msucares
Coordinated Access to the Research and Extension System
Mississippi Agricultural and Forestry Experiment Station

Economic Evaluation of Overseeded Ryegrass and Hay Quality for Wintering Beef Cows in South Mississippi

Bulletin 1058 -- October 1996

David G. St. Louis
Associate Animal Scientist
South Mississippi Branch Experiment Station
Poplarville, Mississippi

Carl H. Hovermale
Agronomist
South Mississippi Branch Experiment Station
Poplarville, Mississippi

Charles S. Forrest
Extension Marketing Specialist
Department of Agricultural Economics
Mississippi State University

Ned C. Edwards
Superintendent
South Mississippi Branch Experiment Station
Poplarville, Mississippi

Published by the Office of Agricultural Communications (Publications Section), Division of Agriculture, Forestry, and Veterinary Medicine, Mississippi State University.

Introduction

Farmers constantly seek ways to reduce the cost of beef cow-calf production. Approximately half the annual cost of maintaining beef cows in South Mississippi is winter feeding (St. Louis et al., 1990). While ryegrass for winter pasture reduces the cost of supplements and hay, overseeded ryegrass pasture is still expensive, costing about $75 per acre. Some producers say that winter pasture is too expensive and they prefer feeding more hay and supplements.

The direction of the debate depends upon many factors, including the calving season, other forages available, marketing strategies, and winter pasture stocking rate. This study focused on the value of overseeded ryegrass for cows calving in January and February in south Mississippi, where locally produced hay is the primary winter forage.

Experimental Procedures

Ryegrass (RG) winter pasture was compared to no ryegrass (NRG) and high-quality (HQ) hay was compared to low-quality (LQ) hay for wintering beef cows. In the summer, Pensacola bahiagrass and Alicia bermudagrass pastures were stocked at 1.0 acre/cow managed in a conventional three-pasture rotation.

For winter grazing, RG systems had two-thirds of the area overseeded with Marshall ryegrass (0.67 acre/cow). These systems were compared to NRG systems. Nitrogen was applied to overseeded pastures at 68 pounds per acre of N(nitrogen) in January and April. Application of P_20_5 (phosphate) and K_20 (potash) fertilizer was made in January according to soil test.

Corn and soybean meal (SBM) were fed once daily in uncovered troughs to meet cow nutrient requirements based on hay-forage analyses. Feeding objectives were to have cows with a body condition score (BCS) of 5 or above (moderate on a 9-point scale) prior to calving in January, and a BCS of 4 (thin) or higher prior to breeding and increasing in weight and condition throughout a 60-day breeding season (April 1 to June 1).

In all systems, non-overseeded pastures received 68 pounds per acre of N plus P_20_5 and K_20 according to soil test in April. Excess summer forage was harvested as hay. Alicia bermudagrass hay was harvested from pastures within the systems and used for treatments requiring LQ hay. The HQ hay from Alicia bermudagrass was produced outside the systems by fertilizing at a rate of 100 pounds per acre of N per cutting, with P_20_5 and K_20 applied according to soil test. Harvesting was every 4 weeks, as weather permitted.

Cows were blocked according to breed type (1/2 Brahman x 1/2 Hereford, 1/2 Beefmaster x 1/2 Hereford, and 1/2 Barzona x 1/2 Hereford) across all forage systems and allotted to treatment groups. Sire breeds (Brangus and Simmental) of the calves were represented across all systems. Open and unsound cows were culled prior to calving and replaced by pregnant cows. Newborn calves were tagged, weighed, navels dipped with iodine, tattooed, dehorned with paste, and castrated within 24 hours. After calving, cows that lost calves were replaced by cow-calf pairs. Cow weight and body condition scores were taken five times annually (mean dates: March 30, June 7, July 31, September 14, and November 27). Calves were weighed at birth, three times prior to weaning (March 30, June 7, and July 31), and at weaning (September 30, 1991, August 31, 1992, September 13, 1993).

Only pesticides currently registered for use on pastures and beef cattle were used during the course of this study, with strict adherence to all label instructions. A commercial salt-mineral mix (12% Ca and 12% P) was available *ad libitum*. A high magnesium mix with 14% Mg was used during winter grazing periods to prevent grass tetany.

Data were analyzed using the SAS GLM procedures. Summer pastures of Alicia bermudagrass and Pensacola bahiagrass were equally balanced across the systems. Years were treated as replicates in a linear model that included year, summer pasture, winter pasture, hay quality, and the resulting interactions in a completely randomized design. Because interactions were not significant, they were omitted from the final model.

Financial summary reports were generated using the Standardized Performance Analysis (SPA) as defined by the National Cattlemen's Association (NCA) Cow-Calf Financial Analysis Subcommittee and the National Coordinating Committee on Integrated Resource Management (IRM) (McGrann, et al., 1994). The SPA program was developed to standardize analyses, terminology, and calculation procedures for cow-calf production nationwide.

Forage system budgets were developed using actual income and expenses from this study. For income and expense items not obtained from the study, assumptions were made to approximate the economic situation in south Mississippi (St. Louis et al., 1995; and Farm Management Handbook). Marshall ryegrass overseeded on sod was calculated to cost $74.74 per acre. A 10-year average was used for prices: steer calves, $80.97/cwt; heifer calves,$72.90/cwt; cull cows, $45.28/cwt; replacement pregnant cows, $650/head. Revenues and expenses were entered as inputs for each study treatment to the SPA-FCC computer program. Condensed results of the cow-calf financial analyses were reported for each treatment.

