

What Are Your Cows Telling You about Their Nutrition Program?



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Routine forage testing, balancing rations, and implementing these rations on-farm are all key components of cost-effective feeding programs designed for optimum performance of the lactating dairy herd. However, taking time to observe dairy cows can provide invaluable clues as to how well the nutrition program is truly working. When feeding dairy cows, we realize that multiple rations are formulated, fed, and consumed by the dairy herd. These rations include the diet balanced by the nutritionist, the ration fed to the cows by the farm staff, and most importantly the one consumed by the cows and digested within the cow. Taking time to evaluate your dairy herd's feeding program can help spot potential problems and allow for changes that can prevent problems. This evaluation must include not only analyzing production records but also careful observation and a "walk-through" evaluation of the dairy cows. This "walk-through" evaluation of the herd should include an evaluation of body condition, rumination, locomotion, and manure consistency.

Milk Production

Evaluating the feeding program for the milking herd can start with, but should not be limited to, evaluating the milk production for the entire herd and groups of cows managed separately. The daily average milk production per cow for the entire herd or per pen of cows can be a valuable tool to monitor the day-to-day response to the feeding program and other management practices. However, this practice does not provide the best means of comparing production over time because changes in average days in milk, lactation number, and milk components can make these comparisons invalid.

Comparisons over time are best made using milk production calculated at a standard number of days in milk and lactation number. Most DHI reports calculate an average milk production for the herd or group of cows (strings) standardized to second lactation cows and 150 days in milk. For records processed by the Dairy Records Management System (DRMS, Raleigh, NC), this calculated value is called "150-day standardized milk." For Valley Ag Software (Dairy Comp 305), this calculation is called "management level milk." Decreases greater than 2 to 3 lb/day of

milk should be evaluated to determine the potential cause of the drop in milk between test periods. Decreases in production can reflect not only nutritional imbalances but also management changes, such as cow comfort (i.e., heat stress related to fans not turned on) or health issues (i.e., mastitis or lameness).

With the widespread use of daily milk recording software programs, individual farms can compare production at a set time period for groups of cows and compare milk production to previous groups. For example, milk production at 4 and/or 8 weeks after calving can be used to evaluate performance of fresh cows and how well transition nutrition and management programs are working on the farm. Of course, this information should be combined with health information for cows calving within a set time frame being evaluated.

Milk Components (Fat and Protein) and Milk Urea Nitrogen

- **Milk fat percent:** Milk components, especially milk fat percentage, can give an indication of diet inadequacies. Decreased milk fat percent (less than 3.4% for Holstein or 4.1% for Jersey cows) can indicate an imbalanced ration being consumed, lack of effective fiber, or sorting of TMR. High milk fat percentages relative to milk protein in fresh cows can indicate excessive losses of body condition and risk for fatty liver-ketosis in the herd.
- **Milk protein percent:** Low milk protein percent may indicate an inadequate metabolizable protein being fed to the herd. Lack of adequate metabolizable protein may include, but not be limited to, amino acid nutrition or suboptimum rumen fermentation.
- **Milk urea nitrogen (MUN):** Targets for MUN concentrations are between 10 to 14 mg/dl. Values lower than 10 generally indicate a protein deficiency unless herd managers have worked closely with their nutritionist to lower the target value. Values greater than 14 mg/dl generally occur when protein is fed in excess of needs or a limited amount of ruminally available starch and sugars are fed. Managers should determine the normal value for their herds and monitor deviations from that targeted value.

Body Condition by Stage of Lactation

Body condition scoring assesses whether dairy cows are carrying the appropriate amount of body fat stores to support the current or future lactation. Ideal body condition varies by stage of lactation. In early lactation, dairy cows are not able to consume an adequate amount of feed to supply the energy needed for milk synthesis and, as such, they mobilize adipose tissue or body fat stores to provide the deficit of energy needed for milk production. Later in lactation, energy intake exceeds the amount needed for milk production and maintenance; thus, dairy cows can regain body fat stores. When assessing whether a group of cows is carrying the appropriate amount of body condition, at least 10 cows, or 10% to 20% of the group of cows, should be

scored and these scores for individual cows compared to those expected for the appropriate stage of lactation (see table).

