Getting Calves Started Well

The current high demand for and high value of replacement heifers means that management of calves and heifers should be a high priority. Common challenges to pre-weaned calves that cause illness and/or death include diarrhea and respiratory infections. Many of the health problems calves face can be controlled by excellent early nutrition and management. This article addresses colostrum, liquid feed, water, and weaning. Making time to feed newborn calves adequate amounts of high-quality colostrum is the single most important step managers can take to ensure healthy, well-grown calves.

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Dairy heifer calves represent a key opportunity to improve the milk production potential of the future dairy herd. Our recommendation is that herds keep death loss of live-born calves to within or below 2 to 5% from birth through the time of weaning, the period of life when dairy calves are most likely to become sick or die. According to data from the National Animal Health Monitoring System (NAHMS) in 2007, average mortality of pre-weaned calves on farms during 2006 was 7.8%. Some herds lose an average of 2% of calves, while others lose 15 to 20%. Death loss is costly to dairy herds and limits the rate of expansion through internal growth of the herd and/or reduces the potential to market extra heifers for dairy purposes.

Keeping calves healthy as well as alive is critical. Common challenges to pre-weaned calves that cause illness and/or death include diarrhea and respiratory infections. Even if calves appear to recover successfully from illness, herd productivity can be impacted by reduced growth rates of sick calves, reduced milk production of cows that experienced sickness as calves, and increased treatment and labor costs for sick calves. Many of the health problems calves face can be controlled by excellent early nutrition and management.

Care at Birth

An excellent calf management program begins with care of the dam prior to calving. About 11 to 13% of calves born to first lactation dams are stillborn, while calves born to older dams are half as likely to be stillborn (1). Calf mortality is influenced by the health of the dam. Additionally, calves have a better chance of survival if stress during the birth process is minimized. Key factors that influence stress include size of calf, health of dam, crowding and cleanliness of the calving environment, and quality of assistance provided. Almost one in five (17.2%) calvings in 2006 required assistance (2). Shortly
after delivery into a clean environment, calves should have their navels dipped, not sprayed, with tincture of iodine.

**Colostrum**

Consumption of an adequate amount of high-quality colostrum is the single most important management factor in ensuring health and survival of calves and maximize future milk production. Colostrum has the protein, fat, antibodies and vitamins that newborn calves need at birth. These nutrients and immune components equip the calf for a good start, a healthy young life and potentially greater productivity as an adult cow.

Colostrum should be fed as soon as possible after birth, either by milking the dam or feeding preserved colostrum from another dam which has tested negative for Johne’s disease. Feed 2 to 4 quarts of colostrum in the first feeding shortly after birth. If the initial feeding was approximately 2 quarts, then feed an additional 2 quarts within 6 hours, and another 2 quarts 6 hours later. Using a colostrometer will identify the quality of the colostrum, clearly indicating it as green (> 50 mg/ml of antibodies), yellow (20-50 mg/ml) or red (< 20 mg/ml) zone quality. Don’t use low-quality (red) colostrum for first or second feedings to calves. Consider the use of an esophageal feeder to feed at least 6 quarts to the calf within 12-14 hours of birth, in 2 to 3 feedings if calves do not drink this quantity.

Absorption of immunoglobulins from colostrum is greatest right after birth and has decreased significantly by 24 to 48 hours. Therefore, feeding colostrum as soon as possible is critical for adequate absorption of immunoglobulins or passive transfer of immunity. No artificial colostrum substitute is equal to high-quality colostrum when it comes to ensuring sufficient antibody absorption by calves.

**Liquid Feed for Calves**

Consistency in feeding of calves is important to ensure good health and growth. Time of feeding and the quantity and temperature of liquid feed should be monitored for best results. Sanitation of feeding equipment is also critical.

Milk replacer is the most common choice of liquid feed for calves (2). Milk replacer prices have increased appreciably in recent years. Milk replacer quality can differ and primarily relates to the protein source (plant-based proteins, animal plasma or egg protein vs. milk-based protein) and fat levels. Younger calves less than 4-weeks-old do not efficiently digest plant-based proteins. This is too critical a phase of life to risk use of a low-quality milk-replacer to save a few dollars.

Higher-protein milk replacers are available to encourage higher growth rates in pre-weaned calves. Research is ongoing to indicate if long-term benefits of these accelerated growth programs justify the increased costs, and if there are positive effects on calf health. Some producers have adopted successfully the accelerated growth program, and others have decided to stay with the traditional program that emphasizes earlier intake of calf starter.

Feeding more whole milk or increased amounts of milk replacer in an accelerated growth program makes the calf rely more on nutrients from these sources rather than from starter feed. While early growth may be more rapid, greater reliance on liquid nutrients may delay starter intake and development of the rumen. However, note that calves in cold housing during the winter do need increased nutrients in order to maintain growth rates while maintaining body heat.

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### Tracking Performance

Nobody likes to lose calves. Keep a record of each birth and each death. Determine mortality rate for heifer calves over a 6-month period.

- **Percent stillborn** = Number born dead plus calves that died within 24 h birth divided by total number of births.
- **Percent calf mortality** = number died from 24 h after birth through weaning divided by number alive at 24 h after birth.

