

GRAZING COVER CROPS TO AVOID SOIL COMPACTION

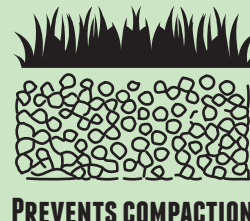
With proper management, soil compaction from grazing cover crops can be minimized.

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.



**ROOTS BUILD SOIL
ORGANIC MATTER**



MEASURING SOIL COMPACTION

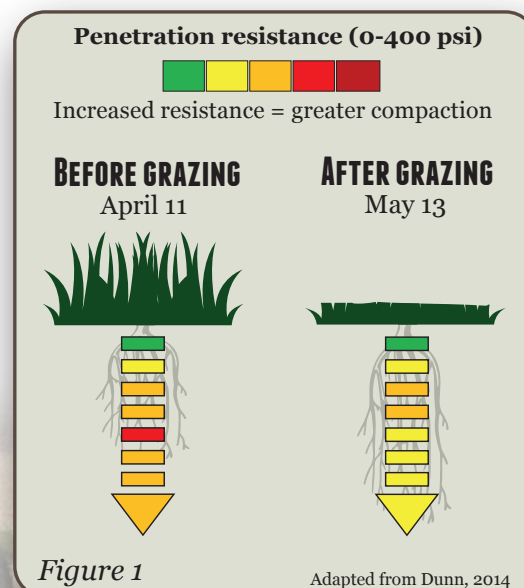
Research conducted in grazed and ungrazed fields showed that compaction, measured by penetration resistance, was greater in grazed cover crop fields versus ungrazed fields in only the upper 10 cm of the soil. Compaction near the soil surface, caused by direct hoof action, does not significantly affect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

Tillage	Cover Crop	Penetration Resistance (J)		
		0-10 cm	10-20 cm	20-30 cm
Conventional	Ungrazed	70	171	205
Conventional	Grazed	110	168	190
No tillage	Ungrazed	109	204	240
No tillage	Grazed	122	179	198

Increased resistance = greater compaction
(Franzenluebbbers 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.



BEST MANAGEMENT PRACTICES TO AVOID COMPACTION



1. Avoid excessive cover crop grazing during wet and muddy conditions:

- ✓ Dry or frozen soils are ideal to minimize effects on subsequent cash crop yield.
- ✓ Do not graze in wet soil conditions unless there is a large amount (>2 tons/acre) of mature vegetation (normally from a summer planting).
- ✓ Grazing on wet soil will cause compaction, hindering cash crop planting.



2. Avoid creating compacted areas from concentrated hoof traffic:

- ✓ Provide and move water on a regular basis, even in winter.
- ✓ Rotate supplemental feed sites within the field.
- ✓ Limit cattle access to natural water sources, shaded areas, or other vulnerable areas.



3. Establish a cover crop grazing plan to:

- ✓ Reduce the amount of time animals are grazing in one area and optimize forage utilization.
- ✓ Know where to move the livestock from fields during wet and muddy periods until conditions improve.
- ✓ Determine the date(s) and under what conditions cattle should be removed from the field, and rotation frequency.
- ✓ Determine the subsequent use for the fields being grazed and graze accordingly.
- ✓ Consider grazing restrictions when selecting herbicides for subsequent crops.



Hay supplemented on a mobile wagon to avoid trampling and compaction next to the bail. Photo taken December 19, 2015

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CONCLUSION

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/>