The Cow – Calf Manager

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Reducing Effects of Weather Stress in Cows and Calves

Weather stress on cattle was big news recently with the blizzards in South Dakota, but weather stress can occur during normal Idaho winters. Producers failing to adjust their management and nutrition program to the weather may have cows that calve in poor body condition, produce weak calves, and fail to breed back. Calves born into cold or wet weather conditions have reduced chances of survival.

Effects on Cows

Cold, wet snow, and wind alone or together can create weather stress on cows. Lower critical temperature (LCT) is the temperature below which an animal must burn extra energy to keep warm. The lower critical temperature for Idaho cows with heavy dry winter coats is about 18°, but the LCT of wet cows is 59° (Table 1). If the energy is not supplied as extra nutrition then cows will burn fat and lose weight to keep warm.

Cows that lose weight during late gestation and calve in low (BCS 4) to thin (BCS 2 or 3) body condition will have lower pregnancy rates this spring. Thin cows also produce weak calves that have a reduced chance of survival. Research from Colorado State indicates that first calf heifers calving in body condition score of 4 or less produce colostrum with reduced antibody levels. Calves from these undernourished heifers were more likely to become sick than calves from well-fed heifers.

Table 1. Lower Critical Temperature (LCT) for cattle depends on coat condition.

Coat Description	Lower Critical Temperature (°F)
Summer or wet	59°
Fall	45°
Winter	32°
Heavy winter	18°

From Marsten et al., 1998

An increase in windchill or wet weather can dramatically increase the cold stress on cows. Table 2 shows the windchill temperatures for cattle with dry winter coats, and Table 3 indicates the general average temperatures and windspeed in areas of Idaho during January, February, and March. Producers should use their monthly and weekly averages for their area of the state. Remember to use the average daily temperature not the average low temperature.

Table 2. Windchill factors for Cattle with Dry Winter Coat.

Wind Speed (mph)	Temperature (°F)										
	0	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**
Calm	0	5	10	15	20	25	30	35	40	45	50
5	-6	-1	3	8	13	18	23	28	33	38	43
10	-11	-6	-1	3	8	13	18	23	28	33	38
15	-15	-10	-5	0	4	9	14	19	24	29	34
20	-20	-15	-10	-5	0	4	9	14	19	24	29
25	-27	-22	-17	-12	-7	-2	2	7	12	17	22
30	-36	-31	-27	-21	-16	-11	-6	-1	3	8	13

Table 3. Average Daily Temperatures and Windspeeds during Winter in Idaho

	Central Mountains		**Snake River Plain**	
Month	**Temperature (°F)**	**Windspeed**	**Temperature (°F)**	**Windspeed**
January	15	2	25	9
February	20	3	32	9
March	29	4	40	10

Adapted from NOAA and various weather sources

Based on these averages, cows with heavy coats in the Central Mountains are experiencing mild cold stress in January and February; whereas, cows in the Snake River Plain are only stressed in January. However, extremely windy or snowy conditions can quickly change the amount of stress experienced by cattle; just as it did last winter in many parts of the Snake River Plain. What is the magnitude of cold stress in normal years? Windchill temperatures are 5°F to 20°F below LCT for cows with dry winter coats. For cows with wet coats, the windchill temperatures can easily be 20°F to 30°F below LCT.

Research from Kansas and Iowa indicates that maintenance energy requirements of the cow increase by 1% for each degree below the LCT (Table 4). For wet cows, the rule of thumb is 2% of every degree below LCT. So energy requirements of cows in January are may be 10 to 20% above what is expected. Periods with high winds, snow or rain increase energy requirements were 20 to 25% above expected.

So how does this change how producers should feed cows? In normal January and February conditions cows will need an additional 3 to 4 lbs of hay OR 2 to 2.5 lbs of grain. For all practical purposes, producers can feed more hay to compensate for weather stress. However, if hay is low in energy then 2 to 2.5 lbs of grain should be fed per cow. Hays that are low in protein will need supplemented with 1 to 2 lbs of protein. Cows that do not receive extra energy will lose 0.5 to 1 lb per day.

In extremely cold or wet conditions, cows will need to eat 7 to 8 more pounds of hay OR 4 to 5 lbs of grain or high energy by-products (i.e. distiller's grain). In most cases, cows will not be able to eat another 8 lbs of hay per day unless hay is very good quality. In these extreme weather cases, cows should be fed the additional grain during the period of cold stress. Cows that are not fed additional energy can lose 1.5 to 2 lbs per day during extreme conditions.

Table 4. Percentage of Increased Energy Needed per Degree of Temperature Below Lower Critical Temperature.

