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Developing Cold Weather Protocols for Calves

Winter weather calls for an array of management changes on dairies. At the top of the list of cold-weather priorities should be the calves. Newborn calves have very little body fat to mobilize as a reserve energy source to regulate body temperature. They also have no natural immunity in the first weeks of life. And their large surface area relative to their total body size means greater total exposure to cold elements.

While management conditions vary between every farm, it is important to develop specific protocols for managing preweaned calves through periods of cold weather. Newborn calves start to require more energy to stay warm when the environmental temperature reaches just 50°F. As a result, cold-weather protocols should start early in the fall and continue well into the spring. They should focus on five basic elements of calf care:

Colostrum Management

In addition to the passive transfer of immunity that it provides, colostrum also is an important source of energy, nutrients, hydration and warmth for newborn calves. Thus, effective colostrum delivery is more important than ever in cold conditions. Administer 4 quarts of warm, clean colostrum within 4 hours of birth (3 quarts for Jerseys).

When maternal colostrum is not available or discarded for disease-control purposes, substitute with a colostrum *replacer* (not supplement) product.

Nutrient Delivery

A 100-pound calf needs 85% more metabolizable energy when the environmental temperature is 10°F compared to 70°F. Table 1 shows nutrition requirements established by the National Research Council (NRC) for a 100-pound calf fed 20:20 milk replacer at various temperatures.

Table 1. NRC requirements for a 100-pound calf fed 20:20 milk replacer at 70°F, 32°F and 10°F environmental temperature

100 lb Calf – 20-20 MR

70°F 20-20	1.25	1.50
Protein ADG (lb/day)	0.72	0.91
Energy ADG (lb/day)	0.72	1.07
Energy balance, Mcal/d	+0.85	+1.37
32°F 20-20	**1.25**	**1.50**
Protein ADG (lb/day)	0.72	0.91
Energy ADG (lb/day)	Weight Loss	0.41
Energy balance, Mcal/d	-0.09	+0.43
10°F 20-20	**1.25**	**1.50**
Protein ADG (lb/day)	0.72	0.91
Energy ADG (lb/day)	Weight Loss	Weight Loss
Energy balance, Mcal/d	-0.65	-0.12

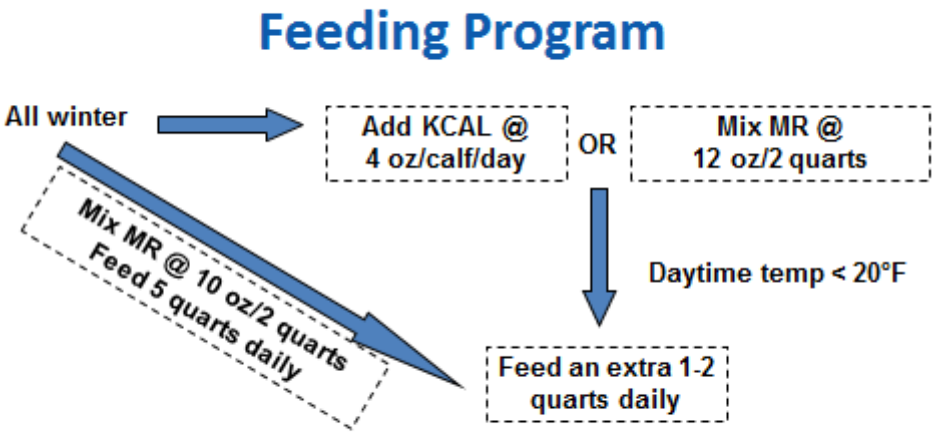
Delivering more nutrients to fuel these additional energy needs can be accomplished by:

- **Increasing milk solids percentage**, up to 12 ounces of powder per two quarts of water (18% solids)
- **Using a fat supplement** like KCAL, at 2 to 4 ounces per calf per day
- **Increasing liquid feeding rates** to 2.5 to 3.0 quarts per feeding
- **Increasing feeding frequency** by adding a third feeding midday

In extremely cold conditions, a combination of these feeding strategies might be most beneficial.

However, ***do not*** increase solids percentages *and* use a fat supplement. Do one or the other, but not both.

Figure 1. Decision tree for when and how to increase nutrients based on environmental temperature.



What is most important is to have a plan in place *before* extremely cold weather sets in, so the thresholds and actions already are understood, and a plan can be put to work as soon as conditions dictate.

When feeding pasteurized waste milk as the primary liquid nutrition source, employing a fat supplement or pasteurized milk balancer can provide supplemental nutrients.

Feeding Fundamentals

Once a feeding strategy is in place, develop protocols to mix and deliver liquid rations at the appropriate level of solids and feeding temperature. Ideal feeding temperature is 101 to 105°F, which means mixing water needs to be 110 to 120°F. Additional measures, such as using insulated carriers to transport milk from the mixing to feeding areas, may need to be taken to maintain feeding temperature. Routine monitoring of the temperature of milk of the last calf fed should be done to ensure feedings are being delivered within the correct temperature range.

Reinforce the importance of sanitation of feeding and mixing equipment, especially because higher levels of solids and fat may leave more residues on equipment. Wash feeding utensils and milk-handling equipment with warm, soapy water. Then rinse with warm water, disinfect, rinse again, and allow to dry.

Write out and illustrate mixing and sanitation protocols (in English and Spanish, if appropriate).

Offer starter grain beginning at three days of age. The rumen development that grain consumption promotes is important for helping calves generate more internal body heat.

Establish supply management and inventory protocols so that additional nutrition products are on hand when needed, and consistent rations can be maintained. Switching rations abruptly is stressful to young calves, especially in cold conditions.

Water

Water delivery often is one of the most challenging aspects of winter calf care. At the same time, water intake is extremely important to help calves process the higher nutrient levels they are consuming in a winter diet. Water intake also promotes starter-grain intake and digestion.

Develop a strategic plan to deliver warm water, via either bottle or pail, on a regular schedule. One method is to make warm water available for 30 minutes immediately after each milk feeding, while calves remain standing.

Housing

A dry, draft-free, well-ventilated environment is necessary for all preweaned calves in cold conditions. In calf barns, aim for 4 to 5 air exchanges per hour, which can be achieved with positive-pressure ventilation tubes.

Newborn calves are especially susceptible to chilling in frigid conditions. Put protocols in place to dry newborn calves off immediately, which can be accomplished with the help of dry bath towels and hair dryers. Warming boxes also can be useful, but work with a veterinarian to be sure they don't become a reservoir for disease-causing bacteria.

Deep, dry straw is the bedding of choice for preweaned calves in the winter. Wood chips or shavings do not provide enough loft and insulation to allow calves to "nest" and retain body heat. The University of Wisconsin provides guidelines nesting score guidelines:

- Score of 3 – legs not visible when calf is lying down
- Score of 2 – legs partially visible when lying down
- Score of 1 – legs completely exposed when lying down

Nesting scores can be improved by one category if calf jackets are used.