

Calf and Heifer Management in New England

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Introduction

Raising calves and rearing heifers is one of the most critical jobs on a dairy farm because these animals become the future milk producers for the dairy herd. Calves and heifers are a major investment, ranking second or third in costs behind feed and labor. It costs about \$2,500 to raise a calf from birth to calving in New England, therefore, it is important to optimize feeding, comfort, and health. Dairy cows are ruminants, and proper development of the rumen during the first year of life is critical for the success of the lactating cow. This review will provide

farmers with ideas on how to implement the aforementioned factors.

Access Inventory

Dairy farmers are notorious for keeping too many heifers, which can be costly unless you are expanding your herd. The first step to assess your calf and heifer management is to calculate the number of heifers you need for your farm. Let's walk through some examples:

- A 100-cow herd with a 30% cull rate, a 22-month age of calving, and a 5% calf mortality rate would need the following number of heifers:

$[(100 \times 0.3 \text{ (30\% cull rate)}) \times 22/24 \text{ (correction for age of calving)} \times 1.05 \text{ (5\% calf mortality added to 1)}] \times 2 = 58 \text{ heifers}$. Multiply by 2 because the cull rate and calf mortality are a yearly number, but it takes approximately 2 years to freshen. **The cost to raise 58 heifers over 22 months = \$132,917.**

- If the same 100-cow herd reduces calf mortality from 5% to 2% and the cull rate from 30% to 25%, how many heifers do they need?
 $[(100 \times 0.25) \times 22/24 \times 1.02] \times 2 = 47 \text{ heifers}$. **The cost to raise 47 heifers over 22 months = \$107,708**

By reducing calf mortality and cull rate you can save \$25,209 (\$132,917-107,708) over 22 months! So, how can you accomplish these goals?



Freestall barn with fans for cooling.
 Photo: Glenda Pereira, UMaine Extension.

Dry Cows

Optimal calf and heifer management begins with dry cows. Researchers from the University of Florida evaluated the impact that heat abatement strategies had on subsequent lactations and calf performance during the dry period. Female calves that had access to shade, and fans postnatal, and were born from cows that had access to shade, fans, and water soakers, weighed 6% more at birth and 7% more at weaning compared with their herd mates. In addition, the cooled calves consumed 12% more milk replacer and had 20% more total intake per day compared with uncooled calves.¹ Researchers also found heat stress impacts multiple generations, as granddaughters of late gestation cooled cows produced 4.3% more milk per day during the first lactation and had numerically longer lifespan (+369 days) compared to granddaughters of late gestation heat-stressed cows.² Heat abatement strategies during the dry period had an impact on calves that were not yet born. While that research was conducted in Florida and not in New England, the researchers stated that 89% of the US dairy herd would benefit from heat abatement strategies during the dry period, especially during the summer months. You should consider adding fans to your dry cow facilities to improve calf health and future production.

Prefresh diets: Most prefresh cows are fed balanced well-managed diets, and data suggest that feeding a balanced DCAD diet will not adversely affect colostrum. Recent research from UNH indicates that feeding 32 g per day of nicotinic acid (not protected) to Holstein cows during the four weeks before scheduled calving will enhance colostrum quality.³ In addition, calves are more feed efficient during the first three weeks after birth.

Colostrum

1 Colostrum quality and feeding: Arguably, the most important thing you can do is provide good quality colostrum to your calves as soon as possible after birth. Good quality colostrum contains > 50 g/L of immunoglobulin G (IgG) and this can be determined by using a refractometer or a colostrometer. Calves are born with a naïve immune system and if they fail to get colostrum within twelve hours, they will likely perform poorly. After birth, the gut starts maturing quickly resulting in a decreased ability for the large Ig proteins to pass, therefore, calves should receive a minimum of four quarts of colostrum as soon as possible. Research with Brown Swiss calves indicated that calves fed

four quarts of colostrum had lower veterinary costs, grew 29% faster and produced 11% more milk during the first lactation, and 17% more during the second lactation compared with calves that were only fed two quarts of colostrum.⁴ Setting up your calves for success begins on the first day after birth because this can impact future performance.

