Raising Dairy Heifers in Feedlots or Under a Management Intensive Grazing System (MIG): Comparison of Animal Performance and Costs – Year 1, 2000

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Objectives and Procedures

Two groups of 72 Holstein heifers (initial BW, 480 lb) were used in a 145-day study on a commercial livestock operation to evaluate the economics of integrating a grazing enterprise in comparison to a traditional confinement feedlot with corn, soybeans and alfalfa crop rotations on a commercial Minnesota livestock and crop farm. Replicated groups of 36 heifers were assigned to either the feedlot or pasture. Heifers assigned to pasture were transitioned from a feedlot TMR over a 10-day period. The research trial for the dairy heifers included a complete cost evaluation of tasks and the equipment used for all activities related to the care of the dairy heifers in the feedlot and in the pasture. Feedlot rations were blended with a TMR mixer. The ration ingredients included dry hay, haylage, corn silage and a feed concentrate. Feed ingredients were valued on an as fed basis as follows: dry hay $75 per ton, haylage $36 per ton, corn silage $20 per ton and feed concentrate $236.20 per ton.

Results

Feed costs: Total cost of feeding the feedlot heifers over the 145-day trial was $7,636. The MIG dairy heifers were grazed over 28 acres of established alfalfa pasture. To help manage bloat, bloat blocks were used. MIG pasture heifers were supplemented with 1 to 2 lb of corn with an ionophore, and hay during the study. Cracked corn was valued on an as fed basis at $62.60 per ton and the feed concentrate and hay valued at $236.20 per ton and $75 per ton respectively. The total amount of supplement fed to the pasture dairy heifers and the total cost over the 145-day trial are summarized in Table 1. The total cost of supplemental feed for the pasture dairy heifers was $2,804.96.

Table 1. Feed supplementation for MIG pasture heifers over the 145-day trial.

	Total lb	(tons) fed	Total cost
Focus feed	10,440	(5.2 tons)	$1,232.97
Cracked corn	10,008	(5.0 tons)	$ 313.25
Hay	26,100	(13.1 tons)	$1,109.25
Bloat block	35 blocks		$ 280.00
Total			**$2,935.47**

Labor costs: For both systems labor was valued at $15.00 per hour. The MIG pasture dairy heifers required relatively little labor, 0.375 hour per day. This is time spent delivering feed to the heifers and moving heifers to new paddocks. The labor requirements for the feedlot dairy heifers are presented in Table 2. On average, 1.37 hours per day were spent with this group, feeding, scrapping and bedding the pens and hauling manure.

Table 2. Labor costs for feedlot heifers.

	Hours/day	Total cost
Mixing & delivering feed	0.75	$1,631.25
Scraping lots	0.14	$ 304.50
Bedding pens	0.19	$ 413.25
Hauling manure	0.29	$ 626.25
Total	**1.37**	**$2,675.25**

Machinery use and costs: Machinery costs for the feedlot dairy heifers were calculated based on hour of use. The cost per hour for the tractor, manure spreader and TMR mixer truck is the use-related cost per hour less the labor charge found in Minnesota Farm Machinery Economic Cost Estimates for 2000 (Lazarus, 2000). Use-related costs include fuel, lubricants, power & equipment repairs and maintenance, and overhead costs. The manure spreader includes a charge for the tractor. The skid loader was charged at a rental rate.

Table 3 presents total machinery use and costs over the entire 145-day trial. A machinery overhead cost was charged against the MIG pasture system for equipment used in the feedlot. The equipment, though not used while the heifers were on pasture, is needed for when the heifers come off pasture and are put into the feedlot for the winter. Overhead costs charged to the machinery were $1,124.66. A golf cart was purchased and used to deliver the feed to the heifers in the pasture. The cost of the Golf cart was $1,200. Assuming the golf cart has a useful life of 7 years and using straight line depreciation, an annual charge of $171.43 was made. Feedlot facilities had 3 pens and were valued at $15,000. An overhead charge of 10% of building value was used. Given that only 2 pens were used for the research trial, a facility charge of $1,000 was made.

Table 3. Machinery use and costs for feedlot heifers.

