

Cold Stress in Beef Cattle

By: Clinton Laffin

Winter is almost here and most cattle producers appreciate that cold weather increases nutrient requirements. However, what increases and by how much?

Cattle are most comfortable within the thermoneutral zone when temperatures are neither too warm nor cold. The upper and lower boundaries of the thermoneutral zone are referred to as the upper and lower critical temperature. 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 cattle maintained in extensive environments (native range, wheat pasture, corn stalks) 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 will replace grazed forages but may not provide sufficient energy. Therefore, providing additional energy by feeding a higher-quality hay or fiber-based supplement (DDGS, Corn gluten feed, or Soybean Hulls) may be required.