Stage of Lactation	Body Condition Score
Calving	3.25
Early lactation	2.75
Late-mid to late lactation	3.0
Dry off	3.25

Dairy cows that are too thin in early lactation or at calving will not peak as high in milk production or maintain production in early lactation. Dairy cows should not lose more than a 0.5 to 0.75 body condition score during the first 60 days in milk. Cows that are overconditioned in late lactation or at calving (body condition scores greater than 3.5) generally experience these conditions:

- reduced feed intakes before calving
- a higher likelihood of metabolic issues after calving
- possibly less milk production
- more health issues, and
- reduced reproductive performance.

Rumination

Rumination or cud chewing results in saliva production. Saliva contains buffers that help in maintaining the pH in the rumen and a more optimum environment for the rumen bacteria that digest the fiber component of a dairy cow's diet. Dairy cows secrete large amounts of saliva daily (greater than 26 gallons, an amount that contains more than 6 lb of sodium bicarbonate). As the neutral detergent fiber (NDF) content of the diet increases, the amount of saliva secreted increases which buffers the rumen contents. Thus, a fine line exists regarding the amount of starch and fiber that must be in the diet to maintain rumen pH, optimize fiber digestion, and provide an adequate amount of energy for the cow for maintenance of herself and milk production.

Dairy cows spend approximately 8 hours daily ruminating with the majority of this time spent while resting. When quietly walking through a group of cows, one will notice that approximately 60% of the cows will be chewing their cuds. In groups of cows where ruminal acidosis is suspected, fewer cows are chewing their cuds, manure consistency in general may be thinner

but varies within the group of cows, and feed intake and milk production vary day to day for individual cows. Oftentimes, inconsistent dry matter intake and milk production may be difficult to spot using group averages.

Precision technologies allow one to monitor, electronically record, and generate rumination activity reports to identify cows that fall outside the normal ranges expected for a particular herd. These technologies can be used to determine individual cows or groups of cows with suboptimum rumination times and target cows that need future observation (assuming the cow is not in heat) for health-related issues and possible problems with the ration being consumed.

Locomotion Scoring

Facility design and management and infectious diseases directly impact the incidence of lame cows. From a nutritional viewpoint, lame cows generally have longer lying times and have altered feeding patterns compared to non-lame herdmates. These lame cows have been shown to have reduced feeding times, less visits to the feedbunk, and a preference for eating closest to the parlor. Thus, early detection of lame cows (locomotion score of 2) is very important. These cows should be trimmed and treated as needed so they can return to a normal walking gait. When assessing a group of cows, 70% of the group should have a locomotion score of 1 where cows have a level back when walking or standing and take confident, long strides while walking (Nigel Cook, University of Wisconsin). No more than 20% of the herd should have locomotion scores of 2 where the cow has an arched back when walking but stands with a level back. Trimming and treating cows with a locomotion score of 2 generally results in the highest probability of cows returning to a normal gait.

Manure Consistency

Manure piles from lactating dairy cows should have the consistency of shaving cream and form a pile with 3 to 6 rings which are 1.5 inches tall. When walking through a group of cows, one should notice that approximately 95% of the cows' manure has this consistency. A variation in consistency where some cows' manure is thinner or thicker than normal indicates that cows may be sorting their TMR, or the ration consumed by the cows is not balanced properly and subclinical ruminal acidosis may be occurring. Piles that are loose, bubbly, and pasty indicate that subclinical acidosis may be a problem. Evaluation of feed being sorted at the feedbunk may be a better method of evaluating whether ruminal acidosis is occurring than evaluating the consistency and composition of manure.

Some nutritionists use manure screening to determine the completeness of fiber and starch digestion in the rumen and variation among cows. Manure samples (1 cup samples from 6 to 10 cows/group) are rinsed with water through a specially-developed screen or a household screen.

Inconsistency of particle size of forages among cows, undigested grain particles, and/or large forage particles may indicate incomplete rumen digestion of feed ingredients.

Bottom Line

Evaluating the herd's response to a feeding program is critical to optimize feeding programs. These evaluations should include monitoring among cows within the dairy herd milk production and milk composition and determining current body condition, time spent ruminating, locomotion, and consistency of manure of cows. By using these criteria to evaluate a feeding program, one can objectively evaluate the effectiveness of the current feeding program and possibly detect problems early. The statement is often made that "dairy cows don't lie." Using this to your advantage allows dairy managers and nutritionists the insight into what really is occurring. By taking time to observe your cows' behavior and milk production, feeding programs can result in healthy, economically efficient dairy cows that positively contribute to a dairy farm's profitability.