	Hours/day	Cost/hour	Total cost
Skidsteer	0.71	$21.00	$2,161.95
Mixer truck	0.50	$15.00	$1,087.50
Tractor	0.07	$ 8.37	$ 84.96
Manure Spreader	0.07	$ 9.38	$ 95.21
Total	**1.35**		**$3,429.61**

Equipment and pasture costs: Table 4 summarizes construction costs associated with fencing, feed bunkers and the watering system for the MIG pasture system. Straight-line depreciation is used and no terminal value is given to the fences, feed bunkers or watering system. The estimated useful life is probably conservative for both the fencing and water lines. Annual cost is calculated as the total cost divided by useful life. A land charge of $85 per acre

was given to the pasture. The high pasture value reflects the relatively high quality of the pasture. The 28 acres of alfalfa pasture used in the study had been in a corn/soybean rotation that had long term average yields of 145 and 45 bu per acre yields of corn and soybeans, respectively. Two heifers on the pasture treatment were lost; one to bloat and one to a lightning strike.

Table 4. Annual cost for fencing feed bunkers and watering system.

	Total cost	Useful life	Annual cost
Fence construction	$5,775.00	10 years	$577.50
Feed bunks	$ 476.00	5 years	$ 95.20
Water lines	$1,102.66	8 years	$137.83
Total			**$810.53**

Heifer performance and value: The heifers were valued at $775 per head. No heifers in the feedlot were lost. The average BW and gain of the pasture group of heifers were similar to those in the feedlot. Heifers averaged 2.02 lb gain per head per day or 293 lb over the 145-day study. Total gain was 20,790 lb or 742 lb per acre. Total costs over the 145-day study are summarized in Table 5. The feedlot costs are calculated over 72 head while the pasture costs are calculated over 70 head.

Table 5. Feedlot and MIG pasture cost comparisons.

	Feedlot		Pasture	
	Total cost	$/head/day	Total cost	$/head/day
Feed cost	$7,636.15	$0.73	$2,804.96	$0.28
Labor	$2,675.25	$0.26	$ 815.63	$0.08
Machinery	$3,429.61	$0.33	$1,296.09	$0.13
Health costs	$ 360.00	$0.03	$ 432.00	$0.04
Facilities	$1,000.00	$0.10	---	---
Bedding	$ 730.80	$0.07	---	---
Fencing, bunkers, water	---	---	$ 810.53	$0.08
Pasture charge	---	---	$1,912.50	$0.19
Death loss	---	---	$1,550.00	$0.15
Total cost	**$15,831.01**	**$1.52**	**$9,621.71**	**$0.95**
Manure credit	**$ 359.52**	**$0.03**		
Net cost	**$15,471.49**	**$1.49**		

Total cost summaries: Manure produced in the feedlot was spread on corn acres, providing a benefit to the cropping enterprise. Manure analysis on an as is basis showed 11 lb of nitrogen (N), 6 lb of phosphorus (P) and 25.4 lb of potassium (K) per ton of manure. The value of the manure based on the analysis is $4.28 per ton. Based on an application rate of 7 tons per acre and 12 acres receiving manure a total of 84 tons of manure were produced. The value of the manure was $359.52. Taken over the 145-day study and 72 head, this translates to $0.03 per

head per day of nutrient benefit for cropping generated by the feedlot. Daily feed costs per head per day were 2.6 times greater for the feedlot heifers than the MIG pasture heifers. Including the fencing, bunker and water costs and the pasture charge as part of the feed cost, increases the feed costs for the MIG pasture heifers to $0.55 per head per day. Labor cost in the feedlot system is 3 times that in the MIG pasture system. Even including an overhead charge for machinery to the MIG pasture system, machinery costs are 40% lower in the MIG pasture system. The cost of raising dairy heifers on the MIG pasture system from 475 to 770 lb over 145 days was $0.95 per head per day. After crediting the feedlot system for the value of the manure to a cropping enterprise, the feedlot heifers cost $1.49 per head per day.

Net returns per acre for the pasture raised dairy heifers were calculated. The value of the gain on the MIG pasture dairy heifers was $0.67 per lb based on contract specifications of a custom heifer grower. Net return per acre for the growing dairy heifer on the pasture treatment was $153.85. The project was repeated in 2001. The summary of the results for year 2 is incomplete.