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BEEF REPORT 2012-13

Cottonwood and Antelope Range and Livestock Research Stations Unit Report¹

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SUMMARY

The Cottonwood and Antelope Range and Livestock Research Stations, located in western South Dakota, are used for research projects focused on the needs of range livestock producers in that region. The stations are comprised primarily of native rangeland that is grazed by cattle at both stations, and also by sheep at Antelope. The philosophy of the research efforts has been focused on conducting applied research to solve problems and address rangeland and livestock management opportunities relevant to the livestock producers and land managers of the region.

INTRODUCTION

These Agricultural Experiment Stations conduct natural resource research, including range management and livestock research applicable to the semiarid, rangeland environment of western South Dakota and the Northern Great Plains.

The Cottonwood Station, located near Philip, comprises about 2640 acres of rangeland. It has a 12-pen feedlot in addition to facilities for grazing cattle research. It has a large hoop barn structure that is used for indoor educational activities. Cottonwood will soon host a new office complex that will have a lab, commodity storage, and shop in addition to grinding and drying rooms for sample preparation.

Research at the Cottonwood Station is currently focusing on replacement heifer development and management of first calf heifers. The combination of rangeland pastures and feedlot facilities at the Cottonwood Station allows flexibility for a variety of projects to address the complex nutritional demands of maintenance, reproduction, and growth that challenge the productivity of heifers and young, growing cows.

The Antelope Station, located near Buffalo, comprises about 8165 acres of rangeland. Livestock at this station include both sheep and cattle. The sheep on this station are owned by NDSU and provide a basis for joint research opportunities. The carrying capacity at this station is for 300-plus cows. The larger number of mature cows on the ranch-scale sized area of land at the Antelope Station provides the opportunity to evaluate alternative management strategies in a total production-system setting. The sheep at the Antelope Station have been utilized in a similar philosophy to evaluate the influence of management alternatives in a system setting.

The size and location of these stations have proven valuable for a variety of wildlife and habitat research protocols.

¹ Salaries and research support provided by state and federal funds appropriated to South Dakota State University.

² Director, West River Ag Center

CURRENT RESEARCH PROJECTS

Research Activities conducted during 2010/12 at each station include:

Cottonwood

1. Impact of maternal nutrition on expression of genes regulating offspring growth, carcass composition and meat quality. A project funded by USDA-AFRI that focuses on the effects of maternal nutrient restriction on offspring growth, performance and carcass characteristics. Investigators are A.D. Weaver (PI), K.R. Underwood, A.E. Wertz-Lutz, R.H. Pritchard, and J.M. Reecy.
2. Impact of maternal nutrient restriction on phenotypic expression in different leptin genotypes of offspring and meat quality. A project funded by the South Dakota Beef Industry Council that focuses on the potential interactions between leptin genotype and management and resultant fat deposition in cattle. Investigators are A.D. Weaver (PI) K.R. Underwood, A.E. Wertz-Lutz, R.H. Pritchard.
3. Influence of propionate salt levels on young cow reproductive performance: Funded through USDA Hatch Formula Grant. Investigators are J.A. Walker, G.A. Perry and K.C. Olson.
4. De-oiled distillers grains as a protein supplement for cows: A project funded by MBI Consortium to evaluate the utilization of a novel dried distillers grain co-product with much of the corn oil removed so the crude protein content is similar to soybean meal. Investigators are Ken Olson, Mindy Hubert, and Nikki Hojer.
5. Heterogeneity project: This study is evaluating the potential to utilize heavy winter Patch Grazing in mixed-grass prairie to enhance heterogeneity for wildlife habitat. Cattle behavior, cattle production, vegetation utilization, and bird and small mammal habitat attributes were measured to evaluate the benefits and/or consequences to livestock production and any benefits for bird habitat. Major participants: Pat Johnson, Kent Jensen, Ken Olson, Roger Gates, Christi Koehler, Janna Kincheloe.
6. Mixed-grass prairie root growth studies: This study is evaluating the production and decomposition of root biomass in mixed-grass prairie in an effort to evaluate root:shoot ratios and root turnover rates. Major participants: Sandy Smart, David Clay, Sharon Clay, Jiyul Chang, Pat Johnson.
7. Long-term range production and stocking rate study: A project that has continued for over 50 years to document differences in vegetation production and cattle gains associated with controlled stocking rates. The principal investigators are Pat Johnson, Roger Gates, Janna Kincheloe, and Ken Olson.
8. Cottonwood hosts three separate weather related stations:
 - A weather station for the SD State Climatological Office
 - A meteorological monitoring site for NOAA
 - A National Atmospheric Deposition Program collection site for precipitation chemical composition.
9. Hosted the research team for "Classification and Mapping of Riparian Forest along the White River in South Dakota". A project funded by a grant from South Dakota Game, Fish and Parks. The

principal investigators are Mark Dixon, Carter Johnson, Alex Cahlander-Mooers, and Alanna Robinson.

Antelope

1. Immunology project: Is response to a Bovine Viral Diarrhea Virus vaccine correlated with production and carcass traits in beef cattle? Investigators are Michael Gonda and Julie Walker.
2. Impact of programmed nutrition on offspring health, growth, performance and meat quality. A project funded by Alltech[®] that focuses on the influence of mineral bioavailability from conception to consumption on offspring health, growth feedlot performance and carcass characteristics. Investigators are A.D. Weaver (PI), K.R. Underwood, B. Holland, M. Gonda, C. Wright, R. Daly, and A.R. Taylor.
3. Influence of propionate salt levels on young cow reproductive performance: Funded through USDA Hatch Formula Grant. Investigators are J.A. Walker, G.A. Perry and K.C. Olson.
4. “Presynchronizing PGF_{2α} injection before the fixed-time artificial insemination (TAI) CO-Synch + CIDR program.” This was part of a multi-state study with Kansas and Florida. Investigators: Jeff Stevenson at Kansas State University, Cliff Lamb at the University of Florida and George Perry at South Dakota State University.
5. Beef cattle systems-effects of early weaning and winter feeding strategy: A project funded by the Four-State Ruminant Consortium to evaluate the combined effects of weaning date (early or normal) and winter feeding strategy (limited or full) on livestock performance, rangeland forage utilization, and economic response. Investigators are Pat Johnson, Roger Gates, Ken Olson, Mary Beutler, Scott Fausti, Janna Kincheloe, Sandy Smart, George Perry, Robin Salverson, and Nikki Hojer-Kroupa.
6. Evaluating glycerin supplementation on reproductive performance of sheep: Funded through USDA Hatch Formula Grant. This project was collaborative effort between SDSU and NDSU, Hettinger Research Extension Center. Major participants were J.A. Walker, G.A. Perry, R. Salverson, P. Nester, C.S. Schauer, J.E. Held, and K.C. Olson.
7. Yellow-flowered alfalfa: A project funded by USDA-CSREES to evaluate the adaptation and value of yellow-flowered alfalfa for rangelands. Investigators include Roger Gates, Arvid Boe, Xu Lan, Pat Johnson, and Janna Kincheloe.
8. Antelope Station hosts two weather-related stations;
 - Meteorological Monitoring Site for NOAA
 - A weather station for the South Dakota State Climatological Office

In addition to these research activities, both stations have been used for Extension and teaching activities such as Tri-County Ag Day and Rangeland Days. Extension Field Staff training has been conducted at Antelope and Cottonwood has been used as a laboratory setting for Range 325, a course entitled Range Measurements.