### Checking Your Colostrum Protocol

It is wise to evaluate the outcome of your colostrum program by checking the serum protein levels of young calves. Immunoglobulins are proteins that are transferred from dam to calf through the colostrum. An easy, though indirect, way to check that is by checking the serum total protein level. A sufficient level of immune protection depends on the intake and absorption of immunoglobulins with 10 mg/ml blood serum commonly used as the critical level. Although immunoglobulins are not the only protein in serum, they are the major proteins very early in life when colostrum feeding is adequate.

Work with your veterinarian to check the serum protein levels of a group of calves. Calves can be sampled between days 2-10 of life, although the correlation of total protein with immunoglobulin is better when the sample is taken between days 2 and 5 (3). The target level for total protein is 5.5 g/dL. Serum protein level less than 5.5 g/dL indicates that there has been a Failure of Transfer of Passive Immunity (FTPI).

Take samples from 8 to 12 calves. The goal should be that less than 20% of calves have FTPI. Also look at the absolute values and the range that they represent. Your veterinarian can help you interpret the results.

If the rate of FTPI is greater than 20%, make changes in your colostrum program to give sufficient high quality colostrum to calves sooner. Conversely, if the results are good, then you and your employees are doing a good job of colostrum management.
Whole milk generally has higher protein and energy values than many milk replacers. For example, whole milk from Holsteins contains approximately 25% protein and 28% fat on a dry matter basis compared to common milk replacers that are 20% protein and 20% fat.

The majority of farm operations feed a medicated milk replacer (2). Little recent research on this topic is available, but available reports indicate that growth rates and incidence of scour are generally improved in calves fed medicated milk replacer. The advantages of feeding medicated milk replacers are likely greater for calves in more stressful environments.

Waste milk from mastitic cows is frequently used alone or in combination with milk replacer. Potential problems with waste milk can include inconsistency in nutrient content, presence of antibiotics and of pathogens that can infect calves. Pasteurization of raw milk is necessary to kill pathogens that can infect these vulnerable animals. Sanitary handling of pasteurized milk is important to ensure that bacteria are not reintroduced.

Weaning

The average age at weaning for calves nationwide is about 8 weeks, according to data from the NAHMS study. However, calves can be weaned successfully as young as 4 weeks of age. It takes good calf management which is beneficial in other ways as well. Regardless of age, weaning should be based on consumption of 2 pounds of calf starter per day for 2 consecutive days during summer months, or 2 pounds per day for 3 consecutive days during other times of the year. Not only does it save milk replacer cost but it may decrease labor in preparing milk replacer, cleaning and feeding. In addition, consumption of calf starter provides nutrients that stimulate rumen development and ease the transition to a dry diet.

Weaning can be done gradually or abruptly. If calves are consuming more than 1 lb. of milk replacer powder daily, then consider gradual weaning. Gradual weaning can be accomplished either by dropping a feeding for 5 days before weaning or increasingly diluting the milk replacer with greater amounts of water for 5 days until weaning. Introduce high-quality dry hay after weaning.

Water

Water promotes consumption of calf starter, indirectly aiding rumen development and increasing growth rates. Water is necessary to promote digestion of calf starter by rumen microbes, resulting in production of volatile fatty acids that stimulate rumen development. Start providing water at 3 to 5 days of age. Provide clean drinking water in a bucket separated from calf starter (4). Most farmers provide water to calves at the same time they begin feeding calf starter. Supply approximately four times (by weight) as much fresh water per day as starter. Estimate water weight as 1 pound per pint or 8 pounds per gallon, so supply 2 quarts of water (4 pounds) if feeding 1 pound of starter per day. Provide water year-round, using warm water several times a day during cold weather.

Starter

Provide a high-quality calf starter by 3 to 5 days of age. Start with a few ounces of calf starter per day, and remove the leftovers each day before adding fresh starter. Calf starter stimulates rumen development more than consumption of hay. If early weaning is a goal for your calf program, then early development of the rumen is important and will help calves thrive during periods of stress prior to weaning.

Summary

The current high demand for and high value of replacement heifers means that management of calves and heifers should be a high priority. Making time to feed newborn calves adequate amounts of high-quality colostrum is the single most important step managers can take to ensure healthy, well-grown calves that will produce milk to their potential during lacta-

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**Checklist for newborn calves**

- Feed 2 to 4 quarts colostrum within 1 hour of birth.
- Dip navel with 7% tincture of iodine solution within 1 hour of birth.
- Feed 2 to 3 quarts colostrum 6 hours after first feeding.
- Feed an additional 2 to 3 quarts colostrum 12 hours after first feeding.
- Weigh calf on day 1 of life.
- Draw blood for serum protein analysis 2 to 10 days after birth.
- Offer several ounces of starter grain in first 3 to 5 days of life and thereafter.
- Offer fresh clean water daily beginning at 3 to 5 days of life, offered in a bucket and separated from calf starter.
- Weigh calf at about 2 months of age.
tion. Measuring levels of passive immunity in calves permits effective management of a farm’s colostrum program.

To keep calves healthy and growing well, choose a high-quality milk replacer and avoid milk replacers with plant-based proteins for the first 4 weeks of life. Early weaning of calves can help reduce costs associated with feeding of milk replacer, but doing so successfully requires early introduction and consumption of sufficient amounts of calf starter and water. Remember that calves are babies and high-quality nutrients will help them thrive in spite of typical stresses associated with the pre-weaning period.

References


