

# Heat Stress and Sheep

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The heat and humidity of summer can be some of the most stressful of times for the sheep and their shepherd, second only to the stresses of the lambing season. The most dangerous times are when the temperatures suddenly soar (with no gradual increase in temperature). This does not allow the sheep to adapt to progressively warmer weather. The danger comes when the temperatures stay in the 80-90-100 degree range, there is high humidity and it does not cool off at night.

The summer of 2005 proved to be the most difficult summer heat that we have faced thus far with our sheep, and in spite of the techniques we employed to make our sheep as comfortable as possible, we still lost a few of them that summer. That season really put our flock to the test for heat hardiness. Of the sheep that died, they died of differing causes, but I believe all died because of the very difficult and unusually high temperatures and humidity that season.

Sheep who are overheated can be prone to bloating. Even when they are acclimated to their pastures, an unrelenting heat wave can cause such stress that a sheep will bloat. We lost one ewe in late June on a 95 degree day; she came in from the pasture to the cool barn around noon, but her rumen was so distended with bloat that even with treating her for the bloat, we lost her within an hour.

We lost one ewe lamb to sudden onset pneumonia. She had been fine the night before and the next morning I found her listless and running a high fever. Administering antibiotics and other supportive therapy did not pull her out of it. Sheep cool themselves through respiration and when they are breathing heavily all day long to try to regulate their internal heat, this can put them into mechanical pneumonia. Once a sheep's lungs are stressed this way, it doesn't take long for the opportunistic bacteria to multiply and overtake the stressed animal.

Be sure to keep a close eye on ram lambs during summer's heat to make sure they are urinating normally. That summer we experienced our first case of "pizzle rot" in a ram lamb (caused by too much protein), and another ram developed "urinary calculii." If you see a ram lamb trying to urinate and he appears to be hunched and in pain, be sure to examine him to make sure he is not suffering from either urinary calculii or pizzle rot.

Coincidentally, a fellow shepherdess (in another state) had a couple of ram lambs go down in the same time frame with symptoms of both pizzle rot and calculii in different lambs. Following are excerpts from a series of emails as she and I were trying to figure out what was going wrong. What had us most puzzled was that we were dealing with intact rams who were not on a grain diet. In the literature both of these problems are

associated with wethers who are fed grain, not intact rams who are on pasture and/or hay (be aware that ewes can also suffer from both problems, but it usually doesn't lead to death because the urethra is larger in a ewe).

“I just talked to my vet. Her theory is that maybe with the hot summer, the sheep were depleting the salt in their systems faster, and they were overeating the mineral mix just to get the salt, and that is what has screwed their systems up. I'm glad I received your email before I talked to her, so I told her some of the things that you found out. She said that unless I have a stone to send in to the lab, it's hard to treat it in a specific way. So generally, she suggested taking away the sheep mineral and giving them salt only. I asked about using the ammonium chloride and she thought that might help. She suggested that next summer I offer the sheep the loose mineral mix and salt separately. One (web)site stated that they saw the formation of stones in ruminants fed diets rich in plants containing oxalates, estrogens, and silica. Alfalfa hay is an example of a plant that contains silica, which is what you were feeding. I looked for other plants containing silica, and found Horsetail Fern. Our new pasture had horsetail fern in it, which the sheep ate. Before we let them onto it, I checked and read that it wasn't typically a problem for sheep (as in poisoning). But I wonder about the silica? I read an article on pastures and drought, and the increased need for sodium. It really made sense to keep both the loose minerals and loose salt available for your sheep.”

After doing more reading I discovered that both problems can be caused by alfalfa hay. I realized that the problems we had here showed up after we received delivery of 2nd cutting alfalfa/grass hay mix (in August) and I had begun putting out this hay into the feeders to supplement the pastures. To prevent this problem recurring here this summer, I will not provide hay this rich to the younger rams, as the ones who were affected were the smaller, late born lambs of the season. My theory is that because they were younger/smaller, that their urethras were smaller and not able to handle passing of the stones, or the extra protein of the fresh cut hay.

