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Feeding Dairy Cattle for Proper Body Condition Score

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Body condition score is a critical measure of a dairy feeding system's effectiveness. Adequate body fat reserves promote milk production, reproductive efficiency and herd longevity. Excessively fat cows or overly thin cows run much greater risks of metabolic problems, lower milk yield, poor conception rates and dystocia (difficulty calving). Failure to attain proper body condition or rapid changes in body condition score during early lactation may indicate problems in herd health or feeding management. Condition score should be monitored at each reproductive examination, including:

- at calving,
- postpartum examinations,
- breeding,
- pregnancy checking,
- late lactation (about 250 days in milk), and
- at dry-off.

Changes in body condition score during lactation

Ideally, 80 percent of the dairy herd should lose 1/2 to 3/4 condition score or less between calving and 30 to 40 days in milk. A typical second lactation or older cow, after 50 to 60 days in milk, will gain 4 to 5 pounds of body weight weekly. Since one body condition score equals approximately 120 pounds of body weight for a mature cow, it will take approximately six months for a cow to regain one full condition score lost during early lactation. Heifers, because they are still growing, require about 160 pounds of added body weight to regain one body condition score.

A drop of more than one condition score or loss of less than one-half score during early lactation indicates the feeding program or management practices are ineffective in allowing cows to achieve maximum milk production and yet remain healthy. A loss of one body condition score during the first two to three weeks of lactation is extremely fast and indicates a feeding problem. A loss of 1/2 body condition score in four to five weeks is normal and indicates proper, effective herd management.

Body condition score, energy balance and milk production

High-producing dairy cows simply cannot consume enough feed during the first 60 to 90 days of lactation to support high milk yields and avoid weight loss. Body fat must be mobilized to support high milk production.

Energy balance is the difference between intake of feed energy and energy output in the milk. Energy balance is related to body condition loss or gain. Maximum negative energy balance occurs within two to three weeks after calving, and cows may reach positive energy balance by approximately 60 days in milk. A primary goal is to manage the feeding program to properly manipulate body condition loss and minimize the duration of negative energy balance. High milk yield does not cause excessive weight loss if the feeding program is well-tuned. Two or three times daily milking does not alter target body condition scores.

Nutrition and body condition score

British research indicates cows that are fat at calving (condition score 4 to 5) experience a longer delay between peak milk yield and peak intake, prolonging negative energy balance (see Figure 1). On the other hand, less conditioned cows at calving (condition score 3) have higher feed intake that more closely coincides with peak milk yield. Overly fat cows (condition score 4 to 5) at calving typically lose body condition, while cows closer to condition score 3 at calving gain body condition.

Figure 1. Performance of cows calving in fat or normal body condition. (Source: Jones and Gainsworthy. 1989. Anim. Prod. 49:1183.)

Body fat appears to inhibit feed intake, so cows fat at calving cannot reach maximum feed intake until they lose some of the excess conditioning. Cows may have a "target body condition" in early lactation, as shown in Figure 1, which they try to reach if diets are properly formulated. The ideal, or target, body condition score is probably lower for genetically superior, high-producing dairy cows.

Feeding guidelines for proper body condition during lactation

When troubleshooting reasons for poor body condition, consider feet and leg problems, overall herd health and feeding management. Any health problem that limits a cow's movement to the feed bunk or her ability to aggressively consume feed will likely limit intake and the ability to maintain proper body condition and milk production.

The major aspects of feeding management that can be adjusted to control body condition include:

- maximizing feed intake,
- adjusting energy concentration,
- adjusting crude and escape protein levels,
- providing adequate fiber to prevent off-feed problems or chronic intake fluctuations, and
- checking macro mineral (Ca, P, Mg and K) levels and water availability.

A major goal of proper feeding is to maximize feed intake during early lactation. The sooner a cow reaches high levels of feed intake, the sooner she moves out of negative energy balance. Consequently, reproductive performance improves and milk production is greater.

Diets that contain adequate fiber help prevent low intake and chronic intake fluctuations, poor body condition scores and erratic and low milk production.

Diets should always be properly formulated to meet energy and protein requirements for high levels of milk production.

Generally, when high energy diets are fed to fully meet the cow's requirements, both fat and thin cows produce more milk compared to when energy is limiting. Adequate dietary energy should come from high quality forages, grains or supplemental fats. The trick is to meet the cow's energy requirement without feeding excessive grain or fat causing acidosis, metabolic disorders or off-feed problems.

Diets formulated to contain proper levels of crude protein and escape protein promote highest milk yields and optimum condition scores. Overly fat cows in early lactation especially respond to proper escape protein levels.

Proper ration formulation includes adjusting the ration before body condition losses become great and persistency of lactation or reproductive efficiency are hurt. Large changes in condition score are stressful, lower appetite and may cause ketosis and fatty livers. The following sections detail specific parts of the feeding program to evaluate during each stage of lactation if poor body condition is a problem in the herd.

Body condition by stage of lactation

Fresh cows (0 to 4 weeks after calving). Remember that cows should calve at condition score 3.0 to 3.5. By four weeks they should not have fallen below 3.0 to 2.5 (very high producing cows may drop to 2.0).

If rapid loss of body condition occurs during the first four weeks, and the cow is otherwise healthy, examine intake, dietary energy and protein, fiber adequacy, and feeding strategy.

Early lactation (1 to 4 months). Recommended score is 2.5 to 3.0. Try to maintain cows in the condition score 3 range and allow the cow to regain positive energy balance. If many cows fall to condition score 2, especially if they are not high producers, check feed intake. Remember that high levels of milk production and good body condition can only be achieved when feed intake is maximized. If cows remain in good condition (3 to 3.5), but do not peak very high, check for inadequate protein, macro minerals or water intake.

Mid-lactation (4 to 8 months). Recommended score is approximately 3. The nutritional objective is to meet or slightly exceed energy requirements so body reserves can be built-up. If cows become over-conditioned during mid-lactation (3.5 to 4.0), reduce energy intake, check crude protein levels and consider culling inefficient producers (cows that fail to milk or that fatten excessively). If cows become under-conditioned (2 to 2.5 range), the ration is probably low in energy. Check the early lactation ration as well because the problem often begins at this time.

Late lactation (8 months to dry-off). Recommended score is about 3.5. The nutritional goals are to completely replenish body fat reserves, yet prevent over-conditioning.

If many cows reach the condition 4 range, reduce dietary energy concentration. If cows are in the low 3 range, increase dietary energy to the mid-lactation group. Also, examine early lactation diets because conditioning problems in late lactation may begin during early as well as mid-lactation.

Body condition and dry cow feeding

Over-conditioning usually begins during the last three to four months of lactation when milk production decreases, but grain intake remains too high. Prolonged dry periods and overfeeding grain or corn silage during the dry period also may lead to over-conditioned cows (score 4 to 5).

University of New Hampshire research recommends avoiding excessive body condition at calving. However, these researchers also note that reducing body condition score by 20 percent during the dry period could cause milk fat depression in the following lactation.

Remember that low feed intake and milk production, reproductive disorders, and disease

largely can be prevented if cows are in proper body condition at calving and are fed properly during the several weeks immediately after calving.

Feeding and body condition score: The bottom line

Effective use of body condition scoring involves:

- measuring condition score at appropriate times following calving,
- comparing the score to optimal scores for high levels of milk production, and
- adjusting the feeding program, as described above, if necessary to avoid poor body condition.

If used properly, body condition scoring can be one of the most effective and profitable means of gauging how well the diet meets the demands of milk production with maintenance of proper body condition.

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