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G90-1003 Maximizing Feed Intake for Maximum Milk Production

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Maximizing Feed Intake for Maximum Milk Production

This NebGuide emphasizes the importance of maximizing feed intake for maximum milk production, and management practices which stimulate feeding activity by dairy cattle.

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- Controlling Dry Matter Intake
- Factors Affecting Feed Intake

The goal of most dairy producers is to maximize milk production in a cost-effective manner. On the typical dairy farm, feed costs represent nearly 50 percent of the total milk production cost. Economically, it is important to maximize feed intake, improve efficiency of feed use, and lower feeding costs. Many dairy producers fail to realize that there is more involved with properly feeding a dairy cow than looking at a computer printout of a balanced ration. With high producing cows, successfully implementing management strategies to maximize feed intake will determine how well a balanced diet supports milk production.

Dry matter intake provides the framework for a productive, profitable ration. A dairy cow has ration requirements for pounds of protein and other nutrients, not simply percentages. Dry matter intake must be known or estimated accurately to make sure that the nutrients required to support milk production can be provided in an amount of feed that the cow can reasonably consume in a day. An optimal feeding program consists of a balanced ration and *management for maximal feed intake*.

Controlling Dry Matter Intake

Both physical and physiological factors control feed intake in ruminants such as dairy cattle. Physical factors include cow size and gut capacity, as well as the fiber content of the diet. As ration energy density increases, gut fill poses less of a constraint and end-products of digestion may become more important in regulating feed intake by inhibiting centers in the brain that control feeding behavior. Intake of low energy diets composed primarily of roughages is largely controlled by gut fill. Intake of diets containing higher levels of grains is more likely controlled physiologically. The relative importance of each intake control mechanism is a function of a given cow's energy requirements for milk production.

Typical intake levels for lactating dairy cows of varying body weights are given in *Table I*. Using these

values, one could calculate that a 1320-pound cow producing 66 pounds of 4 percent fat-corrected milk should consume approximately 46.2 pounds of dry matter daily (3.5 percent x 1320 pounds live weight = 46.2 pounds). In general, higher producing cows will require high levels of feed intake to maintain high production.

Table I. Dry matter intake requirements for lactating cows of varying body weight and milk production level

Live weight: (Pounds)	**880**	**1100**	**1320**	**1540**	**1760**
4% Fat-corrected Milk (pounds)	----------% of live weight----------				
22	2.7	2.4	2.2	2.0	1.9
33	3.2	2.0	2.6	2.3	2.2
44	3.6	3.2	2.9	2.6	2.4
55	4.0	3.5	3.2	2.9	2.7
66	4.4	3.9	3.5	3.2	2.9
77	5.0	4.2	3.7	3.4	3.1
88	5.5	4.6	4.0	3.6	3.3
99	_	5.0	4.3	3.8	3.5
110	_	5.4	4.7	4.1	3.7
121	_	_	5.0	4.4	4.0
132	_	_	5.4	4.8	4.3

Source: NRC. 1989. Nutrient Requirements of Dairy Cattle

Factors Affecting Feed Intake

The factors controlling intake include ration energy density, cow gut capacity, and nutritional requirements. Environmental factors such as high temperature, humidity, and herd management such as slippery floors can decrease daily intake. Feeding management is a large component of this environmental factor, and is the one the producer can most effectively control. Feeding management is composed of feeding systems, feedbunk management, frequency and order of feeding, and psychogenic or social factors. Understanding cow behavior is critical for successfully integrating a balanced ration with an effective feeding strategy. On average, cows consume 11 to 14 meals daily, with each meal lasting approximately 20 minutes. Generally, 65-70 percent of daily dry matter intake occurs during daylight. Clearly, a feeding system which maximizes intake will adapt to these natural feeding behavior patterns.

Maximizing dry matter intake permits feeding higher-forage, lower-concentrate rations which produce the same level of milk production. This results in lower purchased feed costs per unit of milk produced. The following factors needs to be controlled to maximize intake.

Feed Availability; Timing of Feeding

Feed should be available whenever the cows want to eat. Times when bunks are often empty and cows typically eat are right after milking and during freestall and alleyway scraping. Minimize time spent in holding areas and the milking parlor. In general, the maximum amount of time that cows should be without access to feed is six to eight hours daily. Beyond this point, significant declines in dry matter will occur.

Feedbunk Management

It is critical that feedbunks are kept clean. Don't add fresh feed on top of old feed and expect cows to maximize their intake. Be certain that there is adequate bunk space for all cows. If you notice smaller cows and heifers being continuously crowded away from the feedbunk, chances are that their feed intake is not maximal. Whenever possible, provide shade or a water sprinkling system near the feedbunk during hot summer weather. These two items may increase intake by 5-8 pounds per head daily. Water should be available at all times. Decreasing water intake by 40 percent can decrease dry matter intake by as much as 20 percent.

Feeding Frequency

An increase in feeding frequency should result in a more stable rumen environment, and consequently, improved feed intake. More frequent feeding decreases the daily fluctuations in rumen pH which is harmful to rumen fiber-digesting microbes. The positive effect of providing smaller and more frequent meals is greatest with concentrates. When a total mixed ration is fed, feeding frequency becomes less important. However, more frequent feeding maintains fresher, more palatable feed in the bunk or manger _ increasing intake, especially during hot summer months.

Feeding Sequence

Some research indicates that feeding hay before grain, especially in the morning, will improve intake and also help maintain milk fat percentage. The physical fiber provided by the hay stimulates chewing activity and saliva secretion. Saliva buffers the rumen and makes it ready to digest grain without a dramatic decrease in pH level and fiber-digesting microbes. When feeding silages, consider mixing together the forage sources (such as corn silage and grass silage) prior to feeding.

Ration Moisture Content

Wet, fermented rations can depress intake. In general, rations should contain 50 percent dry matter or more. Overly dry and dusty rations may be unpalatable and result in decreased intake.

Social Interactions

Research indicates that first calf heifers spent 10-15 percent more time eating daily when separated from older cows and milk production was improved by 5 to 10 percent. Avoid situations when feedbunk space is limited for a particular group of cows due to social interactions.

As cows move from one production group to another, or as changes in ration formulation become necessary, avoid any sudden changes in ration composition or the manner in which it is fed. This is especially critical when making large changes in energy density of the ration. When a total mixed ration is fed ad libitum, the negative impact of sudden ration changes is reduced.

The nutrients required to support milk production must be provided in a quantity of feed that cows

actually can consume. Management practices which stimulate feeding activity include proper feedbunk management and feeding frequency, proper moisture content of the ration, and avoidance of negative social interactions at feeding. Managing the feeding program to maximize feed intake and monitoring actual intake are the keys to maintaining a nutritionally balanced and cost-effective feeding program.

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