

Nutrition for Grazing Dairy Cattle in Minnesota

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The challenge of managing a grazing system for dairy cattle is quite different than managing a confinement dairy. The manager of a grazing system must be flexible and constantly adjusting to changing environments. Managers of confinement systems are usually very production oriented, seeking profit from high levels of output. Grazing systems are characterized by lower production per cow than conventional confinement systems. Instead, the focus is on high production per acre at reduced costs. A startup-grazing dairy can be established at a far lower cost than a startup confinement dairy. Most graziers are focused on cost control and make creative use of the unique features of their farm.

Pasture species and grazing management

Pasture is the primary source of forage for grazing and organic dairies, for organic livestock production, regulations require a minimum of 120 days grazing per animal (National Organic Program, 2011). In the northern U.S., this requirement is typically met by a May–September grazing season, and profitability depends on pastures that provide a uniform, season-long supply of high quality forage (Undersander et al., 2004). However, in the northern U.S., seasonal variation in temperature and precipitation creates a challenge, as the predominant forage plants, which include perennial grasses such as Kentucky bluegrass, quackgrass, and smooth brome grass, and legumes such as white clover, undergo a “summer slump” in production, and do not actively grow in late fall. Extending the grazing season late into fall would reduce the high costs of harvested feed (Ball et al., 2008). Each forage species has a distinct seasonal growth pattern. The height at which forage is grazed determines the rate of regrowth. The higher the residual in the pasture, the more rapidly the plant will regrow. Most legumes and grasses should be grazed down to 2 to 4 inch stubble, followed by a 4 week rest period.

Supplementing diets on pasture

Feed costs are a high proportion of the total production costs on dairy farms. With grain prices expected to increase in the future, dairy farms will feel pressure to increase the feeding of high quality but low cost forages. Pastures and perennial forages that can be preserved for winter feeding will be a good source of high quality forage on many farms.

Supplementation of feeds is designed to complement pasture forage at a reasonable cost (Hamilton et al., 2012). Table 1 shows that grasses and legumes benefit from different supplement formulations. Neither grass nor legume pasture will meet the energy requirement of the high producing dairy cow. Levels of Neutral Detergent Fiber (NDF), especially in grasses, will limit the ability of the cow to maximize dry matter intake. High quality legumes or grasses provide adequate levels of protein, although requirements for rumen undegradable protein (RUP) may not be met.

There remain unanswered questions on appropriate supplementation for grazing cows. Cows on all forage diets should respond to supplementation with high-energy feeds. Unfortunately grains replace forage in the diet. A typical energy supplement consists of 10 to 16 lb. of finely ground shelled corn with salt and minerals. That works out to 1 lb. of supplement for every 4 to 5 lb. of milk produced each day (Hoffman, 2000). Stored forage or additional grain may be provided to adjust for seasonal changes in pasture performance.

Table 1. Nutrient recommendations for cows in early lactation and nutrient composition of pastures.

Nutrient	Recommendation	Grass	Grass-Legume	Legume
NE _L , Mcal/lb	0.70	0.65-0.70	0.66-0.72	0.68-0.74
Crude protein, % of DM	16.1	27	19	26.5
Bypass protein (RUP)	6.4	4.3-4.6	4.2-5.7	4.6-5.0
NDF, % of DM (min)	25-33	46	45	33
NFC, % of DM	36-44	15-20	15-20	20-25

1989 and 2001 National Research Council Recommendations (NRC, 2001).

Maximizing dry matter and pasture intake

Why worry about pasture intake? Pasture-based dairy cows will have lower milk production due to reduced dry matter intake and not forage quality (Hoffman, 2000). A producer should be concerned about dry matter intake from pasture because it allows us to determine the appropriate supplementation strategy.

Dry matter intake can be very difficult to measure directly on pasture. There are many plant and animal factors that can influence pasture intake and include plant density, plant maturity, breed of cattle, body weight, and milk production. There are three factors that determine pasture intake; grazing time (the amount of time spent grazing), bite rate (the rate at which pasture is taken into the mouth, and bite size (the amount of pasture eaten with each bite). Simply, pasture intake = grazing time x bite rate x bite size. Dairy producers have very little control over grazing time and bite rate. Bite size and pasture yield are influenced by grazing height and density of the pasture. Grazing time will increase as the density of the pasture decreases; therefore, it is essential for dairy producers to provide cows with at least 8 to 12 inches of pasture height.

Conclusions

Pasture can be a cost effective source of feed and housing for dairy animals. The pastures should utilize productive and high quality legumes and grazes organized in paddocks that are intensively grazed with rest periods of three to four weeks before being grazed again. Animals should be monitored regularly to determine the need for supplementation and general health.

Maximizing dry matter intake from pasture can be a difficult task. Develop a pasture checklist to determine whether intake is being limited by pasture or animal factors. From there, a management plan can be developed to improve the grazing outcome. Grazing may not be the simple best way to dairy for all producers. However, when you have forage shortages, determine what kind of pasture management system that a producer could develop that would best suit their needs and goals.