

ROCHE BEEF CATTLE NUTRITION

1115 Effects of supplement type on animal and ruminal physiology of grazing cattle. F. T. McCollum III, *The Texas A&M University System, Amarillo, Texas.*

Nutritional supplementation is an integral and necessary part of today's ranching operations. Selecting a supplement to provide the desired response requires knowledge of responses in both the rumen and also at the tissue level. For optimal activity, ruminal microflora require a balanced supply of proteinaceous substrates and energy. Mineral availability can also affect forage intake and digestion and ultimately influence protein and energy status at the tissue level. Adaptation of the metabolizable protein system by the NRC allows one to directly address ruminal protein/energy imbalances and formulate supplements to balance for optimal ruminal function and improve forage nutrient utilization. The form of protein supplied in a supplement has been examined to determine if supplemental escape protein is beneficial for grazing cattle. The role of NPN compounds in range and pasture supplement is being revisited to better define the levels that can be utilized efficiently to supply degradable intake protein. Research indicates that supplemental fat and escape protein can potentially improve reproductive performance of cows in less than optimum body condition. This indicates that supplement composition may have beneficial influences beyond those inferred by simply correcting a dietary deficiency. Refined recommendations for fat and escape protein and improved delivery methods could provide a valuable therapeutic tool for managing cows in a lower body condition.

Key Words: Grazing, Beef Cattle, Supplementation

1116 Effects of supplementation on voluntary forage intake, diet digestibility, and animal performance. J. E. Moore*, M. H. Brant, W. E. Kunkle, and D. I. Hopkins, *University of Florida.*

A database was constructed from 61 publications on 126 forages in order to predict supplementation effects in non-lactating cattle. There were 400 comparisons between a control, non-supplemented treatment and a supplemented treatment; 142 were with grazed pasture or range, 94 with cool season grass or legume hays and pastures, 13 with cool season silages, 100 with warm season improved grass hays or pastures, 167 with native range or hay, and 26 with straws. There were 210 comparisons with dry and 190 with liquid supplements. There were 41 comparisons with molasses alone, 186 with a variety of meals, 128 with urea either alone, in a few cases, or mixed with grains or molasses, 28 with combinations of meals and urea, and 17 with forage. Daily gains were reported for 276 comparisons, voluntary intake for 258, and direct measures of digestibility for 166. In most cases, gains were increased by supplements. In 52 comparisons where gains were increased < .05 kg d⁻¹ or decreased, supplements were either liquids with no added N, or liquid and dry supplements with urea. Where gains were increased > .05 kg d⁻¹ there was no difference between dry and liquid supplements, but gains were increased more by supplements containing protein meals. Voluntary forage intake (VFI) was always decreased when supplemental total digestible nutrient (TDN) intake was > .7% of BW. At lower supplement intakes, VFI was either increased or decreased. For 90 comparisons where VFI increased, 69 were with native grass or straw. When the ratio of TDN to crude protein (TDN:CP) was < 6.3 (indicating adequate N), VFI was decreased except for ammoniated straws. Observed diet TDN concentration was compared to TDN concentration expected from weighted averages of the ingredients. When supplemental TDN intake was > .7% of BW, diet TDN was always less than expected. When TDN was higher than expected, many forages had TDN:CP ratios > 6.3. Empirical multiple regression equations were developed to predict effects of supplements on VFI and diet TDN concentration.

Key Words: Supplementation, Forage Intake, Diet TDN

1117 Effects of supplementation, management, and environment on grazing behavior. W. E. Pinchak*, *Texas Agricultural Experiment Station, Vernon.*

Grazing behavior and distribution of free-ranging cattle is the integrated expression of how animals interact with the environment to acquire nutrients and maintain thermal balance. The purpose of this paper is to provide an overview of how environmental conditions, supplementation and management affect grazing behavior and distribution in extensive production systems. In the context of this discussion, behavior includes the processes associated with food preference, food selection, prehension and intake, and activity budgets. The landscape distribution discussion focuses on how abiotic and biotic attributes of a landscape, and management interact with grazing behavior to determine spatial utilization patterns of cattle. An overview of a prototypical Ruminant Landscape Utilization Model (RLUM) is provided as a basis for discussion of the potential for linking simulation models to geographical information systems to predict cattle spatial responses to various management and supplemental feeding strategies.

Key Words: Grazing Distribution, Ingestive Behavior, Landscape Use Modeling

1118 Effects of previous grazing nutrition and management on feedlot performance. J. S. Drouillard*, *Kansas State University, Manhattan.*

A review of scientific literature was conducted to summarize effects of grazing nutrition and management on subsequent finishing performance of cattle. In spite of the potential economic relevance of interactions between grazing and finishing performance, controlled experiments evaluating production systems are limited in number. Management strategies designed to improve grazing animal performance can influence feedlot performance and carcass traits, both positively and negatively. Authors have reported on the effects of stocking rate, duration of grazing, forage characteristics, pasture supplementation programs, and administration of growth promoting implants during the grazing period on subsequent finishing performance. Improvements in grazing performance that are attributable to changes in stocking rate have enhanced performance in the feedlot in some cases, and have been overshadowed by the expression of compensatory growth during the finishing period in other instances. Comparisons among warm- and cool-season forages have led to the suggestion that forage species may contribute to differences in gastrointestinal fill of grazing cattle, thereby influencing gain and efficiency during the subsequent finishing phase. Creep feeding suckling calves has been noted as having both positive and negative effects on finishing performance of cattle. Grain supplementation of stocker cattle during the grazing period has been observed to improve grazing performance with no subsequent detrimental effects on finishing performance. Carryover effects of growth implants administered during the grazing period have been the subject of several studies, and impact on feedlot performance has been highly variable. A more thorough understanding of the interactions between grazing nutrition and management, finishing performance, and carcass traits is needed in order to facilitate greater economic exploitation of these relationships.

Key Words: Pasture, Feedlot, Compensatory Growth