

Bluestem Breezes  
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### **Cold Stress: What is Cold to a Cow?**

This week begins my return to full-time status here in Extension. While I have enjoyed maternity leave, I am thrilled to be back and look forward to returning to offering you weekly *Bluestem Breezes*!

We seem to compare cattle and humans in our house far too often. We discuss thermoneutral zone on occasion; normally it's about the time my ultra-cold feet hit the sheets. Thermoneutral zone, in layman's terms, is that temperature range where we are comfortable and capable of maintaining our body systems without spending any extra energy. Person B and I decided mine is about 70-75 degrees, on a good day.

While we joke about this when referring to humans, it is a serious aspect of the cattle business. So, with such a single-digit morning to begin the week, it seems appropriate to address the cold weather's impact on your cowherd. This week, K-State's Beef Systems Specialist Justin Waggoner (many of you met him at the 2014 Ranch and Range Tour) discusses cold stress:

As we all know there is no typical weather pattern in Kansas. We experienced a mild fall this year and thus far winter has been interesting in the Sunflower State with record high temperatures followed by brutally cold and windy days. The downside is that we don't know what might happen in the New Year, as we approach what are typically the coldest months of the year. Most cattle producers know and appreciate that cold weather increases nutrient requirements. However, the obvious questions that come to mind are "What is cold to cow?" and "What increases (energy, protein etc.) and by how much?"

Cattle are most comfortable within the thermoneutral zone when temperatures are neither too warm nor too cold. During the winter months cattle experience cold stress anytime the effective ambient temperature, which takes into account wind chill, humidity, etc., drops below the lower critical temperature. The lower critical temperature is influenced by both environmental and animal factors including hair coat and tissue insulation (body condition). The table below lists the estimated lower critical temperatures of cattle in good body condition with different hair coats. In wet conditions cattle can begin experiencing cold stress at 59°F, which would be a relatively mild winter day. However, if cattle have time to develop a sufficient winter coat the estimated lower critical temperature under dry conditions is 18°F.

Estimated Lower Critical Temperatures for Beef Cattle  
(Coat Condition - Critical Temperature)

Wet or summer coat - 59°F

Dry fall coat - 45°F

Dry winter coat - 32°F

Dry heavy winter coat - 18°F

Cold stress increases maintenance energy requirements but does not impact protein, mineral or vitamin requirements. The general rule of thumb (for a cow in good body condition, BCS = 5 or greater) is to increase the energy density of the ration by 1% for each degree (Fahrenheit) below the lower critical temperature. The classic response to cold stress in confinement situations is an increase in voluntary intake. However, it has been documented that grazing beef cows may spend less time grazing as temperatures decline below freezing, which reduces forage intake (Adams et al., 1986) and makes the challenge of meeting the cow's nutrient requirements even greater. In many cases feeding a greater amount of low-quality hay may not provide sufficient energy. Therefore providing additional energy by feeding a relatively higher-quality hay or grain may be required.

More information on cold stress and nutrition may be found in "Beef Cow Nutrition Guide", Publication #C-735 which may be accessed online at <http://www.ksre.ksu.edu/bookstore/pubs/C735.pdf>.

For additional information, stop by the Extension Office (215 Kansas, Courthouse, Alma; kamayer@ksu.edu; 765-3821). For Bluestem Breezes archives, check out [wabaunsee.ksu.edu](http://wabaunsee.ksu.edu).