Natural Resources Research Update Form

United States Department of Agriculture
Research, Education and Economics

Agricultural Research Service
Date: January 12, 2009

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Title: Finishing beef cattle on grass pastures

Background: Previous research has demonstrated that buying stocker calves in May to graze warm-season grass pastures during the summer is economically volatile (Phillips and Coleman, 1995). Summer stocker producers need alternative production systems to market warm-season grass pastures more economically. We formulated a system to finish beef cattle that utilizes warm-season grass pastures and stocker calves purchased the previous fall to graze cool-season grass pastures. The new system was compared to the currently used total confinement system (Phillips et al., 2004 and 2006). The finished beef produced by pasture finishing can be sold directly to the consumer as labeled or branded beef or sold to a beef processor for fabrication and marketing.

Procedure: Calves used in these experiments were born in late winter or early spring at beef cattle research centers in Arkansas, Montana and Texas, weaned in the fall and grazed annual and perennial pastures before beginning the finishing phase the following summer. Breed of calf was confounded with state of origin, but temperate, tropical and continental breeds were presented. Under the conventional system, calves were placed in pens and fed a typical grain-based finishing diet. Calves assigned to the pasture finishing system grazed warm-season grass pasture under intensive early stocking management (stocking rate = 4.0 to 2.5 calves/ac) for 30 to 40 d. When approximately 80% of the standing forage had been removed, a self-feeder containing the same diet as that fed to the calves in the conventional finishing system was placed in each pasture. Calves were considered finished when fat thickness over the 12^{th} and 13^{th} rib was $\geq$ 10 mm. Carcass data was collected at a

commercial beef cattle processing plant in Texas. Carcasses were sold based on grid pricing. The experiments were conducted each summer for 6 years and a total of 936 steers and heifers were used.

Results: Average daily gains of beef calves grazing warm-season grass pastures under intensive early stocking are usually greater than 2 lb (Phillips et al., 2003). Although calves are harvesting high quality vegetative forage, the ADG observed are less than the ADG if the calves were in the feedlot. However, any body weight gain from forages decreases the amount of feed grain needed to reach final body weight. Once 80% of the available forage had been harvested, a self-feeder containing the same high energy diet used in the confinement system was placed in the pasture. Initially, doors on the self-feeder were set very low to limit access to the feed to reduce the possibility of acidosis. Over the next 30 days, calves shifted their diet from 100% forage to 95% mixed ration and about 5% forage. By the end of the 136-d finishing period (range 120 to 167 d), calves finished on grass had consumed an average of 235 lbs less feed to reach market weight (mean = 2634 lbs; range 2101 to 3111 lbs) than calves fed under total confinement. Feed savings ranges from 0 to 512 lbs per calf, depending on initial body weight, breed and length of the finishing period. Our average feed cost was $166/ton (range $116 to $232/ton). A feed savings of 235 lbs/calf X 3.6 calves/ac x $166/ton = $70.20/ac as the value of the warm season grass (range $152 to $0). We concluded that initial body weight at the beginning of the finishing phase should be at least 70 to 75% of the targeted final body weight and that the length of the finishing period should be no more than 125 days (35 days of grazing and 90 days of access to self-feeder).

Carcasses from calves finished on pasture tended to have less external fat as compared to carcasses produced under conventional methods, but all cattle reached our goal of 10 mm of backfat. Because we terminated feeding at a common endpoint, carcass characteristics were not different between to the two finishing methods. Hot carcass weight, dressing percent and rib eye area of carcasses produced from calves fed on grass were 723 lb, 61.0% and 12.6 in^2, respectively. Marbling scores averaged 370 (300 = slight and 400 = small), average quality grade was select and average yield grade was 2.7.

In addition, no confinement animal feeding operation permit is needed, waste material is distributed over the pasture by the animals each day, and organic N is added to the pasture. Average feed intake over the 136-d finishing period was 2,634 lbs/calf. At an average stocking rate of 3.6 calves/ac, the equivalent of 1250 lbs of manure DM/ac was applied over the finishing period. The nitrogen concentration in the diet was 2.24%. We estimated that calves retrained 25% of the N consumed and over the feeding period excreted 18 lbs of N in the feces and 36 lbs of N in the urine. Half of the urinary N was probably lost to volatilization, so a total of 36 lbs of N/calf was left on the soil surface. Multiplying this amount by the stocking rate (3.6 calves/ac), the annual deposition of N was 129.6 lbs/ac. Organic N is not immediately available for use by the warm season grass, but over time the organic pool would increase and more N would be available for plant growth reducing the need for inorganic N.

Attention should be given to feeder placement in the pasture. Trampling is intensive around the feeder and can cause permanent damage to the grass stand. Also not all warm–season grasses are compatible with a grass finishing system. In our experience, bermudagrass was better than old world bluestem and native tall-grass pastures should not be used. If beef is marketed directly to the consumer, post-harvest techniques, such as aging of beef and electro-stimulation, should be employed to insure a tender product. Consumers are interested in knowing by whom and where their food is produced and will pay a premium for beef that meets their expectations. Profitability of finishing cattle on grass is no different than the conventional method and is dependent upon the cost of the cattle going into the finishing period, cost of the ration fed, and market value of the final product.

Reference:

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