

PASTURE BASED SYSTEMS FOR DAIRY COWS IN THE USA

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The dairy industry has undergone significant changes during the last several years, and promises to change more in the next 10 years than it has during the last 30 to 40 years. We have a dynamic, changing industry that is adjusting to new technologies, price volatility, environmental concerns, and a variety of other issues. During the last 10 years, the number of dairy farms has decreased by 40%, herd size has increased by 60%, and milk production per cow has increased by 20% (now 18,300 lb/cow).

Many years ago, pasture was a major forage source for dairy cows. However, in the late 50's, dairy farmers began moving toward confinement systems. The use of and interest in pasture as a source of forage for dairy cows in the USA began to increase again in the late 80's, primarily because of economic reasons. The relatively stable milk prices and the increasing input costs during the last 20 years have contributed to the "re-adoption" of lower cost grazing systems to reduce input costs. A summary of 22 studies and farm management data clearly indicate that grazing results in about \$100-200 advantage in profit per cow per year compared with confined feeding systems. Savings in feed costs likely account for at least half of the decrease in total costs and improved farm profitability with grazing systems. In New York State, pasture based dairy farms returned \$71 more yearly net farm income (NFI) per cow for a six year period (Table 1), or a \$6,035 greater profit for an 85 cow herd. Improved herd health and less culling also contribute to this higher profitability.

Table 1. Summary of grazing and nongrazing dairy farms in New York averaged over 6 years (1996-2001)

	Grazing	Non-Grazing	Difference
No. Farms	58	105	
No. Cows	85	83	
Milk sold/cow, lb	17,127	18,333	1,206
Operating cost/lb milk, \$	0.102	0.114	.012
NFI/cow, \$	460	389	71
Return on Equity, %	3.8	1.5	
Veterinary & Med/cow, \$	61	74	-13
Machine costs/cow, \$	479	541	-62
Investment/cow, \$	6,533	7,500	-967

* Average of \$6,035 more net income/farm

The use of intensive grazing presents challenges to dairy producers and nutritionists.

Supplemental feeding with pasture-based systems is more difficult to manage than with confinement systems, basically because of less control of the forage component with a grazing system. This reduces the consistency of nutrient intake from day to day. Consequently, milk yield/cow/day can be quite variable and milk yield per cow is often 1700 to 2800 kg/cow/year lower than obtained with confinement systems (Table 2). Milk production on pasture is economic optimization and not necessarily making the most milk per cow. Currently, 23% of the dairy farmers in Wisconsin and 10 to 15% of the dairy farmers in the Northeast USA have “re-adopted” pasture-based systems.

Table 2. Lactation milk yield/cow for Holsteins comparing grazing and nongrazing farms

Location	Grazing	Non Grazing lb/cow	Difference
New York (2000)	17,107	19,006	1,899
New York (2001)	16,295	19,105	2,810
Northeast USA	16,227	18,218	1,991
Maryland (2000)	17,000	19,400	2,400

Historically, most dairy farms have remained profitable by achieving higher milk production per cow and along with a higher volume of milk (increased herd size). Dairy producers have adopted grazing systems in an attempt to reduce the input costs and increase the profit margin per cow. Many are also increasing herd size. The grazing season is typically 6 to 7 months in the upper Midwest and Northeast USA, therefore cows still need to be managed for 5 to 6 months with a confinement system. The economics of supplemental concentrate feeding are usually positive with high producing cows in early lactation where 0.8 to 1.2 lb of milk are produced for each lb of concentrate mix fed and the milk:feed (concentrate) price ratio is usually between 1.75:1 and 2.5:1 in the USA. Targeting this feed to the high producing cows will likely reduce body condition loss and improve reproductive performance. A brief comparison of the dairy industries in the USA, Japan, and New Zealand is presented in Table 3.

Table 3. Comparison of dairy industries

Item	USA	Japan (a)	New Zealand
No. cows, millions	9.2	1.1	2.2
Cows/farm	80	50	250
Milk/cow, lb	18,700 (20,000) ^b	17,600	8,800
Milk prices, US\$/100 lb milk, \$	\$12-13.00	27.00	6.00
Cost to produce 100 lb milk, \$	11.00-12.00	16.00	4.00-5.00
Acres/farm	250	100	340

a) In Hokkaido region

b) Herds on production testing program

If profitable milk production per cow is to be obtained with grazing systems, sound nutritional programs are very important. The continually changing quantity and quality of pasture during each grazing season and the lack of control of the feeding program compared to a TMR feeding system with confinement is a major challenge in obtaining high and consistent feed intake each day. In addition, an extensive research data base with the nutrition of high producing dairy cows under grazing conditions is not available in the USA. At Penn State University, we have had an active research program in nutrition of grazing dairy cows since 1990. We recently reviewed much of the published research in the world on the nutrition of grazing dairy cattle (J. Dairy Sci., 86:1-42, 2003) with the ultimate goal of providing the best available information for dairy producers.

Clearly, management of a profitable grazing system requires higher and different management skills when compared with confinement systems. Successful graziers in the USA have acquired these skills within one to two years after adoption of a grazing system. Keeping the “pasture feed bunk” full is one of the most important aspects of nutritional management. In future columns we will visit about various about the management of pasture-based systems.