No-Till vs. Chisel for Corn/Soybean Rotations
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Objective
To compare tillage effects on corn and soybean yields when using no-till and disk chisel tillage systems in a two-year trial.

Background
Cooperator: Darke County Farm	Soil Type: Patton, Crosby, Hoytville
Nearest Town: Greenville	Drainage: Subsurface
Row Width: 30 inches

1999 Soybean/1998 Corn Field
Soil Test: pH 6.4, P 34 ppm, K 164 ppm
Fertilizer: 0-46-0 (100 lbs/A)
0-0-60 (125 lbs/A)
Variety: Countrymark 3685
Planting Date: May 4, 1999
Harvest Date: October 2, 1999
Harvest Pop.: No-till- 176,176 plants/A
Chisel- 196,504 plants/A

1999 Corn/1998 Soybean Field
Soil Test: pH 6.8, P 51 ppm, K 149 ppm
Fertilizer: 18-46-0 (135 lbs/A)
0-0-60 (100 lbs/A)
150 lbs/A nitrogen with herbicide
Hybrid: Pioneer 33Y18
Planting Date: April 30, 1999
Harvest Date: October 5, 1999
Harvest Pop.: No-till- 20,808 plants/A
Chisel- 21,816 plants/A

Methods
The two crop fields are adjacent to each other at the same site. Four two-year sequences of tillage treatments were analyzed. The four treatments were placed in a completely randomized design with six replications in each field. Half of the no-till plots were chiseled in 1998 and half the chiseled plots were in no-till in 1998. This was done to allow for comparisons of one year of chiseling and one-year of no-till with continuous no-till and continuous chiseling. The chiseled plots were prepared using a soil commander disk ripper followed by a single pass of a field cultivator with cultipacker. Both crops were planted with a Buffalo slot planter into adequate soil moisture and adequate rainfall for good germination. In this year’s corn field, a moderate infestation of wireworm reduced the plant population from a planting rate of 30,000 seeds/acre.
Results

Table 1. Soybean Tillage and Yield, 2 Year Summary.

<table>
<thead>
<tr>
<th>Tillage and Rotation</th>
<th>Yield (bu/A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chiseled soybeans following no-till corn</td>
<td>51.08 a</td>
</tr>
<tr>
<td>Chiseled soybeans following chiseled corn</td>
<td>50.40 a</td>
</tr>
<tr>
<td>No-till soybeans following chiseled corn</td>
<td>42.94 b</td>
</tr>
<tr>
<td>No-till soybeans following no-till corn</td>
<td>37.47 c</td>
</tr>
</tbody>
</table>

Soybean F = 296.1 (Significant differences to be found)
CV = 1.2%, LSD = 1.23 at 5% level of significance.

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<thead>
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<th>Tillage and Rotation</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Chiseled corn following no-till soybeans</td>
<td>184.65</td>
</tr>
<tr>
<td>Chiseled corn following chiseled soybeans</td>
<td>182.625</td>
</tr>
<tr>
<td>No-till corn following chiseled soybeans</td>
<td>181.703</td>
</tr>
<tr>
<td>No-till corn following no-till soybeans</td>
<td>180.463</td>
</tr>
</tbody>
</table>

Corn F<1 (No significant differences)
CV = 2.3%, LSD = 9.22 at 5% level of significance.

Summary and Notes

Soybean yields in the chiseled plots were significantly higher than no-till. This same field showed a yield advantage in chiseled plots for corn of 32 bushels per acre following 1997 no-till soybeans. The field had been in no-till corn and soybean rotation since 1993. As this year's soybeans developed, a very obvious difference in plant height was apparent with the no-till soybeans being several inches shorter and never completely filling between the rows. Two years of no-till in the trial (seven straight years of no-till) yielded significantly less soybeans than the three other two-year sequences.

There were no significant differences in the corn yields in the 1999 chiseled plots when compared to no-till. This same field showed no significant differences between no-till soybeans and chiseled soybeans in 1998. Like the other field, it had been in a no-till corn and soybean rotation since 1993.

It appears that there is some factor in this year's soybean field that limits yield when planting no-till corn or soybeans. This trial demonstrates that the advantages of keeping a field in long-term no-till management or chiseling after several years of no-till can be location-specific.

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