- 2 Colostrum reserve:** Some cows do not produce enough colostrum, so you should have frozen colostrum or colostrum replacer on hand. If you freeze colostrum, make sure to state the IgG level or some indicator of quality on the bag or container. Thaw and warm colostrum slowly because if you thaw colostrum too quickly the antibodies can degrade. If using a colostrum replacer, make sure it is lacteal-based (dehydrated colostrum).
- 3 Stomach tubing:** When calves are not aggressive in drinking colostrum, you may need to stomach-tube the colostrum. It is recommended to not allow calves to suckle on their dam as it can be difficult to assess whether the calf received adequate high-quality colostrum.
- 4 Pasteurization:** Pasteurizing colostrum is an excellent way to enhance the uptake of IgG by the calf. However, the pasteurizer must not surpass the recommended temperature of 60 °C (140 °F) for more than 30 min as this can cause damage to the IgG. Farmers should invest in high-quality pasteurizers and make sure these do not fluctuate in temperature.
- 5 Other day one management:** It is also a good management practice that all calves have their navels dipped with iodine to reduce naval ill. Some producers dip the calves' feet with iodine as well as this will help dry the newborn's feet and reduce pathogen uptake through the soft, moist hoof tissue at birth.

Day Two Until Weaning

While there are many ways to feed and manage calves such as limited milk (or milk replacer feeding) or ad libitum feeding, several things remain constant regardless of the method of milk feeding.

- 1 Free choice and clean water:** Calves need access to water as this is essential for the development of the rumen. When water is consumed, it passes directly into the rumen while milk or milk replacer bypasses the rumen to the abomasum. Water is essential for the bacteria that reside in the rumen to grow which will be integral in the conversion from a preruminant to a ruminant. Previous research

indicated calves that were fed free-choice water consumed 31% more starter grain and grew 38% faster compared with calves that only received water from milk replacer.⁵ Clean water pails and drinkers are important! In addition, routinely replace plastic buckets as they develop cracks that can harbor harmful bacteria potentially making the calves sick. Some farms use stainless steel buckets which are less likely to harbor harmful bacteria.

- 2 Milk or milk replacer:** There are many ways to feed calves milk, and both have their benefits and challenges. The conventional method is to feed four to six quarts of milk or milk replacer per day. Milk replacer will typically be 20 to 22% crude protein (CP) and 20% fat. Calves are weaned at approximately eight weeks of age and you should evaluate that starter intake is adequate. Calves fed the conventional method are a bit smaller but will wean much easier compared with calves fed the accelerated program. Calves on the accelerated program are often fed on a computer or self-feeder and it is not uncommon for these calves to consume 10 quarts of milk or milk replacer per day. These calves will grow well, produce a lot of urine and be more difficult to wean as calf starter intake consumed is much lower than the conventionally fed calves. Milk replacer in this method will be about 26 to 28 % CP and 16 to 20% fat. Research conducted at UNH indicated that calves fed the accelerated program consumed 34% more free-choice water per day than calves fed conventionally.⁶ Water must be provided to calves fed the accelerated program to maintain osmotic balance.

- 3 Starter:** Providing a free-choice calf starter is integral to rumen development. Ideally, the calf starter should be coarse, however, this is not always an option due to constraints of handling grain bins versus bags. In these cases, a pelleted starter is fed. Like water, starter pails or troughs should be cleaned daily to avoid mold formation and to stimulate consumption.
- 4 Hay: Is hay necessary?** Only under certain circumstances. When a coarse starter is fed hay is not needed as it will hinder rumen development. However, if a pelleted starter is fed, then hay needs to be fed in addition to the starter. The hay should be fine, high-quality hay.
- 5 Weaning:** Weaning of conventionally fed calves is usually done beginning on day 42 by cutting milk or milk replacer in half, and by feeding calves only in the morning or evening. Calves that are fed the accelerated program are usually put on a step-down program, reducing milk intake to two quarts per week beginning on day 42 or 49 of life. It is crucial that starter and free-choice water are available. The calf should double in bodyweight by the weaning period.⁷

Feeding The Postweaned Heifer And Breeding

- 1 Nutrient requirements and growth rates:** The post-weaned heifer can be fed a heifer grower grain, or a specific grain mix developed by your feed company. Typically, these diets are approximately 16% CP and



Calf nursery. Photo: John Porter, UNH Extension



Heifer barn feed floor. Photo: John Porter, UNH Extension

lower in energy. Targeted growth at this age should be close to 2 lbs. per day for Holsteins.⁸ For other breeds such as Jersey, the post-weaned heifer will grow at 1.5 to 1.7 lbs. per day. It is common to feed hay to these heifers, but you may feed a TMR if you meet their nutrient requirements. As heifers grow, CP requirement is reduced to 12% as these heifers enter the dry cow pen and are fed a dry cow diet.

