

Healthy Grasslands Will Produce Healthy Profits for Beef Ranchers

Llewellyn L. Manske PhD, Range Scientist
Amy M. Kraus, Composition Assistant
Thomas C. Jirik, Agriculture Communication Editor
North Dakota State University
Dickinson Research Extension Center

Grazing management that maintains healthy plants on grasslands will produce strong animal performance and improve returns for beef ranchers, says a North Dakota State University range scientist.

“Healthy grassland ecosystems produce greater herbage weight and more pounds of calf per acre than grasslands in average condition. The key to improving grassland ecosystem health is implementing grazing management practices that meet the biological requirements of the plants and coordinate grazing periods with grass growth stages to stimulate beneficial processes within grass plants and the ecosystem,” says Lee Manske, a range scientist at NDSU’s Dickinson Research Extension Center.

Plants are the primary producers in the grassland ecosystem, Manske explains. The solar energy they convert into chemical energy during photosynthesis is the primary source of energy driving all ecosystem processes, so the performance levels of the plants regulate the performance levels of the other grassland ecosystem components, including livestock weight gains.

“Effective management practices meet the biological requirements of the plants and help the ecosystem processes function at their full potential. These management practices improve the performance levels of all grassland ecosystem components, elevate plant health status, and increase productivity of grassland ecosystems. The result is sustained high performance levels,” Manske says.

The twice-over rotation system, a biologically effective grazing management strategy developed for use in the Northern Plains, was designed to manipulate processes that result in beneficial changes to plant growth, soil organisms, and biogeochemical cycles in the ecosystem. The twice-over rotation system on native rangeland with complementary domesticated grass spring and fall pastures coordinates defoliation with grass growth stages to enhance vegetation and animal performance.

The twice-over rotation system begins grazing in May, on a spring pasture of crested wheatgrass or other early growing domesticated cool-season grass that has reached the third-leaf stage. This is the earliest plant growth stage at which grasses can be grazed without damage, Manske explains.

Native grasses begin seasonal development more slowly, and the use of domesticated grass pastures in May protects native pastures by delaying grazing on them until the plants have reached the third-leaf stage.

A 3- to 6-pasture native range rotation system is used from early June until mid October, with each pasture grazed for two periods. Each native range pasture is grazed for 7 to 17 days during the first period, the 45-day interval from 1 June to 15 July. The length of the first period on each pasture is the same percentage of 45 days as the percentage of the total season’s grazeable forage each pasture contributes.

During the first period, grasses are between the third-leaf and flowering stages, the stages of plant development at which grazing produces beneficial effects. Two of these effects are of particular importance to beef producers: tillering from axillary buds, which is the method by which grasses reproduce vegetatively, and enhanced activity of rhizosphere organisms that live in the narrow zone of soil surrounding the roots of perennial grasses and provide nutrients for plant growth.

Tillering contributes to the production of greater herbage weight, and the increased activity of the soil organisms supplies the plants with greater quantities of nutrients to support additional growth.

During the second period, after mid July and before mid October, each pasture is grazed for double the number of days it was grazed during the first period. Cows and calves graze a fall pasture of Altai wildrye or other

type of wildrye from mid October until weaning in early or mid November. “Removing livestock from native range pastures during the fall allows native grasses to store nutrients that will maintain plant processes over the winter and to retain the fall vegetative growth that will become next season’s lead tillers. This practice ensures healthy plants in the spring and greater herbage production during the growing season,” Manske says.

The twice-over rotation system’s elevation of plant health and stimulation of beneficial ecosystem processes result in increased plant basal cover and aboveground herbage biomass and improved nutritional quality of forage. The twice-over rotation grazing management system with complementary domesticated grass pastures has a grazing season of more than 6.5 months with the available forage above, at, or only slightly below the requirements for a lactating cow for the entire grazing season.

The increase in quantity and quality of herbage on the twice-over rotation system results in improved animal performance. Cow and calf accumulated weight gain, weight gain per acre, and weight gain per day are greater on the twice-over rotation system than on traditionally managed systems, he says.

The greater herbage production per acre permits higher stocking rates on the twice-over rotation system than on traditional management systems. The twice-over rotation system requires fewer than 12 acres per animal unit for the entire 6.5-month grazing season. This is half the land area that a 6.0-month seasonlong grazing system requires when properly stocked at 24 acres per animal unit. The lower acreage required to carry a cow-calf pair for the season reduces pasture-forage costs.

“The benefits of biologically effective grazing practices are both ecological and economic,” Manske says. “By implementing the twice-over rotation grazing management strategy, producers protect rangeland health, increase their profits, and ensure that the grassland will sustain their cow-calf operation for years to come.”