Calves, Cold Weather And Calories

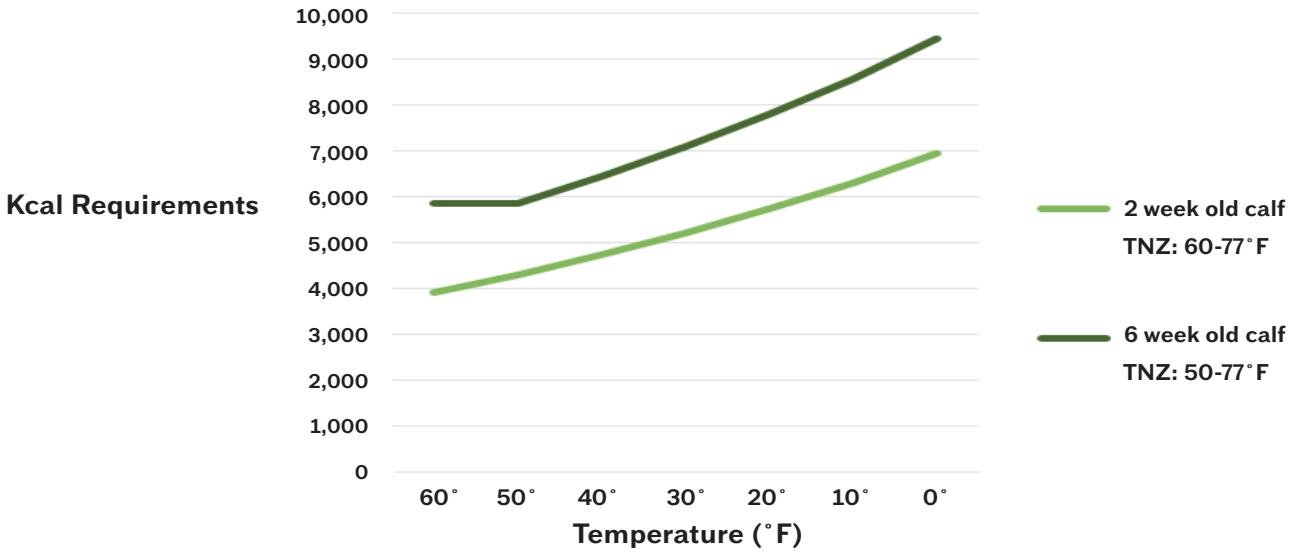
By Alex Austin, B.S.

It's no secret that calves can be more prone to health issues when temperatures decrease. We know that proper bedding, calf jackets and avoiding drafts are all important in keeping calves warm in the winter. An often overlooked solution is providing the calf with additional calories.

The need for energy increases as temperatures decrease. It is important to provide calves with enough caloric energy to meet all their needs. Before calves can use calories for immune support and growth, they must meet their maintenance needs. For this reason, calves not meeting energy needs will be more susceptible to disease and have a lower average daily gain. Calves are born with only 3 to 4% body fat.[1] A calf can easily go into a negative energy balance when exposed to cold temperatures. Negative energy balance happens when calves are not receiving enough energy in their diet, causing them to use fat reserves to meet their maintenance energy needs. Since calves are born with a low amount of body fat, they easily burn through what little fat reserves they have when temperatures get cold.

All animals have a thermoneutral zone. The thermoneutral zone (TNZ) is a temperature range in which the animal does not use any additional energy to maintain its normal core body temperature. A calf's normal body temperature is 100.0-102.5˚F and their (environmental) thermoneutral zone is between 50-78˚F.[2] When external, environmental temperatures are below 50˚F calves must burn calories to stay warm. On the opposite side, when their environmental temperature is above 78˚F, calves must burn calories to stay cool. For a young calf, when the temperature starts to drop below their thermoneutral zone, their maintenance energy requirements begin to increase to maintain their body temperature. For every 10˚F drop in temperature below a calf's thermoneutral zone, their calorie needs increase 10%.[2] As more energy is being used to maintain body temperature, less energy is available for immune support and growth. The graph below depicts the amount of calories required for calves to achieve a 1.5 lb. average daily gain based on age and outside, environmental temperature.[3] The calorie need shown here is based on a Holstein calf born weighing 90 lb. with a goal of doubling its birth weight by 56 days of age. It should be noted that calves greater than three weeks of age will begin to meet some of their caloric needs from consuming starter feed.

