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NebGuide

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Managing Dairy Cattle for Cow Comfort and Maximum Intake

This NebGuide describes housing, milking, and feeding systems that promote cow comfort, maximum feed intake, and profitability.

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The goal of every dairy producer should be to provide housing and milking environments that promote cow comfort, milk production, and herd health. Feeding systems and strategies should maximize feed intake and ensure proper body condition. Cow movement to and from the parlor should be gentle and considerate.

Cow comfort can make a difference of several thousand pounds of rolling herd average milk production between two herds with similar genetics and rations. The successful producer will create a cow environment that minimizes stress, excessive competition for feed and water, and potential for injury. This NebGuide stresses important aspects of facility design and herd management that can enhance cow comfort and promote maximum feed intake.

Freestalls

Design and Dimensions. Properly maintained freestalls or tiestalls are the key to cow comfort on most dairies. Stalls should provide a clean, dry, and comfortable location to lie down. Dimensions and design

of the stall should allow the cow to stand up and lie down naturally. Recommended freestall dimensions are given in the Dairy Housing and Equipment Handbook (MWPS-7) available through Cooperative Extension. An important consideration is "lunge space." When standing up, a cow must lunge either forward or to the side of the stall. If adequate lunge space is not available, cows will have difficulty in rising and may eventually stop using the stall.

To see if your stalls are designed properly for cow comfort, consider the following:

1. Do cows consistently avoid certain stalls?
2. Do cows lie backward in stalls or in alleys?
3. Do cows stand half-in and half-out of stalls? and
4. When cows normally rest, between 10 pm and 4 am, are more than 20 to 30 percent standing in the stalls?

If the answer to any of these questions is "yes," then the stalls are not as comfortable as they should be. Also, check for patches of rubbed-off hair and injuries to hocks and knees. These are signs that cows rub excessively on stall partitions or neck rails when rising or lying down.

Bedding. Straw, sawdust, sand, and shredded newspaper can all work well as bedding material. The choice is often determined by the manure handling system. Any bedding used must keep cows clean and dry. Keeping stalls well-bedded maximizes moisture absorption, adds resilience, makes stalls comfortable, increases usage, and reduces potential for injury.

Most cows prefer a four percent slope from front to rear of the stall. The stall surface, with bedding, should be free of "potholes." Look for dirty switches, udders, and hindquarters. Many veterinarians suggest a "wet knee test." Kneel in the stall for 10 seconds; if your knee is wet, then your stalls are not properly bedded. The "drop knee test," in which you crouch and then drop to your knees in the stall, will quickly tell you how truly comfortable your stalls are for the cows!

Stalls should be inspected daily and wet bedding removed. Improperly maintained freestalls not only reduce cow comfort, but increase the risk of mastitis.

Ventilation

Your dairy's ventilation system should prevent high humidity in winter and heat build-up in summer. Freestall fronts and partitions should be open enough to allow air movement across the cow. Look for excessive condensation and moisture damage, especially on the roof. Cobwebs are often a sign of inadequate air flow. Other signs of poor ventilation include: air that smells of ammonia, excessive coughing, nasal discharge, or open-mouthed breathing by the cows. If you run your fingers through the cow's haircoat, it should be free of moisture in a properly ventilated building.

Floor

All walking surfaces should be skid-resistant to reduce injuries, increase mobility to feed, water, and resting areas, and to encourage estrous activity. If you notice your cows walking very slowly, or timidly, with rear feet spread wide, this could be a sign of poor traction. All concrete should be grooved to make it less slippery. Before placing cows on freshly poured and grooved concrete, be sure to smooth off the rough or sharp surfaces to prevent hoof injury.

Milking Parlor and Holding Pen

Cows should spend no more than two hours in the holding area (one hour or less is preferable). Cows will ruminate in the parlor and holding pen if they are comfortable and at ease. If more than 20 percent of the cows defecate in the parlor, this could be a sign of discomfort or uneasiness. The milking system should be properly designed, installed, and maintained. When cows seem ill at ease in the parlor, stray voltage should always be checked as a possible cause. Milkers should be calm and reassuring as they handle and milk the cows. Publication *EC87-726, Mastitis Control Guidelines*, details proper milking system design and maintenance.

Feeding Management

For any dairy enterprise, but especially for a dairy planning on expansion, the feeding technologies used must be carefully evaluated to be sure they promote **"intense feeding behavior"** by the milking herd.

