Grazing Cover Crops to Avoid Soil Compaction

With proper management, soil compaction from grazing cover crops can be minimized.

**Results**

Two case studies evaluating impacts of grazing corn stalk residue with and without cover crops showed little to no effect on the following soybean and corn yields - even when increases in soil compaction were measured. Crop residue on the soil surface cushions the effects of treading hooves and acts like a sponge to absorb weight and water. Cover crops and their extensive root systems build soil organic matter and prevent compaction.

**Measuring Soil Compaction**

Research conducted in grazed and ungrazed fields showed that compaction, measured by penetration resistance, was greater in grazed cover crop fields versus ungrazed fields in only the upper 10 cm of the soil. Compaction near the soil surface, caused by direct hoof action, does not significantly affect plant root growth.

### Tillage and Penetration Resistance

<table>
<thead>
<tr>
<th>Tillage</th>
<th>Cover Crop</th>
<th>Penetration Resistance (J)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0-10 cm</td>
</tr>
<tr>
<td>Conventional</td>
<td>Ungrazed</td>
<td>70</td>
</tr>
<tr>
<td>Conventional</td>
<td>Grazed</td>
<td>110</td>
</tr>
<tr>
<td>No tillage</td>
<td>Ungrazed</td>
<td>109</td>
</tr>
<tr>
<td>No tillage</td>
<td>Grazed</td>
<td>122</td>
</tr>
</tbody>
</table>

*Increased resistance = greater compaction (Franzenluebbers et al, 2008)*

The action of grazing stimulates plant roots to grow and give off exudates, building organic matter and helping relieve compaction.

In a spring 2014 Practical Farmers of Iowa study on cover crop grazing, cattle grazed for eight days on cereal rye planted following corn harvest. Using a penetrometer, resistance was measured before and after the cattle grazed. Figure 1 demonstrates that at shallow soil depths (< 10 cm), penetration resistance is slightly increased following grazing. Deeper down, compaction following grazing was less than before grazing.

*Penetration resistance (0-400 psi)*

*Increased resistance = greater compaction*

**Figure 1**

Adapted from Dunn, 2014
Implementing best management practices when grazing cover crops will help reduce the risk of compaction issues, especially during wet and muddy spring weather. Proper grazing of cover crops will not negatively impact soil properties or decrease crop yields, while effectively providing economic and environmental benefits.

More information on this case study can be found in "Grazing Cover Crops on Corn Ground"
http://practicalfarmers.org/farmer-knowledge/research-reports/2014/grazing-cover-crops-corn-ground/