Developing a Grass-Based Finishing System for Wisconsin

Wisconsin Grazing Lands Conservation Initiative Grant Program

Research Brief #1

Researchers Gary Onan (Professor, UW River Falls) and Dennis Cosgrove (Agriculture and Natural Resources Specialist, UW River Falls) set out with a plan to determine what type of growth performance, carcass merit, and economic outcomes might be expected from finishing beef cattle on pasture in a Wisconsin setting utilizing a well-managed intensive rotational grazing system.

Project Description

20 BueLingo steers and 17 steers from the UW-River Falls herd were chosen for this trial. The UWRF cattle consisted of 4 purebred Polled Herefords and 13 Angus/Hereford crossbred steers. All steers were weaned in November 2008, and on March 31, 2009 were weighed and assigned to either of two treatment groups, feedlot fed or pasture fed. The pasture group was maintained on alfalfa haylage until pasture was available.

On May 20, starting weights for individual steers were determined. At this time, the pasture fed steers were put out to pasture, feeding exclusively on grass and legumes as well as trace mineral salt blocks. The feedlot fed steers were fed a mixture of 80:20 corn grain:corn silage (DM basis) plus minerals and vitamins to meet NRC requirements.

The pasture fed steers were rotationally grazed throughout the summer, feeding on pastures composed of a variety of grasses and legumes, including orchardgrass, festulolium, novel endophyte tall fescue, meadow fescue, bromegrass, meadow bromegrass, perennial ryegrass, red clover, white clover, and alfalfa. Each paddock was approximately 5 acres and was subdivided into breaks of 1.25 acres. From May 20 to August 20 the steers were moved to a new break every other day. After that, steers were moved every day in an attempt to improve rates of gain. On October 5th, it was determined that the pasture had stopped producing adequate forage so the pasture fed steers were finished on a ration of alfalfa haylage and trace mineral salt.

All steers were weighed approximately every 32 days and scanned with real time ultrasound. When individuals reached proper market weight for their frame size and a minimum of 0.30 inches of backfat at the 12/13 rib, they were scheduled for harvest. The steers were processed at various sites in MN and WI. Typical carcass data was collected on all animals including carcass weight, backfat, loin muscle area, and marbling score. USDA quality and yield grades were calculated using this data. Samples of the loin muscle were sent to the North Dakota State University meat laboratory for a sensory analysis that tested for juiciness, tenderness, flavor intensity and off flavors.

An economic analysis was also conducted to determine the cost of production for each cattle finishing system. The goal of this analysis was to determine a cost per pound of gain within each system. Expenses incurred within the feedlot fed group included feed, bedding, labor and vet service. Expenses incurred within the pasture fed group included land rental, water lines and equipment, fencing, labor and vet services.

Trial Results

The feedlot fed steers had a significantly higher daily weight gain during their finishing period than did the pasture fed steers. Feedlot fed steers were growing at a rate of 2.89 pounds per day compared to 2.07 pounds per day for pasture fed. As a result, the feedlot fed steers had a significantly shorter time to slaughter. In spite of that, all pasture fed steers reached market at 20 months of age or younger and the cost per pound of gain was lower for pasture finished steers. (Table 1).

In terms of carcass performance and sensory analysis, the results varied among the

treatments. Pasture fed steers had a significantly lower amount of backfat. This resulted in a significantly more desirable yield grade for the pasture fed steers, meaning that they had a higher percent of boneless, closely trimmed retail cuts from the high-value parts of the carcass. However, there was no statistical difference between treatments in terms of marbling degree and percent of carcasses reaching low choice although feedlot fed steers did have a slight advantage in both categories.

Sheer force (tenderness) and percent cook loss were similar among treatments, with a slight edge to pasture fed beef. There was a non-significant statistical trend toward more tender beef from pasture fed steers. Juiciness scores were almost identical. In trained taste panel testing, feedlot fed beef had a significantly higher flavor intensity and a significantly lower amount of detectable off flavors.

