



## Handling Heat

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The widespread use of air-conditioning has made life much better for people, but little has changed for our livestock. Summer is still a high stress time and your livestock can have serious issues when the thermometer climbs. Males are more affected by extreme heat than females; fat animals more than thin animals; and older animals more than young. Animals with any compromise of the immune or respiratory systems are at serious risk. Some advance planning and observation of your livestock can make a big difference in their comfort and in your profits.

Unlike horses and humans, cattle, sheep, goats, and pigs do not sweat, at least not in amounts sufficient to be beneficial for body cooling. They maintain their body temperature at or near a constant, normal, level by panting. This moves air across the highly vascular and moist mucous membranes of the mouth, tongue, and nasal passages, thus cooling the blood passing through these tissues much like the water in an engine is cooled as it passes through the radiator. For this to occur they need a lower environmental humidity and adequate water for evaporation on the surface of the membranes. If livestock are not able to maintain their normal body temperature they start to show signs of reproductive compromise first, followed by heat exhaustion at about 105 F, and cell breakdown and death at about 107 F.

In extremely hot weather it is normal for body temperatures to rise moderately above normal during the heat of the day and to cool off at night when environmental temperatures are less. It takes several hours, however for this to occur. Although air temperatures often decline in the late afternoon or evening the animal's body temperature may not fully recover its normal level until 2 or 3 o'clock in the morning after several hours of cooler temperatures. Because of this, taking the temperature to determine if an animal is sick is best done early in the morning to get a true indication. If you must "work" or handle livestock during hot weather, do it as early as possible in the morning and be finished before their body temperature starts to rise. The digestion of grain generates a lot of heat so in hot weather it is best not to feed high levels of grain and to feed grain early in the morning.

In hot weather the first thing to suffer in your herd is reproductive efficiency. Reproductive problems can range from poor fertility to no fertility. In some males high core body temperature causes suppression of libido, but that is only the beginning of the problems. In male mammals the testicles cannot produce or maintain sperm cells at body temperature. The scrotum is designed to keep the testicles several degrees cooler than the body's core temperature by means of special muscles that lower the testicles away from the body as air temperature rises and pull them back closer as air temperature decreases. Also, the pampiniform plexus is a heat exchange unit that cools the blood



entering the testicles. When these mechanisms are overcome by the environmental temperature problems occur. Sperm cell formation, or spermatogenesis, starts to decrease when the testicular temperature rises as little as 1/2 degree and sperm cells start to die if the testicular temperature rises as much as 2 degrees above optimum. This can be significant because if extremely hot weather causes the death or deformation of sperm in the male system it can take as long as 6 weeks for new cells to be formed and mature. This can result in a temporary sterility. Research has shown that in females, high body temperatures can result in lowered conception rates and embryonic death. Excessive heat affects embryo survival and fetal development most markedly during the first 21 to 30 days after breeding.

Charles Dudley Warner, a friend of Mark Twain, is famous for saying “Everyone complains about the weather, but no one does anything about it.” So what can we do? The simplest answer is shade and the simplest shade is the shade tree. Closed in spaces are not very helpful because they restrict air movement. If you use a barn for shade, utilize a breezeway or fans. If natural shade is not available a little creativity and simple materials can provide permanent or temporary shade. On an extremely hot day a shade structure can cause a drop of 12 to 15 degrees F in environmental temperature. The accompanying photos were taken at the same time, one in the sun and one under a temporary shade. Sprinklers and misters are often used for cooling. Wetting the ground, can help to reduce temperature by evaporative cooling and also helps to keep dust irritation down.

A good rule of thumb for drinking water is if you wouldn't drink it and enjoy it, neither will your livestock! In cool temperatures mature livestock drink about 10% of their body weight per day in water. This is about 1.25 gallon per day for each 100 lbs of body weight. In summer this doubles or even triples in order to meet body cooling requirements. Cleaning water tanks and supplying fresh water becomes even more critical. The question is not “does my animal drink”, but “does my animal drink enough?” Summertime temperatures also necessitate more frequent tank cleaning because as temperature rises, bacteria and algae grow much faster. Fencing animals out of ponds and providing drinking access only keeps the water clean. Ponds surrounded by vegetation stay significantly cooler than those surrounded by bare ground and this enhances water consumption. Young animals have even more critical requirements. They drink smaller amounts at a time, have a higher metabolic rate, and are more likely to be finicky drinkers.

Excessive heat can affect your livestock and your profits in several ways. Hot animals have poor appetite and growing animals that don't eat don't grow. Females that are trying to pick up body condition prior to breeding season or calving need to eat to capacity as well. While air conditioning is not practical, adequate shade, plenty of clean water, and a moratorium on handling in the afternoon and evening can limit health problems and help ensure good reproduction rates in your herd.