Results and Discussion

Over three winters, there was no significant difference in cow or calf performance attributed to hay quality because grain was supplemented to compensate for hay quality differences. The NRG cows lost more weight and body condition during the calving season than RG cows ($P<0.05$) and did not recover weight or body condition through the rest of the year.

Calves from dams on the RG treatment gained more weight during the calving season and through midsummer than calves from dams with no winter grazing, but weaning weights were not significantly different ($P=0.22$) (Table 1). Interactions between winter pasture and hay quality were not significant ($P<0.05$) for any animal measurements taken.

For 3 years, HQ hay ranged from 49 to 62% TDN and 9 to 17% protein, while LQ hay ranged from 42 to 55%

TDN and 7 to 14% protein. Average TDN and protein for HQ hay was 54% and 11%, while LQ hay had 48% and 10% TDN and protein, respectively. In 1993-94, the average Alicia bermudagrass hay analyzed by Mississippi forage testing program was 55.8% TDN and 11.8% protein.

Cows in the RG treatment consumed 25% less hay and 63% less grain than cows in the NRG treatment (590 lb/head less hay and 540 lb/hd less grain). When averaged across NRG and RG, cattle fed HQ hay consumed 7% less hay and 20% less grain than animals receiving LQ hay (Table 2). The amount of grain fed in RG systems was highly dependent upon when ryegrass could be grazed. In the winter of 1991-92, cows on RG-HQ consumed more grain than cows in RG-LQ (Table 2) because grazing was delayed 34 days in one replicate of RG-HQ because of stand failure and replanting.

Cows in the RG treatments had a pregnancy rate of 93% compared to 84% for cows in the NRG treatments (P=0.06, Table 3). In the financial analyses, a 15% replacement rate was assumed for the RG systems. This allows culling of 7% for nonpregnancy and 8% for health and soundness. In NRG systems, 24% of cows were replaced, 16% for nonpregnancy and 8% for other reasons. Replacement pregnant cows were assumed to be purchased and not raised in the analyses to simplify comparison of treatments. This is a common practice among some producers. If replacements were raised, land area required would depend on replacement rates.

In the analyses, hay needed in excess of pasture clippings was purchased. Price of LQ hay was assumed to be $50/ton, a standard delivered price for most large round bales of hay in south Mississippi. A price of $70/ton for HQ hay was arrived at by using HQ and LQ hay in a least-cost linear program. Hay, corn, and 48% SBM were used in a diet containing 12.3% protein and 67% TDN for lactating beef cows. Corn and SBM are often used as standards for comparison of protein and energy feeds. Corn and SBM were priced at $140 and $250 per ton (bagged and delivered), respectively, and LQ hay at $50/ton. The value of HQ hay to be included in the least cost diet was contingent on the values listed for corn, SBM and LQ hay. To be included in the least cost diet HQ hay was $70/ton (shadow price). Initial price for HQ hay in the linear program was set high ($100/ton) so that it would not be included in the least-cost diet and a shadow price would be calculated.

Net income was $24 per cow greater for RG systems than for NRG systems when averaged across HQ and LQ hay. The difference would have been greater if observed weaning weights had been used instead of average weaning weights. Ryegrass was more important in systems with LQ hay than in systems with HQ hay even though the difference in hay quality was small. Net income from the NRG-LQ systems was $35 less than from the RG-LQ systems. Net income was $13 per cow greater for NRG-HQ systems than for NRG-LQ systems, while RG-HQ systems had $8 per cow less net income than RG-LQ systems (Table 4). Two of three winters of this study were mild and less hay and grain were fed to cows without ryegrass than under normal weather conditions.

Implications

Cow body weight, condition, and reproductive performance in spring calving cows can be improved with overseeded ryegrass pasture. Improved calf performance from ryegrass pasture in the spring was not sufficient in this study to affect weaning weights. Net farm income was improved with overseeded ryegrass pasture. This was primarily because fewer cows on ryegrass pasture were open and fewer replacement cows were purchased. Winter feeding costs were approximately the same for the four systems studied, a difference of $15 per cow in pre-tax farm expense comparing RG-LQ to NRG-LQ.

Overseeded ryegrass pasture reduced the amount of supplements fed when compared to no winter pasture, but the grain cost savings were offset by pasture costs. Similarly, high-quality hay reduced the amount of supplements fed compared to low-quality hay but the grain cost savings were offset by increased hay purchase costs. Net farm income was improved when high-quality hay was fed in systems with no overseeded ryegrass pastures.

References

Farm Management Handbook. Agricultural Economics Department, Mississippi Cooperative Extension Service, Mississippi State University.

McGrann, James M., John Parker, and Nicole Michalke. 1994. Financial Performance Calculation Software for the Cow-Calf Enterprise. Agricultural Economics Department, Texas Agricultural Extension Service, Texas A & M University. Version 6.1 - SPA-FCC.

St. Louis, David G., Carl H. Hovermale, J. D. Davis, and Fred H. Tyner. 1990. Alicia bermudagrass vs. Pensacola bahiagrass: Economic comparison of intensive cow-calf forage systems for South Mississippi. MAFES Bulletin 970. St. Louis, David G., Carl H. Hovermale, and Charles S. Forrest.1995. Economic comparison of cow-calf forage systems with four stocking rates for South Mississippi. MAFES Bulletin 1023.