All sheep must have certain basics met in order to survive summer safely and in good health. The same goes for all other animals as well as people too. That same hot summer claimed two chickens and a peahen. I will share here some things that we do to manage our flock during the hottest parts of the summer.

**WATER:** It may seem redundant to mention water, but providing FRESH, CLEAN, COLD water during the summer is very important. You can freeze ice in plastic bottles to place in the water troughs to help keep the water colder, longer. Be sure that your sheep always have access to fresh, cold water at all times, especially during the summer.

**Apple Cider Vinegar** - we believe in the health benefits of using apple cider vinegar and we do add it to our flock's water trough. The rate is 1/4 gallon of cider vinegar to 30 gallons of water. As an immune system “boost” we will drench the sheep with a cider vinegar/garlic infusion mixed 50/50 with water at the rate of about 15-20 cc per sheep, each time we happen to be handling them, such as deworming or trimming hooves, et.

Soluble Vitamin E - we purchase this product from Pipestone Veterinary Supply and keep a dilute mixture ready to add to the drinking water. During very unrelenting hot days I add it almost daily to their water.

SELENIUM - Many areas of the country are deficient in selenium in the soils. Be sure to work with your veterinarian to make sure your sheep have enough selenium in their minerals. If they don't, Bo-SE (an injectable vitamin E/selenium) can be used to help supply adequate selenium. Without adequate selenium, fast growing lambs can develop White Muscle Disease.

MINERALS: Be sure that your sheep have access to dry, free choice, loose minerals (the minerals should be accessible at all times by the sheep, but where the mineral cannot get soaked by rain). After the problems we had with the rams last year however, we may be providing some loose salt also during the worse heat of the summer. I found that the best mineral feeders are the free standing ones that Sydell produces. I use the ones that hold 25 lbs. These have a cover and rotate in the wind, which keeps the minerals from getting wet if it rains. If it's particularly humid the minerals may form a hard surface, which is easily removed.

KELP: We started using kelp about six years ago. The minerals and micronutrients contained in kelp are very helpful in the sheep's diet (and is also good for fowl and other livestock). We saw a dramatic improvement in fleece softness and sheen, especially when compared to fleeces I bought from farms that did not use kelp. Some shepherds put the kelp out free choice separate from the minerals. I usually mix mine 50/50 with the loose minerals and then also throw add some soybean meal at a lower ratio for some added protein.

PROTEIN BLOCKS: When parasites are especially problematic due to wetter than normal conditions, combined with temperatures that fluctuate between hot and cold, we have found the sheep's protein needs are higher. We have started providing sheep mineral/protein blocks in addition to the loose minerals mentioned above (be sure to read the label and see that it does not contain copper, which is becoming more difficult to find). An excess of internal parasites can cause anemia in sheep and in order to combat that, the red blood cells need to be built up. Providing extra, readily available protein with the extra minerals is important. Because we cannot always depend upon the pasture grasses to provide consistent good levels of protein due to fluctuating weather, this is a way to help supplement their protein needs, especially during the stress of summer heat. However, based on our experience with pizzle rot last summer, which is due to too much protein in the urine, I am rethinking whether or not to use protein blocks; best scenario would be not to provide these to the rams and ram lambs.

SHELTER: It is imperative that your sheep have shelter from the hot sun. If you do not have stands of trees that offer shade, there must be some sort of lean-to or building for them to go into for relief from the sun and heat. During the summer's heat we run several large industrial fans in the barn, and I often find the sheep clustered in front of the fans, cooling off.

