Row Cleaners in No-Till Corn

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Lloyd Murdock, Jim Herbek, and Tim Gray

Row cleaners are planter attachments mounted in front of the double-disc openers on planters. They are designed to move most of the surface residue to the sides of the row, allowing no-till planting into a band with a fairly clean surface. This attachment is best suited for wet, cool soils to allow a more rapid warming of the soil surface, on rough soil to allow some smoothing before planting, and in heavy residue to prevent "hairpinning" of residue into the planting slot. There is evidence that cleaning the residue from the row raises soil temperatures which results in quicker corn emergence and sometimes increased yield. The approach has been of particular interest to farmers that are no-tilling wetter and cooler soils early in the spring, where no-till has not been as consistently successful as conventionally tilled systems.

Field Test of a Row Cleaner. This experiment is a continuing trial that has been carried out for 3 years (1989-91) on a Sadler silt loam soil. This soil has a fragipan and does not have good internal drainage. Three treatments were compared (conventional tillage, no-tillage with no-tillage without row cleaners). The standard University of Kentucky Recommendations were used. Corn was planted on all plots at the rate of 22,500 seeds per acre. Conventional tillage consisted of chisel plowing and two disc harrowings. Soil temperatures, rate of corn emergence, final stands, and yields were measured. There are several types of row cleaners, but the one used in this experiment was of the rotary toothed design and clears an 8-9 inch band ahead of the planter. It was invented and patented by Howard Martin, a farmer in Todd Co., Kentucky. The row cleaners are attached to the planter in place of the residue "cutting" coulter.

Soil Temperature. Cleaning the row resulted in an increase in soil temperature at a 2 inch depth in the row 2 of the 3 years. In those two years, the average temperature increase for 4 weeks following planting ranged from 3 to 5° F. The largest difference occurred early, immediately after planting, and the differences decreased with time. The soil temperature in the cleaned row was almost identical to those in the conventionally tilled plots. One year (1990),
there was little difference in soil temperature between treatments. There was little sunshine following planting during this year and the soil was warmed mostly by the ambient air temperature rather than solar energy.

Corn Emergence. The rate of corn emergence was affected by soil temperature. During years with warmer row temperatures, the corn in the no-tillage cleaned row and conventional plots emerged 1 to 2 days ahead of the no-till rows with residue. The one year when temperatures were all the same, there were no differences in emergence rates.

Final Stands. Stands on all treatments in 1989 (Table 1) were much less than the 22,500 seeds planted. Cool, wet weather began shortly after planting which reduced stands. The stands were more severely reduced (3800 plants/ac) with no-till where the rows were not cleared. Plants in this treatment also had an unhealthy appearance early in the growing season. There was little difference in stands the other two years. However, for some unexplainable reason, the stand was somewhat lower in the no-till row cleaned plots in 1990.

Yields. The yields were low and similar for all treatments during 1990 and 1991 due to drought. The average yield for the no-till without row cleaning was 3 to 5 bu greater during these years, probably due to added moisture conservation. The yield of the no-till with no row cleaning was significantly lower (16 bu/ac) in 1989, when the cool, wet spring increased stress on the plants early in the growing season. The no-till, row cleaned treatments performed as well as the conventional treatments under these adverse conditions.

Summary
1) Cleaning residue from the row increased soil temperature 3 to 5° F during years with adequate sunshine (similar to conventional tillage). No difference in temperature was found during the year with minimal sunshine.
2) Row cleaning resulted in faster emergence of the corn (similar to conventional tillage) during years with adequate sunshine.
3) Row cleaning increased final stands and yields in the year with a cool, wet spring and adequate sunshine. There was little effect other years.
4) Row cleaning appeared to make the effect of no-till more consistent with that of conventional till on this imperfectly drained soil during cool, moist springs.
5) Row cleaned treatments performed very similar to the conventionally tilled treatments with the benefit of residue in the row middles.

[Signature]
Extension Soils Specialist
Table 1. Effect of Tillage and Row Cleaning on Corn Population and Yields.

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<thead>
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<td>21940</td>
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<td>20080</td>
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<td>18570</td>
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<td>20770</td>
<td>21320</td>
<td>19400</td>
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Final Stands (plants/acre)

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<tr>
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<td>89</td>
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<tr>
<td>Conv.</td>
<td>132</td>
<td>86</td>
<td>58</td>
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