From an economic standpoint, pasture fed beef was a more cost effective production method. Even with the added cost of finishing the steers on haylage due to seasonal constraints on forage growth, costs were measurably lower for the pasture fed treatment (Table 2).

Item	Feedlot	SEM	Pasture	SEM	P
N	18		18		
Receiving Weight (lbs.)	814	21.9	823	24.7	0.783
Start Weight (lbs.)	946	23.5	873	23.6	0.036
Harvest Weight (lbs.)	1226	24.9	1226	23.1	0.987
Average Daily Gain (lbs.)	2.89	0.12	2.07	0.07	<0.001
Days From Start Wt. to Slaughter	119	4.7	187	5.6	<0.001

Table 1: Growth parameters for feedlot vs. pasture finishing treatments. Harvest weights represent the last monthly weight projected to harvest date using the most recent ADG.

Item	Feedlot	Pasture Average Land[a]	Pasture Excellent Land[a]	Haylage Feeding Period[b]
Labor Feeding	752.40	360.16	360.16	280.00
Labor Manure Removal	366.86			112.00
Labor Total	1119.26	360.16	360.16	392.00
Bedding	1602.86			425.00
Veterinary	48.96	192.96	192.96	
Feed	2922.34	1580.75	2630.75	1509.30
Total[a]	5693.41	2133.87	3183.87	2326.30
Total Gain[c]	6184	4413	4413	2874
Cost/lb Gain[d]	0.921	0.484	0.722	0.809
Ave Cost/lb[e]	0.921	0.612	0.756	

Table 2: Costs for selected production inputs for feedlot-fed steers vs. pasture-fed steers. **a** Two scenarios were calculated for the pasture feeding period. The opportunity cost for land rental for the Average Land was set at $100.00/A and the value for Excellent Land was set at $150.00/A. **b** This column represents the costs for finishing 11 of the pasture-fed group after grass production had ceased beginning on October 5. **c** This row represents the total gain of all animals on that treatment. Note two pasture columns representing opportunity costs and a value in the right hand column representing the gain achieved by 11 animals of the pasture-fed group during their finishing on haylage. **d** This row is the Total divided by the Total Gain value within the same column. **e** The cost/Lb. gain for the feedlot-fed steers is repeated in this row for comparison. The values in the pasture columns represent weighted average cost of gain including the haylage feeding period costs.

The future

With the goal of this research in mind, it can be concluded that finishing steers on pasture is an effective method of production. This was manifested in the fact that even though growth rates were slower than for the feedlot group, the pasture group reached market within a very desirable age range. In addition, cost per pound of gain was considerably lower for the pasture group.

Furthermore, carcass quality grade lacked any statistically significant differences between the two treatments. Pasture cattle had a more favorable yield grade. Sensory analysis was an area where the two treatments also differed somewhat. The pasture fed beef had significantly higher levels of detectable off flavors. This information seems a little misleading, however; due to the fact that the pasture fed niche market has been founded on the fact that such products have "non-normal" flavors not found in feedlot raised animals. Because the standards for such testing were created before pasture fed products were being marketed, it is difficult to determine if "off flavors" are actually a negative quality. From a purely statistical standpoint, pasture feeding steers is as economically viable, if not more so, than feedlot feeding them.

The Grazing Lands Conservation Initiative Grant Program is a partnership between the private sector GLCI Steering Committee, the USDA Natural Resources Conservation Service and the WI Department of Agriculture and Consumer Protection. This series of research briefs summarizes projects funded by this program. Our mission is to expand the use of profitable, grazing-based livestock production systems that foster environmental stewardship. This is accomplished through high quality technical assistance to owners and operators of private land, university and producer coordinated research, and educational programs. For more information on the program or on the research in this Brief, contact: **Laura Paine, Grazing and Organic Agriculture Specialist, 2811 Agriculture Drive, PO Box 8911, Madison, WI 53708-8911, (608) 224-5120, laura.paine@wi.gov**