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Preventing Heat Stress in Small Ruminants

by Dr. Jerusha Lay, DVM

Heat stress can have many negative effects on not only the health of livestock but also the production. The major production losses we see come in the form of decreased weight gain, lowered milk production, increased susceptibility to diseases and, most commonly, decreased fertility. During times of extreme heat, animals tend to spend more time laying around and less time up grazing; in combination, metabolic changes create less energy available for growth and milk

production. With rams and bucks, heat can be very detrimental to their ability to settle females as breeding season begins in the fall.

In dairy animals, it is very common to see lower milk production in times of heat waves or warmer weather. This can be related to decreased appetites and increased stress due to higher temperatures. If operating a small ruminant dairy, care should be taken to keep the does as comfortable as possible and provide free access to a clean water source. Young growing kids/lambs may also see decreased growth rates during the summer months.

Heat may have the most effects on bucks and rams. Toward the end of summer, as temperatures are often still high, the day begins to become shorter and breeding seasons begin. The effects on breeding are twofold: First, the increased temperatures will decrease overall libido in rams. When the animals are hot and stressed, they have less desire to breed the females. The other issue is that it can decrease semen quality. In livestock, sperm development depends on temperatures lower than the normal body temperature of animals. Normally, the testicles' location outside the abdomen

allows the testicles to be cooler than the core body temp; however, when temperatures outside the body are higher than that of the animal, the testicles cannot sufficiently cool enough for sperm development. Since the process of sperm development takes 6 weeks, it may take up to 2 months for semen quality to improve even after the temperatures decrease.

All warm-blooded animals have a “zone of thermal neutrality.” While it may sound complicated, it is basically the range in temperatures where the animal does not have to use any extra energy or calories to keep itself warm or keep itself cool. It’s the temperature range in which they are comfortable. In the wintertime, animals will use energy to keep their bodies warm; when the temperatures become higher, they must also use energy to keep themselves cool. For example, panting or rapid breathing will require more energy because all the chest muscles contract more frequently. In areas of the country like Kentucky, hot days are often accompanied by a high humidity, which makes the potential for heat stress more likely. As we look at the risk of heat stress, we often refer to the heat index. The heat index also factors in humidity, wind speed and solar radiation and is more accurate in accessing the overall weather conditions.

Within livestock, many other factors make some animals more vulnerable than others. First is the species; luckily, sheep and goats are more heat tolerant than species such as cattle or alpacas, with goats being more tolerant than sheep. Within each species, some breeds are able to withstand higher temperatures than others. For example, within sheep, the hair breeds of sheep seem to be more heat tolerant than wool sheep. Several things contribute to these differences. Animals with horns, long floppy or loose skin may dissipate or give off excessive heat through horns or skin. As the animal’s blood flows through the extremities closer to the skin surface, it gives a chance for the blood to be cooled before being returned to the animal’s core. Overly conditioned or fat animals are at an increased risk of heat stress. Animals with dark-colored hair coats are more susceptible to the sun’s radiation because the darker colors will absorb heat, so breeds of animals that have white hair coats do better in hotter temperatures.

Within sheep, the hair breeds such as katahdin tend to be less vulnerable to heat stress than the wool breeds. When we think of wool, our first thought is of clothing that keeps us warm in the winter; however, wool

acts as an insulator and in extreme heat may also act to block heat away from the animal, just as an insulated cup keeps cool fluids cold or warm fluids warm. Wool sheep need at least 1 inch of wool for protection from the sun; sheep should be shorn in the spring to allow enough time for growth before the heat of summertime.

All the factors that make certain animals more or less susceptible may influence decisions on what breeds to buy depending on the location and climate that your farm is in. Regardless of the species of animal and location, there are several things we can do to help prevent heat stress, especially if your farm has animals that are more vulnerable and you’re located in areas where high humidity commonly increases the heat index.

Always have a clean water source available for animals. During times of heat, water intake may be twice that of what they consume during cooler temperatures. With no other choice, animals will drink water that is either hot from the sun or dirty from manure or algae, but it is not appealing to them. Research suggests that under certain conditions small ruminants may consume 10 times more water during times of extreme heat versus when it is cold. If possible, water troughs should be placed in shaded locations or changed frequently to prevent the temperature of the water from becoming too warm. Self-replenishing water troughs may also be used. Water troughs should be cleaned frequently to encourage animals to drink when needed. If in large fields, water troughs in multiple locations may help by making access easier when the animals are grazing.

The sun’s radiation is a major source of heat. Having a shaded area allows animals to have a place to get out of the direct sunlight. This is especially helpful for the breeds with dark-colored hair coats. Shade sources can be in the form of trees, sheds, barns or shade clothes. If animals are allowed access into barns or sheds, make sure that proper ventilation is provided. While shade does block the direct sunlight, metal barns can also become very hot if the doors aren’t open or without ventilation or fans. Mist sprayers to put on fans may be beneficial but can make it more difficult to clean barns if bedding is wet; in dairy operations, mist sprayers could potentially increase the risk of mastitis if the area is not cleaned often enough. Trees in pastures for shade in many cases are adequate; however, it can create sanitation issues if manure and mud build up in one

location where the animals are spending large amounts of time. Shade clothes are large durable clothes that are put on frames that may be able to be moved from location to location.

Sheep and goats are ruminants, which means they use fermentation to digest forages such as grass and hay. The process of fermentation creates heat (think of how warm compost piles become), so low-quality forage diets can also be an internal heat source of ruminants. For high-producing animals in hot weather, it may be beneficial to provide a high-quality roughage source and/or supplement with more digestible feedstuffs such as grain. You may want to discuss summertime rations with your local nutritionist. Also, avoid getting animals over-conditioned, as it may also decrease their tolerance to heat.

For rams and bucks, it can be frustrating if temperatures in early fall are still unfavorable for breeding season. You may consider waiting longer before putting the males in for breeding. For rams with wool scrotums, some producers will shear wool off the scrotum to decrease temperatures. Another option may be keeping the sires in a cool barn or under fans during the daytime and turning them out with the females in the evenings when conditions are cooler.

If your animals become ill from extreme heat stress, symptoms may include panting, open-mouth breathing, or weakness. Consult with your herd/flock veterinarian if you suspect that an animal is suffering from heat stress or for further information on prevention.

References:

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