



Chill Factor

Preparing your cattle for colder temperatures can save money and ensure good herd health.

by Heather Smith Thomas

As fall changes into winter and temperatures continue to drop, producers must remember that cattle need a chance to adjust to seasonal changes. Cattle grow longer, thicker hair for cooler temperatures, and along with a layer of fat under their hides, they have good insulation to reduce heat loss from the body and to help minimize cold stress.

Changing temperatures in the fall and shorter days and nights stimulate appetite, growth of winter hair and other physiological changes. All these changes contribute to an increase in heat production so the animal can withstand winter temperatures.

Weather is always a factor in cattle health. Stressed animals are more vulnerable to stress-related illnesses, so cattle need more care during cold or wet weather. Good management to prepare cattle for winter and to minimize weather stress can save money and reduce the incidence of illness or the loss of animals.

Cold weather brings additional challenges if it is accompanied by wind or wet weather. Charles Stoltenow, North Dakota State University Extension veterinarian, says it's important to provide windbreaks and bedding in those conditions. "It all comes down to maintaining body heat, and nothing saps this out of the animal faster than wet and wind," Stoltenow says. Once the hair gets wet and lies down flat rather than standing up fluffy with air spaces between the hairs, it loses its insulating quality, and it's very hard for the animal to keep warm.

"Many cattle died in the Atlas storm [when a lot of heavy, wet snow got dumped in South Dakota, Montana and Wyoming in early October, 2013]," Stoltenow says. "Some got buried in drifts, but many died simply because they got wet, and then the weather turned cold. They could not keep themselves warm enough, even though the temperatures were not bitterly cold."

If producers have wet conditions during winter, they also need to think about providing enough bedding to enable cattle to have a dry place to lie down so the cattle are not losing as much body heat. "Cattle are stressed if they are standing hunched up," he explains. "By contrast, if you have bedding for those cattle and a place to lie down, they are more comfortable, and tend to stay healthier."

Young calves

Cold stress in calves has more lethal consequences than in cows, says John Hall, University of Idaho Extension beef cattle specialist. "Newborn calves are most at risk, but calves less than two weeks of age and sick calves may also be at risk in severely cold weather," he says. Ranchers who calve in January and February are usually prepared for cold stress, but it can also affect calves born during late winter storms or an early spring downpour of rain.

Russ Daly, South Dakota State University Extension veterinarian and associate professor, says newborn calves can handle fairly cold temperatures once they are dry and have the insulating effect of a dry hair coat. Colostrum is also important — after a calf has suckled, it has the energy to keep warm.

"A calf is born with less than a day's worth of energy in the form of brown fat to metabolize for body heat," Daly says. "If the calf doesn't get colostrum, once that brown fat is gone there is no energy available to maintain or regulate body heat. Colostrum is





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high in fat, with two to three times more fat than regular milk. This really makes a difference in getting the calf up and going.” A newborn calf that has had a full feeding of colostrum can stay warmer in cold weather.

Hall explains the lower critical temperature (LCT) is less for calves than cows, especially if the animals are wet. “The LCT for calves is close to 60 degrees. With a little rain or snow, the LCT moves closer to 70 degrees. As little as 1/10th inch of rain on the day the calf is born can increase calf losses by 2 to 4%,” Hall says.

Daly says young calves dry off quickly on a dry day if the cow cleans them immediately after birth.

“Sometimes in cold weather you have to help with that process,” Daly explains. “It’s crucial to have bedding for baby calves. There’s not much body mass in a small calf; these babies chill quicker than a large animal. Bedding helps insulate the calf, making a separation between the calf and frozen ground, snow, cold concrete, etc. This is important in helping calves stay warm.”

Commercial calf blankets can increase survivability in young calves during extremely cold weather. Hall says, “Putting blankets on weak or chilled calves for a few days while they are in the barn may help calf survival.”

Frostbite can be an issue in calves born during cold weather. Extremities suffer first. “Most people who calve early calve inside, but occasionally a calf freezes its ears,” says Daly. “After the calf is born and dry there is much less risk for frostbite, unless a calf is suffering from a debilitating condition such as



Windbreaks and temporary shelters can be helpful for protecting calves with good nutrition from the cold.

scours and dehydration,” says Daly. In that situation, there is less blood flow to extremities.

If the newborn has frozen ears, tail or feet, care should be taken to not damage the tissues when trying to warm the calf. “If you suspect frostbite, remove the calf from cold conditions but don’t warm the ears or feet too quickly,” Daly says. “Use warm water and towels, not hot water, and don’t rub the area too much or you may further damage the tissue.”