ENERGY REQUIREMENT OF CALVES WITH 1.5 LBS ADG GOAL



Source: [3] Hoffman, Patrick C., and Rhonda Plourd. *Raising Dairy Replacements.*1st ed., Midwest Plan Service, 2003

Two different feeding style approaches are used to deliver more calories to calves during cold weather.

Feeding Strategy #1: Increase calories to the calf by increasing the volume of milk or milk replacer being fed.

Feeding Strategy #2: Increase caloric density of the milk or milk replacer by adding additional fat. Some companies market a fat additive or a cold weather calf milk replacer with a 25:25 protein to fat ratio.

Both feeding strategies will provide a needed increase in calories but which method is most beneficial?

Fat additives, or increasing the fat percentage in the milk replacer, does increase the calories delivered to the calf, but research studies have shown this strategy is not the best approach. In a research study done by Keunen and Renaud, calves were fed whole milk formulated milk replacer with a 26% crude protein and 32% fat and a milk replacer that had a 26% crude protein and 17% fat. Calves fed the whole milk formulated milk replacer had a lower average daily gain and also had a decrease in calf feed starter intake compared to calves fed milk replacer with a higher protein to fat ratio.[4] Another study resulted in similar findings when feeding milk replacers with 14, 17, 20, and 23% fat (all with a consistent 27% crude protein level). *"Preweaning apparent digestibility of DM, organic matter, fat, nonfiber carbohydrates, Ca, and P and serum amylase concentration were linearly reduced as fat increased from 14 to 23%".*[5] In this study it was also found that starter intake was lower when the calf milk replacer was at 23% fat and best at 17% and 20% fat. The decrease in digestion and calf feed starter intake that was observed in the higher fat milk replacers (23%) resulted in a lower average daily gain.[5]

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> Feeding a fat additive or a high fat milk replacer as part of a cold-weather feeding program has been shown to reduce calves' overall digestion efficacy, starter intake and average daily gain.

Producers feeding increased fat to their calves in the winter will sacrifice calf performance. It is for this reason that Crystal Creek® recommends increasing the amount of milk or milk replacer fed rather than increasing fat content.

When increasing milk replacer fed, it should be noted that the total solids need to remain between 12-14% (not just adding/increasing the milk replacer powder). Adding more powder but not increasing the amount of water mixed with it will change the total solids concentration and can cause nutritional scours.

Nutritional scours are usually caused by inconsistent milk feeding. Calves with nutritional scours are more likely to develop secondary infectious scours (scours caused by pathogens) confirming the importance of feeding milk at consistent temperatures, times, amounts and correct total milk solid concentrations.

Making sure calves are receiving enough calories during cold weather is crucial. Keeping them warm, healthy and growing during the cold winter months is possible with the right strategy. Contact a Crystal Creek® representative to learn more.

1 Iowa State University Extension and Outreach Ryan Breuer, DVM, NW IA Dairy Specialist.

2 "Energize Your Calves This Winter." Dairy Herd Management, 17 Jan. 2011, www.dairyherd.com/article/energize-your-calves-winter.

3 Hoffman, Patrick C., and Rhonda Plourd. *Raising Dairy Replacements.* 1st ed., Midwest Plan Service, 2003.

4 Keunen, Aaron J. (June 24th 2018). *Performance effects of feeding Holstein calves a whole milk formulated milk replacer.* Presentation at ADSA Annual Meeting, Knoxville, Tennessee.

5 "Effects of Fat Concentration of a High-Protein Milk Replacer on Calf Performance." *Journal of Dairy Science*, vol. 92, no. 10, 2009, pp. 5147-5153., doi:10.3168/jds.2009-2245.

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