	Cow Weight (lbs)			
	1,000	**1,100**	**1,200**	**1,300**
Coat Type	Percentage increase in energy req. per degree below LCT			
Summer or wet	2.0	2.0	1.9	1.9
Fall	1.4	1.3	1.3	1.3
Winter	1.1	1.0	1.0	1.0
Heavy winter	0.7	0.7	0.6	0.6

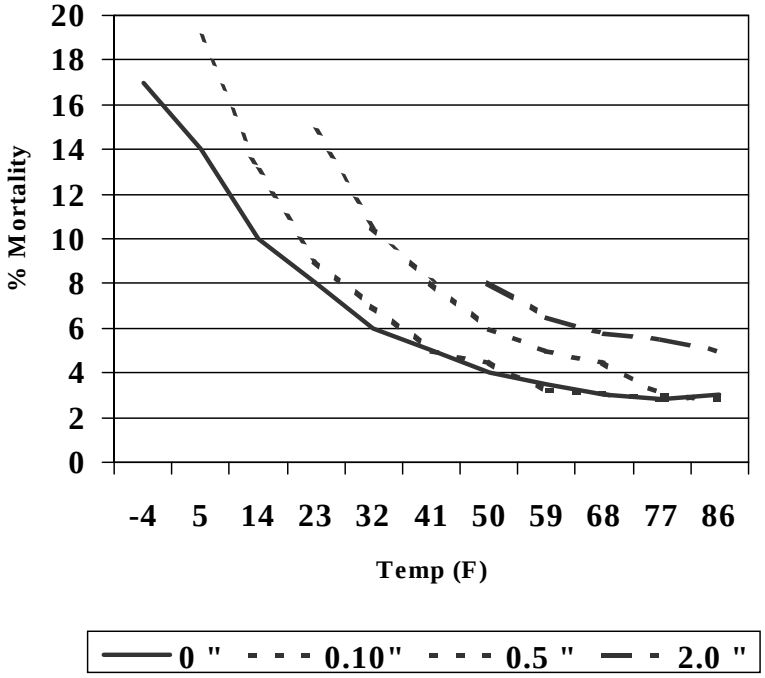
From Ames, Kansas State University

Even if cows have lost weight during extreme cold stress periods, it is not too late to increase energy intake so cows gain weight. Usually feeding 3 to 5 lbs of grain or high energy by-products for several weeks will help cows recover lost weight.

Effects on Calves

Cold stress on calves has more lethal consequences than cows. Newborn calves are the most susceptible cattle to cold stress. Calves less than 2 weeks old and sick calves are also at risk. The figure below illustrates the dramatic effect cold and precipitation have on calf survival. The lower critical temperature for calves is closer to 60°F with calf mortality increasing exponentially as temperatures move below 50°F. Add a little rain or snow and the LCT moves closer to 70°F. As little as 1/10 of an inch of rain on the day the calf is born can increase calf losses by 2 to 4 %.

Effects of Temperature and Precipitation on Calf Mortality



Adapted from Azzam et al., 1993

Strategies to reduce this stress start with keeping the cows well fed and in good body condition. Cows that calve in good body condition (BCS 5-6) have stronger calves with greater energy reserves. These cows are also less likely to run out of energy during calving and will be up drying off the calf sooner than underfed cows.

Extra diligence in checking cows for signs of calving during extreme weather conditions is also important. Calves need to nurse within 2 to 4 hours of birth or sooner during cold or wet conditions. Feeding cold-stressed calves 2 quarts of warm colostrum with an esophageal feeder (calf tube feeder) will help reduce calf loses, and give calves enough energy to nurse on their own.

A clean, well-drained calving location with windbreaks will help decrease the impacts of poor weather on calves. In some cases, cows and calves may need to be moved to sheds or barns for the first day or two of the calf's life. However, cows and calves should be moved to pastures as soon as the calf is strong and eating well, usually 1 to 2 days after calving. Due to health considerations, cows should be calved out on clean pastures whenever possible; calving in barns should be used only as needed.

Commercial calf blankets such as the Woolover® blanket can increase calf survivability and gain. Research from North Dakota State demonstrated a 0.3 lbs increase in average daily gain for beef calves wearing blankets for the first 3 weeks of life. Having enough blankets for all calves would be cost prohibitive, but putting these blankets on weak or chilled calves for a few days while they are in the calving or maternity barn may help calf survival.

Dealing with cold weather stress sometimes means more management than just "keeping their bellies full", but producers that stay on top of weather conditions and adjust their management accordingly will be rewarded with healthier calves and more pregnant cows.