No-till and Strip-till Corn Shines in 2005

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It has been a tough spring for Indiana corn farmers with prolonged cool weather conditions from April 20 to early May, soil crusting, and corn seedling rots resulting from cool and saturated soils. This has lead to many concerns for low or uneven stands, and the challenging decisions about whether to replant corn portions of some fields. Agronomists Bob Nielsen of Purdue and Peter Thomison of Ohio, with respective state pathology experts, have provided excellent advice about how to handle those decisions. See http://www.agry.purdue.edu/ext/corn/news/articles.05/MidAprilCorn-0522.html However, the good news is that no-till and strip-till corn have survived this season as well as, or often better than, conventionally tilled corn.

Successful No-till Corn Establishment on Clay Loam Soil near Columbia City. Planting Date: April 16, 2005

Normally farmers think that if soils are cold with conventional tillage, they will be even worse with no-till in a cool spring. However, a lot depends on the time of day that you measure soil temperature, whether it is cloudy or sunny, just how much residue cover is above the temperature probe, and whether the relative soil moisture content is higher with no-till. Daily maximum soil temperatures during the first 4 weeks after planting are usually about 3 F warmer after chisel plowing than after no-till, and about equal for chisel plowing and strip tillage in the corn row area. Daily minimum temperatures are about equal for all 3 systems, although if any system has an advantage it tends to be no-till. If soils stay moist, daily minimum temperatures in no-till average about 1.0 F higher than with conventional tillage.

This spring, daily average soil temperatures were not substantially lower in no-till unless surface residue cover was very high (such as would be the case if no-till corn followed grain corn). In 2005, no-till corn emerged just a day or two later than conventional tillage on similar soils with common treatment planting dates. Unless there was a problem with seed treatments, no-till corn emergence percentages exceeded 95% of what was planted. In some cases, no-till corn completed emergence sooner because soil crusting limited corn emergence in conventional tillage. No-till soil typically crusts much less than other tillage systems since the soil structure at the surface becomes much more stable as a result of enriched organic matter and the lack of recent tillage operations that break up soil clods (and where it takes time for the bond strengths holding soil clods together - despite intense rain energy - to re-establish themselves). Long-term no-till also has the advantage of a multitude of large continuous pores to help drain the saturated water associated with intense rains. Conventional tillage disrupts these large pores, and can lead to more water ponding, and slower drainage.

In our tillage research plots this year, we planted 32,000 plants per acre in mid-April and achieved about 31,000 in no-till, moldboard and chisel plots in west-central Indiana (West Lafayette) and about 29,000 in no-till versus 27,000 in chisel in north-eastern Indiana (Columbia City). So, if anything, the corn stands in no-till are at least as good as those in conventional tillage. Our population results this year are not unusual. In fact, no-till corn stand establishment has never been significantly lower than that conventional tillage in over 80 comparisons conducted in the last 20 years. Simply put, we are more successful in getting good stands with no-till now because we have better planters, better seed treatments, and more stress-tolerant hybrids than we did 30 years ago.

And fall strip-till corn is really shining this year; it is off to a faster start than either no-till or chisel plow corn in Northern Indiana. Strip-till corn has the same reduction in soil crusting as no-till, but generally has the advantage of much warmer and drier seedbeds than no-till. To achieve the most optimum seedbed conditions with strip-till, it really helps if the planting operation left a level or slightly raised soil berm. Planting into a trench with overly aggressive soil cleaners will lead to cooler soil temperatures and wetter conditions around the seed. Strip-till's main advantages, though, are the additional planting flexibility (versus no-till), the high residue cover it leaves between the rows, and the opportunity it provides for deep fertilizer banding.

No Tillage: The Best Tillage Choice for Replanting

If replanting is necessary, no-till is by far the best option available. It takes the least time, results in the least likelihood of cloddy seedbeds that could result in uneven emergence, best preserves the benefits of any previously applied herbicides and starter fertilizer, requires less fuel, and has even less chance of reducing corn yields (relative to conventional-till) in late May planting versus planting in early to mid-April. So, even if you didn't no-till plant corn the first time, it is not too late to start. You may need a more robust planter, though, to achieve sufficient down pressure on the planting units to penetrate hard crusts on clay soils.

Summary:

No-till corn and strip-till corn have both survived the test of this difficult spring. In fact, they in many cases out-performed fields that were field cultivated just ahead of planting. Our yield results aren't in yet for this year but, if it is consistent with previous years, no-till corn will yield within 5 bushels per acre of conventionally tilled corn planted after soybean. Strip-till corn will yield at least as good as conventionally tilled corn. Both systems will generally increase profits as long as planting isn't delayed substantially. No-till is the tillage option of choice for any replanting of corn that is still required. Furthermore, fears of a cool spring are not a justifiable reason to avoid preparing for either no-till or strip-till corn production in 2006.

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