultivation (one pass) and chisel plow plus spring field cultivation (chisel plow plus) on large, field-scale trials. See the accompanying story for a description of each tillage method.

In 2004, which was one of the coolest growing seasons on record, corn yields were significantly affected by tillage at six of the 10 sites.

No-till averaged 167.8 bushels per acre; one-pass, 174.2; strip till, 174.6; and chisel plow-plus, 177.4.

In 2005, which was warmer than normal, corn yields were not significantly affected by tillage treatments.

Key Points

- Strip till produced some of the top yields in U-M trials on slow-to-warm soils.
- Trials covered both cooler- and warmer-than-normal growing seasons.
- Strip till protected the soil and water without sacrificing too much yield.

Yields were 195.8 for no-till, 202.2 for strip till, 196.5 for one-pass and 200.5 for chisel plow-plus.

Over the two years, the yields averaged:

- chisel plow-plus — 190 bushels per acre
- strip till — 188 bushels per acre
- one-pass — 185 bushels per acre
- no-till — 180 bushels per acre

Residue coverage after planting corn averaged 60%, 47%, 29% and 21% for no-till, strip till, one-pass and chisel-plow-plus, respectively.

Significant differences in final plant populations among tillage treatments were rare, and when they occurred, were generally small.

"These data show that strip till can produce yields similar to chisel plowing while maintaining residue cover and reducing the risk of soil erosion," says Jodi DeJong, U-M Extension, Marshall.

Researchers define tillage systems

In the University of Minnesota trials, researchers defined the tillage systems this way:

No tillage (no-till): No-till systems leave the greatest amount of residue cover on the soil surface and provide the greatest erosion control. Fertilizers may be broadcast in no-till systems, but band applications at or after planting are preferred. No-till requires complete chemical weed control. Generally, no-till has been successful in regions of Minnesota where there is less precipitation and there are coarse-textured or otherwise well-drained soils. The no-till treatment received no fall or preplant tillage prior to planting corn. Planter attachments (row cleaners and/or coulters) were used on the planters at most sites.

Strip tillage (strip till): The strip-till system is relatively new in Minnesota. Strip tillage creates a raised berm by tilling a zone 5 to 9 inches deep and 6 to 10 inches wide, but leaves the soil and residue undisturbed between the tilled zones. Since it leaves more than 30% residue on the soil (averaged across tilled and untilled zones), it is a conservation-tillage system. Residue is removed from the tilled zone at the time of strip tillage, and corn is planted into the residue-free area. Advantages for fall strip tillage include better warm-up of soils and a mellow seed bed due to freeze-thaw effect. While strip tillage is possible in the spring, the soil has less time to warm up prior to planting

and the seedbed may be uneven. Subsurface banding or zone incorporation of phosphorus and potassium fertilizer may be combined in the same pass with fall or spring strip tillage.

Strip-till implements used in these trials varied across farms, ranging from mole-knife with opening coulters and berm-shaping disks, to combinations of fluted coulters, to a large, toothed disk. All strip tillage was carried out in the fall.

Spring field cultivate (one-pass): The one-pass system of this study had no fall tillage and only a single pass in the spring with a field cultivator before planting. Using this system, fertilizer may be broadcast and incorporated with tillage or applied with the planter. This system typically leaves about 30% residue cover after planting corn in a corn-soybean rotation, and therefore usually qualifies as a conservation-tillage system. One-pass, along with strip till, is also referred to in this publication as "reduced tillage."

Chisel plow plus spring field cultivate (chisel plow-plus): The chisel-plow-plus system is generally considered conventional tillage for corn following soybean on the poorly drained glacial till soils in Minnesota. Fertilizer may be broadcast and incorporated with tillage or applied with the planter. The soil warms up fast in the spring but is left with less than 30% residue cover.





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