Organic Dairy Cattle Nutrition and Management

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The challenge of managing a grazing system for dairy cattle is quite different than managing a confinement dairy. Currently, some grazing producers are moving towards 100% pasture because of increased feed costs, their personal philosophy to use less grain, or they may have a specific market demand for grass-fed products. The objectives of our study was to develop practical strategies for organic dairy producers to enhance the profitability of their farm by evaluating organic grain supplementation levels and its effect on economics of organic dairy cows.

Organic dairy cows at the University of Minnesota's West Central Research and Outreach Center (**WCROC**), Morris, MN, that calved during fall 2011 and spring 2012 calving seasons were used to evaluate production, reproduction, and grazing behavior of organic dairy cattle supplemented with three levels (none, low, and high) of organic grain. During the 2012 grazing season, 96 lactating Holstein and crossbred organic dairy cattle were randomly assigned to a grain supplementation treatment (no grain, low grain, and high grain). Cows were fed the following dietary supplementation levels, 1) no grain supplementation (100% pasture, **GRS**), 2) low grain (2.72 kg of grain supplementation per day, **LOW**), or 3) high grain (5.44 kg per day, **HI**). Supplement was fed with a total mixed ration of an organic grain mix (corn and minerals). The TMR was 11.34 of organic corn silage, 9.1 kg of organic alfalfa silage, and 0.68 kg of organic minerals. Furthermore, at least 30% of their diet consisted of high-quality organic pasture during the grazing season. All feed consumption was recorded daily with Feed Supervisor software utilized by the WCROC dairy. Supplemented cows were fed TMR in a compost barn after the morning milking and were allowed to graze during the afternoon and evening. The GRS cows were continually on pasture except during milking.

The GRS cows had lower milk, fat, and protein production than the LOW and HI cows (Table 1). However, LOW and HI cows were not different for milk, fat, and protein production. Surprisingly, there were no differences in production between the two supplemented groups of organic cows, but the HI cows may have been partitioning the extra 2.72 kg of grain into body condition. As expected, the GRS cows had higher milk urea nitrogen (MUN) than the LOW and HI groups of cows. When correcting for the fat and protein content in milk, the difference between the GRS and LOW and HI cows was reduced, but the GRS cow were still lower for energy-corrected milk.

Across the grazing season, there were no differences for body weight for the GRS (489 kg), LOW (490 kg), and HI (494 kg) organic cows. For BCS across the grazing season, the GRS (2.98) cows had lower body condition scores than the LO (3.09) and HI (3.15) cows. Potentially, the LOW and HI cows in this study devoted more of the energy they consumed to maintain and restore BCS compared than GRS cows and this, in turn, may have resulted in the enhanced reproductive cyclicity of the LOW and HI cows.

Table 1. Means of production by supplementation group during the 2012 grazing season for organic dairy cows.

	Grass		Low Supplement		High Supplement	
Measurement	**Mean**	**SE**	**Mean**	**SE**	**Mean**	**SE**
Milk (kg)	14.6[a]	2.1	18.3[b]	1.9	17.9[b]	1.9
Fat (kg)	0.56[a]	0.05	0.69[b]	0.05	0.60[a,b]	0.05
Fat (%)	3.82[a]	0.2	3.78[a,b]	0.2	3.38[b]	0.2
Protein (kg)	0.47[a]	0.05	0.59[b]	0.05	0.57[b]	0.05
Protein (%)	3.20[a]	0.1	3.24[a]	0.1	3.20[a]	0.1
Somatic cell score	3.66	0.32	3.26	0.27	3.03	0.27
Milk urea nitrogen (mg/dl)	14.25[a]	0.3	10.06[b]	0.2	7.33[c]	0.3
Energy-corrected milk(kg)	14.6[a]	0.54	16.9[b]	0.50	16.5[b]	0.50
Body weight (kg)	489	12.1	490	11.7	494	11.6
Body condition score	2.98[a]	0.06	3.09[a,b]	0.06	3.15[b]	0.06
TMR cost ($/cow/day)	0.0[a]	0.06	3.18[b]	0.06	4.21[c]	0.06
Pasture cost ($/cow/day)	1.02[a]	0.03	0.87[b]	0.03	0.86[b]	0.03
Production revenue ($/cow/day)	5.02[a]	0.3	6.35[b]	0.3	5.53[c]	0.3
Income over feed cost ($/cow/day)	3.61[a]	0.3	2.20[b]	0.3	0.38[c]	0.3

[a,b,c] = Means within a row without common superscripts are different at $P < 0.05$

Total mixed ration cost were lower ($0.00 versus $3.18 versus $4.21), pasture cost were higher ($1.02 versus $0.86 versus $0.87), and production revenue from milk were lower ($5.02 versus $6.35 versus $5.53) for GRS, LOW, and HI cows, respectively. Income over feeds costs ($/cow/day) was higher for the GRS and LOW cows compared to the HI cows ($3.61 versus $2.20 versus $0.38, respectively). For profitability, grain costs were substantially higher for the HI cows, and therefore, resulted in a reduced income over feed cost for HI cows.

Pasture can be a cost effective source of feed and housing for dairy animals. During the first year of our organic grain supplementation project, cows that consumed 100% pasture had lower milk production, lower body condition scores, but higher income over feed cost. This information can be significant to organic dairy producers, as well as conventional producers, who are looking to reduce input costs during high grain prices. Producers who have a handle on their feed costs in an organic dairy production system can make informed decisions that reduce financial loss. The most important point for reducing inputs and increasing profits in organic dairy systems is to produce high quality forages and maximize dry matter intake on pasture.