- 2 **Conventional ad libitum feeding:** Heifers should be grouped by body weight to facilitate ration balancing to meet the nutrient needs. In this feeding method, a high forage diet is fed, and heifers can eat when they want. There will be more labor involved in this method of feeding as old feed will need to be removed and more manure will be produced than in limit-fed heifers.
- 3 **Limit feeding:**⁹ Limit feeding is feeding a very precise diet to meet the animal's specific requirements. Unlike ad libitum feeding, limit feeding is designed to optimize the utilization of the nutrients within the diet to their maximum potential. Typically, all feed will be consumed within two hours of feeding, and less waste is produced. Heifers should be grouped in pens within 200 pounds of body weight of each other. Limit feeding will save feed and labor costs; however, heifers must be weighed at least once a month and diets adjusted accordingly. Additionally, because heifers eat at the same time, overcrowding should be avoided to prevent "boss heifers" from controlling the feed bunk which may cause headlocks. Expect quite a bit of noise in the beginning as heifers get used to the new diet. Do not provide any edible bedding such as straw or sawdust as heifers will consume the bedding.
- 4 **Heifers on pasture:** The nutrient requirements of heifers on pasture are no different than heifers fed any other way. However, high-quality pasture is very high in rumen degradable protein which can be a challenge for balancing rations. The energy in this type of feeding program needs to be highly digestible non-structural carbohydrates (finely ground corn or small grains). Some farms will have the heifers follow the lactating cows. This method allows the lactating cows to consume the higher quality feed and the heifers will clean up the rest of the pasture. A strict deworming program needs to be implemented, especially if heifers graze too close to the ground. Water is a necessity for heifers and cows on pasture.
- 5 **Ionophores:** Ionophores are gut-specific antibiotics that have been shown to improve feed efficiency in heifers. They also control coccidiosis and should be considered an important feed additive on any dairy.

- 6 **Alternative feeds:** By-products such as wet brewer's grains can save dairy farmers money. Sometimes this product can be free or much lower in cost than conventional corn-soy-based grain. Data from the University of New Hampshire showed that heifers fed a diet of wet brewer's grains and forage, grew at the same rate as heifers fed a corn-soy-based diet.¹⁰ Consider other alternative feeds such as bakery waste which is high in energy. Be cognizant of molds and avoid feeding mold at all costs to any dairy animal. Work with your feed company to incorporate by-products.
- 7 **Breeding:** The age of first calving should be 22 months and no later than 24 months. The longer it takes to get a heifer bred, may result in an increased cost of raising the heifer, which does not include the milk that can be lost by extending the age at first calving. A first-calf cow should be approximately 85% of the weight and size of her mature herd mates and should produce 80% of the milk of her mature herd mates.⁸ If first-calf cows do not meet these criteria, you should review and reevaluate your heifer-raising practices.

Summary

- Are you feeding too many heifers? This can be a considerable hit to your bottom line.
- Provide heat abatement for dry cows. This will result in healthy calves which will become high-producing cows.
- Feed a well-balanced dry cow/prefresh diet and consider adding 32 g/day nicotinic acid per cow to improve colostrum quality.
- Dip navels and feet with iodine.
- Test colostrum, feed colostrum that tests > 50g/L IgG, and feed at least 4 quarts as soon as possible. If not available, use frozen colostrum or a lacteal-based colostrum replacer.
- Feed free-choice water and coarse starter if possible.
- Understand the management needs of your post-weaned heifers regardless of how you raise them.
- Consider using proven feed additives like ionophores to enhance your heifers' growth.
- Breed heifers at the optimum size (minimum for Holsteins 48 inches at the withers) with the goal to freshen at 22 months.

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