FrontLine®
Information for Today's Agri-business Professional

Raising Healthy Calves in Cold Weather

Winter Feeding - why be concerned?

At 0°F (-18°C), a 90 lb. (41 kg) calf eating 1 lb. (454 g) of milk replacer powder daily (equal to 1 gallon or 3.8 liters of 12% solution) can "burn up" its entire body fat reserve (~3-4% of BW) within 18 hours! Bring on the groceries!

Undoubtedly, young calves (≤3 weeks of age) can be prone to negative effects of cold weather, including depressed immune function (increased risk of sickness), poor response to treatment, decreased growth performance, and possibly death. Adjusting the milk or milk replacer feeding program is a highly effective way to address the increasing energy needs of calves in cold weather. Cold weather calf nutrition programs should focus on calves less than 3 weeks old, as they are not eating adequate amounts of starter grain to meet their energy requirements, nor do they have adequate rumen development to capture enough energy from the calf starter they do consume.

What's cold to a calf?

A newborn calf's thermoneutral temperature is about 50-80°F (10-27°C), which means the calf's maintenance energy requirement is relatively constant within this temperature range. For a newborn calf, 50°F is the "lower critical temperature", or the temperature at which the calf's maintenance energy requirement begins to increase in order to maintain core body temperature. ***As more energy is used for maintenance, less is available for growth and immune function.*** By a month old, a calf's lower critical temperature is closer to 32°F (0°C) due to rumen development (greater internal heat production), grain intake, and greater internal fat stores.

Besides temperature, other variables that may affect the calf's response to cold stress are:

- Wind exposure – calves should be housed such that wind and drafts are not an issue
- Breed – smaller calves (e.g., Jersey) have higher maintenance requirements per unit of bodyweight
- Hair coat condition – if wet due to rain, snow, mud, manure
- Thickness of hair – an adaptation to cold temperatures
- Bedding type and condition – straw is superior to wood shavings during the winter

A 100 lb calf's maintenance energy requirement increases by 55% when temperatures drop from 68°F (20°C) to 32°F (0°C), and by 85% from 68°F to 10°F (-12°C). Let's assume we are feeding 100 lb calf: 1.25 lbs/day (10 oz. per 2 quarts total solution fed twice daily) of a 20-20 milk replacer supports 0.72 lbs of energy-allowable daily gain at 68°F, but at this feeding rate the calf will be in negative energy balance at 32°F (-0.09 Mcal/d) and 10°F (-0.65 Mcal/d) and predicted energy-allowable gain is also negative.

How much energy is in a milk replacer?

The most common milk replacer formulas fed today are 20-20 and 22-20 milk replacers, however, "winter formulas" (i.e., 20-22 or 20-24) are available. While fat concentration is an important determinant of energy density, simply increasing the fat percentage does not change the energy concentration of the milk replacer as much as one might think. As fat is increased in a milk replacer formula it displaces an equal percentage of carbohydrate (mainly lactose). Although fat contains 2.25 times more energy than lactose, displacing carbohydrate diminishes the net impact of each unit of fat. Increasing milk replacer feeding rate or adding a fat supplement to your current milk replacer solution is a more effective strategy than just increasing milk replacer fat percentage while keeping feeding rate constant.

Milk Products
The Milk Replacer Source®

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P.O. Box 150, Chilton, Wisconsin 53014, (920) 849-2348, Fax (920) 849-9014

What are the ways to increase energy intake during times of cold weather?

Be certain your conventional milk replacer (20-22% CP) contains at least 18% fat

Increase liquid feeding rate 25-50% (i.e., if you normally feed 4 quarts/day, feed 5 or 6 quarts daily), which can be accomplished by:

1. Giving an extra pint or quart of the normal milk replacer solution at AM & PM feedings.
2. Feeding an extra half or full bottle at noon
3. If limited by bottle size to 2 quarts/feeding, increase the milk replacer powder solid percentage to 18% (equal to 12 oz powder dissolved into 2 quarts total solution); then feed the normal liquid amount but keep water available for at least 30 minutes to an hour after feeding. This approach increases energy density of the milk replacer solution, but liquid feeding rate may need to be increased as well during extreme cold.

What about supplementing extra fat? (most energy supplements on the market are 7% CP, 60% fat)

Fat supplements add energy, but feeding over 4 oz/calf/day (0.25 lbs or 113 g) often results in reduced starter intake - counterproductive! Here are some guidelines for using a fat supplement:

- Adding 2 oz/feeding of a fat supplement that contains 60% fat to 10 oz of a 20% fat milk replacer (mixed into 2 quarts total solution, fed twice daily) is equivalent to feeding a milk replacer with 27% fat!
- Be aware of the maximum total solids percentage for a solution of 18%: [(2 oz fat supplement) + (10 oz milk replacer powder) in 2 quarts of total solution = 18% solids], don't add a fat supplement to a milk replacer solution that is already 18% solids (12 oz powder in 2 quarts).

How about accelerated growth programs?

Milk replacers used in accelerated growth programs typically do have lower fat percentages (15-18%), but they are designed to be fed at feeding rates – usually 2 lbs of powder or greater – that are much higher than conventional programs. A fat supplement may help increase energy intake provided solids percentage doesn't exceed 18%.

What is an example program?

The ideal feeding program for calves during cold weather is a subject of much debate. Obviously, the program will vary based on region, average wintertime temperatures, and the goals of the calf raiser. Here is an example program to consider:

- All winter – increase the energy intake of calves 3 weeks old or younger by: 1) feeding an extra pint or quart per feeding of the standard milk replacer solution, 2) increasing milk replacer solution solids percentage to 18%, or 3) adding 2 oz/feeding of a fat supplement while not exceeding 18% solids
- Extreme cold (≤10°F daytime temperature) – feed an extra pint or quart/feeding (depending on energy density of the solution) of the standard "all-winter mix" mentioned above, or add a 3rd feeding of an extra 1-2 quarts.

Continued

Management tips for cold weather calf raising:

- Any feeding change should be transitioned slowly to allow the digestive system to adapt.
- Consistency is the key for young calf nutrition. Don't constantly change the solids percentage of the milk replacer solution as that can lead to increased risk of digestive upsets such as nutritional scours or bloat.
- Offer water if at all possible as calves consume considerably more starter when water is available. Consider offering warm water for 30 minutes to an hour shortly after milk feeding, then remove any water that hasn't been consumed to avoid making ice.
- Consider using calf jackets for young calves to help lessen body heat loss to the environment.
- Evaluate indoor air quality – as barns get closed up for the winter airborne bacteria counts may build up due to lack of fresh air exchange and circulation. A good reference on this topic can be found here: University of Wisconsin - Basic Recommendations for Naturally Ventilated Calf Barns

  (http://svmweb.vetmed.wisc.edu/dms/fapm/fapmtools/9ventilation/Recommend_for_naturally_vent_calf_barns_2007.pdf)

Take-home messages:

- Cold stress can have negative effects on young calves if not managed properly.
- Many general management and nutritional strategies exist for decreasing the impact of cold weather.