Mismatch of Modern Beef Cattle Fed by Traditional Management Practices

Llewellyn L. Manske PhD
Range Scientist
North Dakota State University
Dickinson Research Extension Center
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Biologically efficient 12-month livestock pasture and harvested forage management strategies improve profit margins for beef production and enhance the regional agricultural economy by increasing value captured from land natural resources. Efforts of the beef production industry at correcting the problems of high production costs and low profit margins have been on improving animal performance. Traditional livestock production practices assume the source of income to be from the sale of the animals. After 50 years of improvements in animal performance, high production costs and low profit margins continue to be problems for beef production. These problems persist as a result of the mismatch of forage nutrients required and forage nutrients available between modern, high-performance cattle and traditional low-performance forage management practices. Forage management systems were not improved simultaneously with beef animal performance. Modern cattle on traditional forage management practices developed for old-style cattle have reduced production efficiencies that depress cow and calf weight performance below genetic potentials causing reduced value received at market and reduced profits.

The fundamental problem with traditional livestock forage management concepts is that the land resources are managed from the perspective of their use. It is imperative for future progress that management of renewable natural resources be directed away from placing priority on the use and to be focused towards meeting the requirements of all the living and nonliving components of the ecosystems for the purpose of improving ecosystem processes and maintaining land resource production at sustainable levels. The renewable forage plant nutrients produced on the land natural resources are the original source of new wealth generated by livestock agriculture. The quantity of new wealth generated from forage nutrients is proportional to the forage management strategies' capabilities to be effective at meeting the biological requirements of the plants and soil organisms, to be efficient at capturing produced forage nutrients, and to be efficient at converting forage nutrients into salable commodities like calf weight.

Effectively meeting the biological requirements of plants and soil organisms occurs when the defoliation resistance mechanisms of grass plants and the biogeochemical processes of ecosystems are activated by partial defoliation during phenological growth between the three and a half new leaf stage and the flowering (anthesis) stage. These mechanisms help grass tillers withstand and recover from grazing by triggering compensatory physiological processes that increase growth rates, increase photosynthetic capacity, and increase allocation of carbon and nitrogen; by stimulating vegetative reproduction of secondary tillers from axillary buds; and by stimulating rhizosphere organism activity and increasing conversion of inorganic nitrogen from soil organic nitrogen. Activation of these mechanisms results in increased herbage biomass production, increased plant density, increased available forage nutrients, increased soil aggregation, improved soil quality, increased soil water holding capacity, increased resistance to drought conditions, improved wildlife habitat, and improved grassland ecosystem health status.

Improvement in performance of forage management systems requires paradigm shifts that consider the land natural resources to be the source of new wealth generated from livestock agriculture with the renewable forage nutrients as the primary unit of production and the produced animal weight as the commodity sold at market. Biologically efficient 12-month pasture and harvested forage management strategies effectively meet the biological requirements of plants and soil organisms, and improve the characteristics of soil; efficiently capture forage produced nutrients; and efficiently convert nutrients into animal weight commodities. These improvements permit renewable natural resource ecosystems to perform at biologically sustainable levels and modern high-performance beef cattle to perform at genetic potentials. Results of these improvements reduce costs per pound of crude protein, reduce costs per

pound of calf weight gain, reduce costs per day of forage feed, and increase returns after feed costs per acre. These changes in costs and returns effectively increase profit margins for land and cattle enterprises and improve the regional livestock agricultural economy.