Impacts of Cattle Grazing Corn Residue

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Introduction
Many crop farmers have concerns that cattle trampling will adversely affect soil physical properties and subsequent crop productivity. Soil compaction, measured as an increase in bulk density or penetration resistance, influences the ability of a plant to acquire water, nutrients, and oxygen because of restricted soil water movement, oxygen and nutrient diffusion to roots, consequently reducing crop yield. Studies conducted by the University of Nebraska at 7 location have found that grazing in late fall or winter does not result in biologically significant compaction on cropland or negative impacts on subsequent crop yields.

Crop Yield and Compaction
Sixteen years of corn residue grazing in Eastern NE did not result in detrimental effects on soil properties (including bulk density and penetration resistance) or crop yields. These fields had silt-loam soil were managed under no-till and in corn-soybean rotation. In fact, grazing of corn residue improved soybean yields by 3.4 bu/ac with fall (Nov. to Feb) grazing. In a western NE field managed in continuous corn, grazing of corn residue for a 5 year period did not affect corn yields (148 vs 154 bu/ac, for not grazed and grazed, respectively). A three year study with five locations in eastern NE also showed that grazing had no impact on subsequent crop yields. Three locations were managed under continuous corn with corn yields of 239 bu/ac for grazed and 223 bu/ac for ungrazed (which did not statistically differ). Two locations were in a corn-soybean rotation with soybean yields not differing between grazed (59 bu/ac) and ungrazed (62 bu/ac). During the last two years, soil penetration resistance was measured in the spring and was found to be slightly increased at two locations. However, the increase in penetration resistance would not have impeded root growth (below threshold level) and did not carry over into the next year.

Soil Microbial Activity
After 16 years of grazing corn residue, an increase in the soil microbial community was observed (when compared to areas that were not grazed). The effects on the soil microbial community may explain the improvement in soybean yields which was observed in the grazed treatment because an increase in soil microbes (actinomycete bacteria and saprophytic fungi) may increase the rate of nutrient cycling.

Surface Roughness
It should be noted that an increase in surface roughness due to grazing has been observed, especially under wet soil conditions when the soil is thawed which can sometimes impede seed placement. A study in SE Iowa evaluated the effects of grazing corn residue on fields managed under spring till or no-till in a corn-soybean rotation over a three-year period. Cows were moved to a new section of the field each month during the winter. Therefore, the impact of grazing was measured in 15 areas for each tillage treatment. There was only one instance when grazing had an effect on soybean yield. In this instance, they reported a reduction in soybean yields from 45 bu/ac to 41 bu/ac when corn stover was grazed in the no
Information related to grazing of corn residue can be found at beef.unl.edu/cropland including things to consider when developing rental agreements.

### References