**FOOD:** Sheep will often eat less if they are too hot. If they are standing inside the barn or shelter to avoid heat, then make sure there is free choice hay near them so they can eat while seeking shade. If they go to pasture, make sure they can go out early in the morning to graze when it is cooler and that they can go back out in the evening or even allow them to graze at night. Lambs' health and wool growth will both be compromised during the hottest parts of the summer, so making sure the sheep still consume enough energy to maintain their own weight and wool growth is important. This may entail some management changes on the part of the shepherd to help them through the worse heat of summer. Also be sure to watch late-born lambs as they may not be getting enough milk from their dams who may be grazing less and lying around more. It has seemed that lambs born later in the season - as it gets hotter - seem to have a slower rate of growth than lambs born earlier in the spring when it is cooler.

**HORNS:** I am told that sheep with horns handle heat better than polled sheep because the horns help to dissipate the heat.

**GENETICS:** Just as individual people handle heat differently (some people seem to thrive in hot weather while others of us wilt) so will sheep have differing levels of heat tolerance. If you live in a hot climate, seek out shepherds in your area to see how they manage their flocks during the heat. What breeds are being raised in your area? If possible buy your starter stock from flocks that have acclimated to similar climates. Sheep born and raised in a particular climate will be more adaptable to that climate than bringing in stock from a different part of the country that may have a vastly different climate. If you have sheep showing signs of heat stress, or if you lose sheep during the heat, realize it is partly nature's way of culling. Eventually you will have a flock that is very hardy for your climate as your more hardy animals survive the climate that you are raising them in. Ron Parker in "The Sheep Book" discusses a program wherein a Professor Leroy Boyd of Mississippi State University attempted to develop sheep that would be adapted to the hot and humid conditions of the deep South. He noted that "animals with greater development in the loin and rump, thicker skin, and deep rather than wide bodies tended to have a greater heat tolerance." (pg 87) If this is true, then continuing to improve your sheeps' conformation for these traits may help create a more heat tolerant flock.

If you are unsure whether your chosen breed of sheep will do well in a warmer climate, consider buying a wether or two and seeing how they do for a season before you invest in breeding stock.

**DEWORMING:** Any time that your sheep are stressed, their immune system will be compromised. Be sure to stay on top of parasite overload by making sure your flock is dewormed appropriately. Keeping your sheep in top condition during the summer, with a high plane of nutrition, will allow them to tolerate parasite loads better. Even though it may look like your sheep are grazing all day, be sure to understand and learn about pastures and to evaluate what a productive, healthy pasture is. We keep free choice hay in our feeders all summer, in addition to their pasture grazing. This insures that the sheep

can eat at any time and also helps to conserve our pastures when grass growth slows down during the heat of summer.

**SHEARING:** Shearing should be scheduled to the climate the sheep are being raised in as well as for the fleece growth of the breed you are raising. It is very important that sheep be sheared at some point during the spring before summer heat begins. We schedule shearing for mid-March, about 2-4 weeks before lambing begins. This will help them get through the summer months. As autumn approaches, and cooler weather with it, they will begin to grow their wool at a rapid rate. We then shear again in mid-October, which is our prime “clip.” (Our breed of sheep should be shorn twice a year; other breeds only require once a year shearings). If you raise sheep in a warmer climate, you may not see the heaviest, longer and more luxurious fleece yield of the sheep that are raised in cooler, dryer parts of the country. During extreme heat waves some shepherds will shear their sheep yet again. However, one shepherdess had her sheep shorn mid-summer because of the heat, and unfortunately the stress of being sheared in the extreme heat caused one ewe to walk away and fall over dead.

As I write this it is early May and we have already had temperatures close to 80 degrees. I am hoping that we are not going to face another extremely hot summer. The only good thing that I feel came out of dealing with the past summer’s heat stress is that the sheep who survived it in good shape are proving to be hardy and heat tolerant. With the midwest’s propensity to progressively hotter and more humid summers, as time goes on, hopefully our flock will become more and more heat tolerant.

**Disclaimer:** Please remember that I am not a veterinarian. I am only relaying what has worked for us on our farm in our climate. Please consult your own veterinarian for advice. Many of the strategies that we employ have been gained through discussions with fellow shepherds and veterinarians from around the country, reading, and of course, from our sheep, who are our best teachers.