

Maximizing heifer growth in spite of the cold

Déborá Santschi

Ph.D. agr., Nutrition and Management Expert, R&D; Marie-Ève Robert agr., Dairy Production Advisor, Montérégie; and Steve Adam, agr., Comfort, Behaviour, and Well-Being Expert, R&D, Valacta

With the arrival of winter and its cold temperatures, it is important to make some adjustments for the calves and heifers on our farms. Countering the effects of the cold helps heifers maintain their growth rate, so they calve at an optimal age and weight for maximum profit.

Unweaned calves

With a thermoneutral zone (comfortable temperature range) between 10 and 20°C, young calves, particularly those born during the winter, are extremely vulnerable. Because their rumen is not yet functional, there is no heat-generating fermentation to help keep them warm. A wet or shivering calf devotes a great deal of energy to maintaining its body temperature, which weakens its immune system and slows growth. Here are some ways to help calves withstand winter conditions.

Increase energy intake with milk. Calves need additional energy to compensate for the energy they expend keeping warm. The general recommendation is to increase energy intake by 50 per cent during the winter months.

Increase the number of feedings per day (e.g., from two to three). This is the most effective strategy, although it is not always easy to fit into a routine.

A "richer" milk

Should you increase the amount of milk replacer powder to provide a "richer" meal in winter? Absolutely NOT!!!! This practice will likely lead to dehydration through a process known as osmosis: the surplus powder creates an imbalance, and water is drawn from the calf to restore equilibrium. The calf will be thirstier, and dehydration will intensify the effects of the cold.

Always follow the manufacturer's recommendations for dilution.

	Summer (+20°C)	Winter (-15°C)
Requirements		
Dry matter (kg/d)	8.2	9.1
Net energy for maintenance (Mcal/d)	6.4	8.2
Net energy for gain (Mcal/d)	2.8	2.8
Ration (kg/d)		
Hay	6.5	6.5
Corn silage	3.1	3.6
Haylage (18% CP; 32% DM)	7.2	8.2
High-moisture corn	--	0.4
Soybean meal	0.6	0.7
Minerals	0.15	0.15

Increase the volume of milk per feeding by one or two litres—although it will still be difficult to achieve a 50 per cent increase in energy consumption. If bottle size is a limiting factor, nipple buckets are an alternative, but they must be covered to prevent rapid heat loss.

Increase the fat and protein content of the milk replacer to provide more energy. Talk to your supplier about the different milk replacers available. And come spring, don't forget to readjust the feeding regime.

Limit the environmental impact. In addition to sufficient energy, good insulation helps maximize calf growth. Follow these guidelines to lessen the effects of the cold:

- **Dry newborn calves thoroughly.** A dry coat is a better insulator than a wet one.
- **Provide four litres (three litres for small calves) of lukewarm colostrum (38°C) as soon as possible** after birth to boost the calf's immune system and generate heat.
- **Provide calves with blankets or jackets.** Make sure the calves are dry and that the jackets fit properly (you should be able to slide your hand between the jacket and the calf's leg). Keep the jackets on for three to four weeks, depending on the temperature and the calves' comfort level (avoid removing jackets during an intense cold spell). Make sure the jacket is not rubbing on the calf's navel, which could cause an infection. Always wash the jackets before using them on another calf to prevent the spread of disease.
- **Add heat lamps** so the calves can warm themselves up.



- **Make sure the milk is warm (38-40°C), and provide lukewarm water to reduce energy expenditure.** Follow the manufacturer's recommendations for water temperature when reconstituting the milk replacer. If the water is too hot, the proteins may be denatured.
- **Make sure that air speed does not exceed 1 km/h (60 ft./min) at calf level to avoid creating wind chill.** Insufficient air circulation can be just as critical, however, since moisture, ammonia and bacteria will accumulate in the air around the calf. Leave at least two to three feet of space between barn walls and calf pens, and keep the front and back of the pens open (wire mesh).
- **Add enough dry bedding so the calves' legs are covered when they are lying down** (90 per cent of their daily activity). Dry bedding insulates the calves from the cold ground or floor. Ample bedding also reduces bacterial contamination in the ambient air.

Growing heifers

Although less vulnerable than calves, heifers of all ages are likely to be bothered by extreme cold, particularly those housed in cold barns or outdoors. If no adjustments are made, their growth could be affected, leading to delayed breeding and calving, and higher rearing costs. The thermoneutral zone for heifers with a functionally developed rumen

is between 5 and 25°C. At that age, the fermentation process in the rumen generates heat, which helps offset the effects of the cold.

Cold weather increases the amount of energy required to maintain a heifer's body temperature, resulting in an increase in dry matter intake. The example below shows the effects of a temperature drop, from +20°C to -15°C, on an 11-month-old Holstein heifer weighing 335 kg, with a target weight gain of 900 g/d.

Feeding the summer ration throughout the winter months will seriously affect this heifer's growth. The average daily gain of 655 g/d is well below the target gain of 900 g/d. An additional 27 days will be required to reach 400 kg, the recommended weight for first breeding for Holsteins. Adjusting the ration during the winter to account for higher energy requirements will advance the age at first calving by a month.

Is this strategy cost-effective?

Adjusting the ration to better respond to heifer requirements is always profitable. The winter ration presented below may cost more per day, but because it leads to a higher weight gain, it is less costly in terms of \$/kg of gain, translating into an overall savings of \$38/heifer from the age of 11 months to breeding.

	Summer ration fed in winter	Adjusted winter ration
Weight at 11 months (kg)	335	335
Gain (g/d)	655	900
Weight gain (kg) required to reach 400 kg (breeding weight)	65	65
Number of days required to reach 400 kg	97	71
Cost of the ration (\$/d)	1.98	2.17
Cost per kg of gain (\$/kg)	3.02	2.32
Total cost until breeding	192.06	154.07
Savings resulting from feeding an adjusted winter ration	\$37.99/heifer	