

Grazing Cattle Compact Wheat Ground

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Grazing cattle on winter wheat prior to grain harvest is common throughout the southern Great Plains. To take advantage of this in northern Colorado, there would have to be ample fall moisture to allow for the additional growth prior to jointing.

It would be beneficial for producers in limited rainfall locations to have the availability to utilize growing wheat that has not yet jointed. In some parts of the country grazing wheat in the fall or early spring is determined by jointing, which is defined as the growth stage when a hollow stem can be first identified above the roots and below the developing head. Work done at Oklahoma State University by Gene Krenzer best explains the advantages of terminating grazing at jointing (OSU Fact Sheet PT 95-10).

Although grazing of wheat ground is commonplace in some states, little research had previously been conducted to determine if grazing has a negative effect on wheat yield in Colorado. Many Colorado wheat producers have not been willing to rent their growing wheat and/or stubble because of concerns about yield reduction. Producers who both farm and ranch have been unsure of the net gain or loss as a result of such grazing practices. Many cow-calf producers in northeastern Colorado have the opportunity to graze limited green growing wheat as well as wheat stubble to assist in reducing production costs. Uncertain beef cattle prices being the norm, the potential for reducing feed cost in the cow-calf industry is significant. Thousands of wheat acres in Colorado could be made available to both increase revenue for the wheat producer and decrease feed costs for the cow-calf producer.

Producers in Colorado do not have the luxury of annual growing wheat in both the fall and early spring. A case study showed that although soil strength was increased, wheat yield was not decreased. In following the data collection closely it was obvious that the weather patterns were very different from year to year. Producers need to take advantage of favorable situations.

From 1994 to 1997, a study was conducted by CSU and NRCS to determine the effects of cow-calf grazing on wheat fields on comparing soil compaction and wheat yields. The study was led by Tom McBride with Colorado State University Extension in Adams County. While grazing clearly increased soil compaction (as measured using a drop-cone apparatus), any resulting detrimental effect on yield was not apparent. Since grazing reduced feed cost by an estimated

\$0.73 per cow-calf unit per day in this study, it appears that cattle can graze growing wheat and stubble in northeast Colorado, thus lowering feed costs and having little or no negative impact on yield.

Typical agricultural fields are commonly compacted by tractor and other heavy equipment traffic. Soil compaction by livestock has also been shown to reduce pasture yields. Livestock tend to create higher contact pressure than many tractor tires, thus they can produce higher levels of soil surface compaction. Yet, due to the low total weight of livestock (compared to agricultural tractors), their compaction usually is limited to the upper four inches of the soil profile.

This study included four treatments: 1) no grazing, 2) grazing the growing wheat in the spring, 3) grazing growing wheat and stubble both in the spring and fall of the same year, and 4) grazing the growing wheat and stubble both in the spring and fall of the same year and then grazing the growing wheat again in the spring two years later. Cow-calf pairs, fenced off with electric fence, were pastured in this section of land for 1-2 weeks, and the sections were intensively grazed at a 1-2 cow-calf unit per acre. Prior to turning the cattle in, drop-cone penetration readings were made to determine surface compaction. Compaction readings were taken again after grazing.

Soil compaction due to livestock traffic was measured using the drop-cone technique. A 2 kg, 30 degree apex angle cone is dropped from a height of 1 meter. The depth of penetration is measured, and this value inversely correlates to soil strength (lower penetration depth indicates higher soil strength). Soil strength is an indicator of soil compaction. Fifty (50) drop-cone measurements were taken randomly in each plot. This testing procedure was repeated eight times throughout the study for a total of 2,900 drop-cone tests.

The effect of grazing on soil strength was seen in both the spring and fall (April and October) measurements. The effect of grazing is apparent to a lower degree almost two years after grazing. Much of the compaction is apparently alleviated by the freeze-thaw cycles of the soil. In the spring of 1996, grazing had a significant effect on soil strength. However, there were no apparent differences in soil compaction due to the grazing that had taken place two years previous

Low summer moisture and hail damage produced low yields. Yield was significantly higher for the grazed treatments. The hail could have damaged the non-grazed wheat more since it was more mature at the time of the hail. Generally, throughout the study, no major differences in wheat yield could be observed.

Extension staff in Adams, Arapahoe, Morgan, and Elbert County worked jointly on this project with a farmer/rancher cooperator, Zeb Eldringhoff, whose operation is located near Deertrail, in

northeast Colorado. Natural Resource Conservation Service personnel located in Byers cooperated in the study as well. Additionally, Colorado State University campus personnel, Paul Ayers, John Shanahan, Frank Peairs, and Tom Fields, assisted with this project.