Feeding technologies include:

- **feeding system** (computer feeder, total mixed ration, forage fed separately from grain, manger, fenceline feeding, etc.),
- **feeding strategy** (when is feed available, feeding frequency, etc.), and
- **ration ingredients.**

A profitable feeding program will optimize these three components to encourage cow comfort, normal feeding, and social behavior by the milking herd. Intense feeding behavior encourages maximum feed intake, optimum production and reproduction, and improved herd health. When expanding herd size and facilities, some producers experience reduced milk production, reproductive efficiency, and poor herd health. Some of these problems relate to poor feeding management.

Feeding Behavior

Recently, researchers at Michigan State University collected feeding behavior information on cows in early and peak stages of lactation. These cows were housed in a tie-stall barn. At peak milk yield, cows ate over 50 pounds of dry matter and drank over 20 gallons of water daily. Meal size averaged about five pounds, with 11 meals eaten daily. Each meal lasted about 30 minutes for a total of about five hours of daily eating time.

Higher producing, older cows consumed more feed, ate larger meals more quickly, ruminated longer and more efficiently, and drank more water than lower producing, younger cows. Because of these inherent differences between first-calf heifers and older cows, it makes sense to group them separately if we want to do the best possible job of promoting intense feeding behavior and aggressive eating habits.

Maximum Feed Intake

Cows should reach maximum feed intake no later than ten weeks after calving. This minimizes the time spent in negative energy balance. Generally, cows that attain high levels of intake early in lactation will produce more milk, with fewer health problems, and have greater reproductive efficiency. A first-calf heifer should increase daily dry matter intake by three to four pounds/week for the first three weeks postpartum, and an older cow closer to five or six pounds/week.

A cow at peak intake should be consuming at least four percent of her bodyweight as feed dry matter. For example, a cow weighing 1350 pounds should eat 54 pounds of dry matter (.04 x 1350). Another good rule of thumb is to expect one pound of dry matter consumed for every two pounds of milk

produced. So, a cow producing 100 pounds of milk ought to be eating at least 50 pounds of dry matter.

Feed intake below these target levels will usually result in excessive body condition loss, poor reproductive efficiency, increased incidence of herd health problems, and lower persistency of milk production.

Remember that a balanced ration furnishes nutrients in proportions and amounts which properly nourish a cow for 24 hours. In addition, the required nutrients must be contained in an amount of feed that the cow can consume in 24 hours. These requirements are overlooked by many producers, yet every profitable feeding program must meet these two fundamental nutrition guidelines.

Feeding Strategy to Maximize Intake

Major components of feeding strategy that influence intake include:

- feed availability and timing of feeding,
- feedbunk management,
- feeding frequency and sequence,
- ration moisture content,
- heifer and cow grouping strategies,
- avoiding sudden ration changes, and
- ensuring sufficient water availability.

Feed should be available *at least 20 or more hours daily* for most feeding systems. *Fresh feed should always be available when the cow wants to eat!* Recent onfarm research confirms that with today's high-producing herds, cows want to eat after milking, following freestall alleyway scraping, or whenever feed is pushed up to cows. Also, 65 to 70 percent of daily dry matter intake occurs during daylight hours. Clearly, a feeding system which maximizes intake will adapt to these natural feeding patterns.

Feedbunks should be kept clean and free of spoiled feed -- cows do not produce milk from feed they don't eat. Most experts recommend *2 to 2.5 feet of bunk space per cow*. However, the optimum amount of bunk space per cow for your herd depends on feed availability. **The key is to observe social behavior at feeding time.** Is there excessive dominance and competition for feed? Do smaller heifers and recently fresh cows get pushed away from the bunk by dominant cows? Excessive mud, manure, water, ice or debris will impede cattle movement. Developing the best feeding system for your herd, especially if the herd has just expanded and cows have been placed into new groups and facilities, requires careful observation of your herd's feeding and social behavior.

Ration moisture content should be closely monitored and rations adjusted accordingly (at least weekly). Try to maintain ration moisture content between 15 and 50 percent for maximum intake. Rations should be pushed-up to cows several times daily to stimulate feeding activity. If you feed forages and grains separately, try to feed grain at least four times daily, and no more than five to seven pounds per meal.

The heart of any feeding system for high-producing cows must be high quality forage. High-fiber, low quality forages limit intake. Consequently, more grain, relative to forage, can be consumed which often results in acidosis, off-feed problems, and poor milk production. In addition to feeding high protein and energy forage, always avoid moldy, dusty, or excessively coarse and stemmy hay which will reduce intake.

To combat heat stress, a well-designed fenceline feeding system requires shading and some sort of

sprinkler system. This has improved feeding activity by 60 percent in the University of Nebraska research herd.

Feeding sequence of forages and supplements can influence intake and milk yield. In one study, feeding high-moisture ear corn and protein supplement before alfalfa silage increased dry matter intake by two pounds/day and milk yield by four pounds.