Older calves

Larger calves have more blood flow to extremities and are more adept at getting out of the wind. “If shelters are used, they should be periodically moved to clean locations, with clean bedding,” Daly explains.

As calves get older, windbreaks and temporary shelter can be helpful, along with good nutrition. If they have adequate nutrition and are in good body condition they have more insulation against the cold and enough energy to keep warm.

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Lower Critical Temperature depends on coat condition	
Coat description	Lower critical temperature (°F)
Summer or wet	59
Fall	45
Winter	32
Heavy winter	18

Source: Courtesy of John Hall

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

Source: Courtesy of John Hall



Research from Kansas and Iowa indicate maintenance energy requirements of a cow increase by 1% for each degree below her lower critical temperature.

“We generally focus on protein, but energy for calves is crucial,” Daly says. “Weaning-age calves need a high-energy diet. People here on the northern plains also recognize that these animals will increase their feed intake in response to the cold.”

Effects on cows

LCT for cattle depends on their hair coat. A heavy winter coat provides much more insulation than summer hair, and the animals won't need extra energy to keep warm until the temperature drops below that point. “The LCT for Idaho cows with heavy dry winter coats is about 18 degrees, but the LCT of wet cows is 59 degrees,” Hall says.

If the cows are not receiving extra nutrition to provide the needed body heat, they burn fat to keep warm and lose weight. Weight loss during late gestation will result in lower pregnancy rates the next breeding season.

“Thin cows produce weaker calves, with reduced chance of survival,” Hall says. “Research from Colorado State University showed that first-calf heifers in body condition score 4 or less have reduced antibody levels in their colostrum, and their calves are more likely to become sick.”

An increase in windchill or wet weather can dramatically increase cold stress on cows. Hall says research from Kansas and Iowa indicates maintenance energy requirements of a cow increase by 1% for each degree below her LCT. For wet cows the rule of thumb is 2% for each degree below LCT. For cows with wet coats, windchill temperature may easily be 20 to 30% below LCT. Periods with high winds, snow or rain will dramatically increase energy requirements.

Daly says, “We must be sure we're providing the additional feed they need.” For animals with a functional rumen — older calves and adult cattle — having adequate protein to utilize the energy is important. Microbes in the rumen break down the roughage in forage into useable energy, but they need protein to do this.

During a cold winter, stockmen can usually help cattle maintain themselves, but prolonged cold makes it challenging to feed calves enough for weight gain. “For mature animals, the best way to help them respond to cold stress is to feed enough energy and protein — especially as cows get into later gestation — to make sure the fetus isn't shortchanged,” Daly explains. If any animal is putting all its resources into keeping warm, something will be shortchanged.

Hall says during normal January and February weather in Idaho, cows need an additional 3 to 4 lb. of hay or 2 to 2.5 lb. of grain per day. “Generally, you can just feed more hay to compensate for weather stress, but hay that is low in protein will need supplemented with 1 to 2 lb. of protein. Cows that don't receive adequate nutrition to stay warm will lose 0.5 to 1 lb. of weight per day,” he says.

In extremely cold or wet conditions, cows need to eat 7 to 8 more lb. of hay or 4 to 5 lb. of grain or high energy byproducts, or they may lose 1.5 to 2 lb. of weight per day.

Windbreaks and bedding can help cattle maintain body temperature without as much extra feed and prevent frostbitten ears, teats or scrotal frostbite in bulls. Cows may suffer frostbitten teats even before they calve if they can't get out of the wind. Cows should be monitored for teat damage and possible scabbing and scarring. **HW**



Scrotal frostbite in bulls

Cold weather and/or windchill can cause testicle damage and semen deterioration, but wind is the greatest danger. George Perry, professor and beef reproduction specialist, South Dakota State University, says frostbite can affect sperm production. “Spermatogenesis in a bull is 61 days. Anything that affects sperm production will take 61 days to clear the system, with normal cells and healthy sperm after the bull recovers,” he explains. If damage was severe it may take several months before the bull is fully recovered, and in some cases he may be permanently infertile.

This possibility is a good reason to have breeding soundness exams performed each year before bulls are turned out. Just because a bull was fine last year doesn't mean he will be fertile this year.

“There's a difference between a subfertile and an infertile bull,” he explains. “The infertile ones you realize there's a problem because you get no calves. A subfertile bull costs you money because you think he's doing the job. You get a few calves — but not nearly as many as there should be.”

If damage is severe enough, the bull will be permanently infertile. “If something happens to the blood flow to the testes, this can impair function. This would be similar to severe freezing on a human finger or any other extremity,” Perry says.

“After suffering frostbite, if the bull doesn't have normal sperm at the time he's checked, you might give him another 60 days and check him again.” **HW**