

## Are Your Sheep Warm Enough?

by Melanie Barkley, PSU Extension Service

Baby, it's cold outside! Different parts of the country have experienced some really frigid temperatures over the past month. This has sparked some interesting conversations related to feeding sheep to account for the added energy required to keep warm. Some of the discussions centered around increasing grain or hay, which led me to this article about ruminant digestion and how sheep keep themselves warm.

Understanding how sheep digest feed starts with a look at the four stomach compartments. The rumen is the part where bacteria break down the fibrous portions of the forages that sheep consume. This includes both cellulose and hemicellulose. These feeds then move to the reticulum where the animal regurgitates the food to do a more thorough job of chewing, also known as chewing the cud. The next compartment is the omasum, which absorbs much of the water used in the fermentation process. The final compartment is the abomasum where the enzymes and acids break down the microbes and any remaining feed components into nutrient forms that the animal can absorb.

While in the first two compartments, feed goes through a fermentation process to digest fiber, starch, sugars and proteins into volatile fatty acids (VFAs) and microbial protein. The animal absorbs the VFAs in the rumen. These VFAs are considered the major energy source for a ruminant.

Sheep produce heat from two methods: through the fermentation process and from nutrient metabolism in body tissues. These both

help sheep maintain body temperature, or in other words keep warm, during cold weather. The key is that sheep need to consume enough energy to support their energy needs for maintenance as well as heat production. Just how much additional energy do sheep require during extreme cold? Well, it depends on several factors. Two factors relate to body condition and fleece length. Sheep Production Handbook mentions a critical low temperature of 50 degrees for a freshly shorn sheep, while the critical low temperature for a sheep with 2 1/2" of fleece length is 28

degrees. We also know that sheep in good body condition are better able to withstand colder temperatures than sheep in poor body condition.

Environmental factors can also influence critical temperatures. Obviously, the actual temperature is one factor. Wind speed is another factor: the higher the wind speed, the more additional energy a sheep requires to maintain body temperature. According to Sheep Production Handbook "High-quality hay may be the preferred nutrient source, since it has a larger heat increment (heat produced in the body from digestive processes) than concentrates." Hay has the added advantage of being easier to feed in remote areas. However, as ewes get closer to lambing, their energy needs may increase such that they require more easily digested feeds in order to meet their added energy requirement. Thus, grain becomes the feed of choice in late gestation.

Why is this important? The first reason that comes to mind for most producers relates to animal welfare. All producers seek to manage sheep such that the sheep are comfortable. A very good second reason relates to health and vigor in newborn lambs.

Much early research in this area is still applicable today. Alexander (1962) (Energy metabolism in the starved

newborn lamb. Australian J. Agr. Res. 13(1): 144-164) suggests that "a low summit metabolism in lambs may be associated with poor prenatal nutrition. This may cause mortality since the lamb must increase heat production if it is to survive cold weather shortly after birth". "Adult sheep have been observed to be so underfed that their body temperatures fell 4 degrees C when



**Free choice high quality forage is an excellent way to increase energy in a ration as well as provide added heat production needed to keep sheep warm in inclement weather.**

the surrounding temperature dropped from 35 degrees C to 20 degrees C" (Graham 1964).

The next time the temperatures drop during the winter, remember that your sheep require additional amounts of energy in order to keep warm. How much additional energy is difficult to determine. However, free choice high-quality hay can certainly assist the sheep with maintaining body temperatures and is likely the feed of choice. For those ewes nearing the end of gestation, consider increasing their grain supplementation.