Never forget water availability. Have no more than 20 to 25 cows per waterer and place them strategically so that all cows in a group have easy access to them, such as at entry ways to the milking parlor, freestall, or loafing area. Water needs to be within 50 feet of the feeding area. A high-producing cow requires about one-half gallon of water for each pound of milk produced. A limitation of water consumption by 40 percent can translate into a 20 percent reduction in dry matter intake. Even a one to two pound decrease in dry matter intake could limit peak milk yield by two to five pounds. Keep in mind that a one pound increase in peak milk yield translates into a 200 pound increase in milk production over the complete lactation.

Remember: Your ultimate feeding goal is to entice an essentially full cow to return to the bunk to eat a few more pounds of feed!

Grouping and Feeding

Grouping strategy should promote maximum feed intake and aggressive eating behavior as soon after calving as possible. All groups of cows should be homogeneous to facilitate ration formulation and feeding. Group size is dictated by feeding facilities, total herd size, and the maximum number of cows that can be handled given the milking, feeding, and housing facilities and personnel available.

Group heifers separately within several weeks of calving. This allows the heifer to adapt to the postpartum environment, improves feeding behavior, and reduces metabolic disorders. Following calving, separate grouping of heifers has resulted in higher feed intake and milk yield. Field observations suggest that the beneficial effects of separate grouping is most pronounced in the transition cow. For both first-calf and older cows, a separate group with low cow density and ample bunk space should reduce postpartum stress and competition. If abomasal displacement is a problem, we have had good success at our University of Nebraska herd with 5 pounds/cow of long-stem alfalfa hay fed daily.

Feeding System Checklist:
Key to Successful Expansion

In summary, consider the following checklist to ensure that you have put together the most profitable feeding system for your dairy herd. Whether you plan on expanding your herd size, have already done so and are now experiencing some new herd problems, or if you simply want to improve the efficiency and profitability of your current dairy, considering each of the points on this checklist should maximize your feeding system's effectiveness.

I. **Facilities/Grouping**
   A. Feeds/feeding management
      - feed storage (adequate capacity, well-maintained, easily accessible)
      - forage properly inventoried
      - efficient delivery of feed to all groups possible
      - minimize wastage (5% refusal daily)
      - accurate weighing of all feeds to all groups

B. Cows and cow movement
   - gentle and considerate movement to and from parlor; avoid sharp turns in alleys and parlor
   - access to feed when cows want to eat
   - access to shade and cooling; adequate shelter in winter
   - time away from feed and water is minimum (<6 hours daily)
   - accurately weigh or tape cows
   - proper body condition

C. Bunks and lots
   - bunk space adequate (2 to 2.5 feet/cow)
   - water availability and quality (20 cows or fewer/waterer)
   - feed facilities well-maintained
   - bunks free of rough surfaces and edges

II. **Feed Quality at Bunk**

A. Delivered feed
   - adequate particle size (15% or more of particles more than 2 inches long)
   - TMR is uniformly mixed, every day
   - TMR fed at least twice daily
   - feed pushed up to cows frequently
   - no molds, low feed temperature, good palatability all day long
   - ration moisture between 15 and 50 percent
   - minerals force-fed at two to four ounces per cow daily
   - is grain mix coarsely textured?
   - grain fed four or more times daily; five to seven pounds/meal maximum
   - 2.5 to 3.5 pounds of milk per pound of grain
   - 1.8 to 2.5 percent of bodyweight consumed as forage daily
   - forage tested routinely and rations balanced at least four times yearly

B. Refusal of feed
   - feed should not build up in mangers/bunks
   - composition of refused feed - do cows select feed?

In addition to this checklist, you should also evaluate the following cattle, feed, and environmental factors when attempting to gauge how successfully your feeding program meets the nutritional and behavioral needs of your cows:

1. feet and leg problems that might limit mobility
2. rumination (cud chewing) activity -- ideally, more than half the herd should be eating or ruminating at any one time
3. manure consistency, color and content
4. haircoat appearance and cleanliness
5. respiration -- check for coughing or nasal discharge
6. physical condition of forages -- should be of adequate particle size and free of weeds, mold and putrefaction
7. animal handling -- considerate and gentle.

Summary

Always observe your cow's social and feeding behavior to determine the effectiveness of your feeding, housing, milking, and grouping systems. A well-designed feeding system, for any size herd, needs to

promote intense feeding behavior and maximum intake of a balanced ration. Remember 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 and cow comfort will determine how well a balanced diet supports milk production. Consideration of these feeding and management guidelines, intended to maximize cow comfort and feed intake, will allow you to successfully expand your dairy, or fine-tune an existing dairy, to enhance the profitability of your operation.

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