FORAGES AND PASTURES
SYMPOSIUM: Improving efficiency of production in pasture- and range-based beef and dairy systems

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Abstract

Despite overall increased production in the last century, it is critical that grazing production systems focus on improving beef and dairy efficiency to meet current and future global food demands. For livestock producers, production efficiency is essential to maintain long-term profitability and sustainability. This continued viability of production systems using pasture- and range-based grazing systems requires more rapid adoption of innovative management practices and selection tools that increase profitability by optimizing grazing management and increasing reproductive performance. Understanding the genetic variation in cow herds will provide the ability to select cows that require less energy for maintenance, which can potentially reduce total energy utilization or energy required for production, consequently improving production efficiency and profitability. In the United States, pasture- and range-based grazing systems vary tremendously across various unique environments that differ in climate, topography, and forage production. This variation in environmental conditions contributes to the challenges of developing or targeting specific genetic components and grazing systems that lead to increased production efficiency. However, across these various environments and grazing management systems, grazable forage remains the least expensive nutrient source to maintain productivity of the cow herd. Beef and dairy cattle can capitalize on their ability to utilize these feed resources that are not usable for other production industries. Therefore, lower-cost alternatives to feeding harvested and stored feedstuffs have the opportunity to provide to livestock producers a sustainable and efficient forage production system. However, increasing production efficiency within a given production environment would vary according to genetic potential (i.e., growth and milk potential), how that genetic potential fits the respective production environment, and how the grazing management fits within those genetic parameters. Therefore, matching cow type or genetic potential to the production environment is and will be more important as cost of production increases.
FORAGES AND PASTURES

SYMPOSIUM: Optimizing the use of fibrous residues in beef and dairy diets

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Abstract

Increased corn prices over the past decade have altered land use away from traditional forage in favor of corn. Accordingly, beef and dairy producers have had to adopt nontraditional forage resources into their production systems, many of which have become available as a result of increased corn production. Corn residues have become more available due to increases in corn hectares and yield. The individual plant components (i.e., husk, leaf, and stem) vary in fiber digestibility (NDF digestibility estimates = 40.5, 31.4, and 0.6% ± 0.8 for husk, leaf, and stalk, respectively). Stocking cattle to consume 3.6 kg forage/25.5 kg of grain allows cattle to graze selectively; selection of husks and leaves improves cattle performance. Byproducts of the wet and dry milling industries can be supplemented to calves grazing corn residues to provide protein and energy. Optimal gains were observed when these byproducts were supplemented at approximately 2.5 kg/d to 250-kg growing calves. Gestating beef cows do not require supplemental inputs when grazing corn residue, if stocked appropriately. Alkaline treatment of crop residues improves their feeding value. Concentrations of up to 20% harvested corn residue treated with calcium oxide can be included in finishing diets with an average of 1.3% reduction in G:F when diets contain 40% wet or modified distillers grains. Conversely, when untreated corn residues are included in similar finishing diets, G:F is reduced by 13.4%. Calcium oxide–treated residues included in beef growing diets increases DMI and ADG without significant improvements in G:F. Calcium oxide treatment of corn residues has been evaluated in dairy diets by replacing corn or corn silage with variable results. Efficient use of nontraditional fiber sources, such as corn milling byproducts and corn residue, are critical to the future viability of ruminant animal production.
FORAGERS AND PASTURES
SYMPOSIUM: Improving soil health and productivity on grasslands using managed grazing of livestock

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Abstract

Beyond grazing, managed grasslands provide ecological services that may offer economic incentives for multifunctional use. Increasing biodiversity of plant communities may maximize net primary production by optimizing utilization of available light, water, and nutrient resources; enhance production stability in response to climatic stress; reduce invasion of exotic species; increase soil OM; reduce nutrient leaching or loading in surface runoff; and provide wildlife habitat. Strategically managed grazing may increase biodiversity of cool-season pastures by creating disturbance in plant communities through herbivory, treading, nutrient cycling, and plant seed dispersal. Soil OM will increase carbon and nutrient sequestration and water-holding capacity of soils and is greater in grazed pastures than nongrazed grasslands or land used for row crop or hay production. However, results of studies evaluating the effects of different grazing management systems on soil OM are limited and inconsistent. Although roots and organic residues of pasture forages create soil macropores that reduce soil compaction, grazing has increased soil bulk density or penetration resistance regardless of stocking rates or systems. But the effects of the duration of grazing and rest periods on soil compaction need further evaluation. Because vegetative cover dissipates the energy of falling raindrops and plant stems and tillers reduce the rate of surface water flow, managing grazing to maintain adequate vegetative cover will minimize the effects of treading on water infiltration in both upland and riparian locations. Through increased diversity of the plant community with alterations of habitat structure, grazing systems can be developed that enhance habitat for wildlife and insect pollinators. Although grazing management may enhance the ecological services provided by grasslands, environmental responses are controlled by variations in climate, soil, landscape position, and plant community resulting in considerable spatial and temporal variation in the responses. Furthermore, a single grazing management system may not maximize livestock productivity and each of the potential ecological services provided by grasslands. Therefore, production and ecological goals must be integrated to identify the optimal grazing management system.