Economics of Grazing Alfalfa on Michigan Dairy Farms

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Introduction

Costs of feed production and manure handling are increasing more rapidly than the price of milk, placing an economic squeeze on dairy farmers. Decreasing profit is causing many to look for ways to reduce their costs. One option is the use of rotational grazing systems to reduce feed costs. A deterrent to the adoption of grazing is the lack of good information on the long-term economic benefits of grazing. Although many farmer testimonials are heard, well documented comparisons of grazing and confined feeding systems are seldom found. Such comparisons are difficult because variations in weather across locations and years obscure the data that must be compared. A proper comparison must be made over many years of weather accounting for equipment, material and labor requirements, forage losses, and feed supplementation. A model of the dairy forage system (DAFOSYM) provides a tool for performing such an analysis.

Methods

To evaluate the costs and benefits of grazing in Michigan, DAFOSYM was used to compare the long-term performance and economics of confined feeding and grazing systems on a representative dairy farm. Farm simulations showed how grazing of alfalfa affects feed requirements, manure handling, overall feed and manure costs, and the risk or year-to-year variation of these costs. A further analysis was conducted to determine the sensitivity of the predicted results to assumptions for herd production level, crop productivity under grazing, machinery life, and grazing management costs.

The farm included 100 milking animals plus replacement stock on 250 acres of owned land. Essentially all forage and grain feeds required by the herd were produced on the farm. The same machinery and structures were used for both confined feeding and grazing systems. Grazing systems required additional investments in fence and watering equipment. Fence included both high tensile perimeter fence and electric fence used to form paddocks. Labor for grazing management was assumed to be 5 h per week during the grazing season. Milk production levels of 18,000 and 20,000 lb/cow were used. Simulations were done for 25 weather years using East Lansing, Michigan weather.

Results and Discussion

Use of rotational grazing along with good feeding management provided a substantial reduction in the use of conserved forage, corn, and soybean meal on this representative farm. The simulated feeding strategy replaced TMR with grazed alfalfa based upon availability. The TMR was balanced to meet the energy and protein needs of the animals while considering the quantity and quality of grazed alfalfa consumed. The net result was the use of about 40% less alfalfa hay and silage, 35% less corn silage, 10% less corn grain, and 25% less soybean meal.

Use of grazing provided an economic advantage over confined feeding. Equipment and material costs were similar between the systems because the amortized cost of fence and watering equipment was largely offset by the cost saving obtained through less hours of use of harvesting, feeding, and manure handling machinery. This reduction in machinery use also reduced fuel and electric use about 33%. With less machinery use, less labor was required. The labor saving was partially offset by grazing management labor giving a net reduction of 26%. Seed, fertilizer, and chemical costs were reduced 23% with grazing primarily because less corn was produced. About 34% less bedding was required with 34% less manure hauled each year. Altogether, these effects provided a 12% reduction in the average feed and manure handling cost. Grazing the 18,000 lb herd reduced these costs by $0.83/cwt of milk produced compared to the confined feeding system. At a production level of 20,000 lb/cow, the cost reduction was slightly less at $0.73/cwt. The net return or profit margin of the farm was increased by $146/cow or $58/acre.

The use of grazing did increase the risk in maintaining feed costs. The variation in feed and manure handling costs for the grazing system over many years of weather was 40% greater than the variation of those costs with confined feeding. This occurred because the annual fluctuation in yield for grazed alfalfa due to the influence

of weather was higher than the variation of the average production of all harvested feeds. Even though the variation was greater with grazing, feed and manure costs were always less with grazing.

A major assumption in this analysis was that the same milk production was maintained for both the confined feeding and grazing systems. Further analysis determined that the dairy producer could accept up to a 1,600 lb/cow decrease in milk production with this grazing system in Michigan and still obtain a greater profit than the alternative with confined feeding. The sensitivity of several other assumptions of the analysis are noted in Table 1.

Conclusion

Grazing of alfalfa is an economically viable option for dairy farms in Michigan. The grazing strategy used and other assumptions of the analysis affect the benefit received. With the strategy evaluated in this study, many of the inputs in feed production are reduced and the need for purchased feeds is reduced. The overall result is an increase in the annual return to management or farm profitability of $100 to $240/cow.

Table 1. The reduction in cost and the increase in net return attained through grazing of a herd producing 20,000 lb/cow and the effect of changes in certain assumptions used to describe the grazing system on this cost and net return.

Change in grazing system	Reduction in feed & manure cost ($/cwt)	Increase in net return ($/cow)
Base grazing system	.73	142
20% lower yield of grazed alfalfa	.50	98
6 year alfalfa stand life	.77	150
20% greater fence costs	.68	132
10 h/wk for grazing management labor	.66	128
14 year machinery life	1.05	238
Smaller equipment and forage structures	1.08	212
40% culling rate and bloat control additive	.71	111