



Heat Stress in Sheep

Heat stress is generally not a problem under normal conditions in the British climate, but when it does occur it can pose a significant risk to the welfare of sheep causing suffering to the animals involved rendering them more susceptible to other disease conditions and can also impact flock productivity and profitability.

Managing animals during heat-load events requires proactive planning. A few simple strategies and husbandry practices can be followed to reduce the impacts of high temperatures on animals. Please remember that if you are in doubt about a problem, you should always seek immediate expert advice from your veterinary practitioner.

What is heat stress?

The body temperature of sheep is a fine balance between body heat production and body heat loss. If a sheep is unable to achieve and maintain this balance, they are unable to lose sufficient heat which in turn increases their body temperature resulting in heat stress.

Factors that can influence heat stress

A complex range of climatic and animal factors influence susceptibility to heat stress, a combination of factors can lead to increased risk.

Climatic Influences

Factor	Influence on Heat Stress
Ambient temperature	Temperatures close to or above the sheep's body temperature will limit its ability to lose heat via convective cooling.
Relative humidity	Increased humidity reduces an animal's ability to lose heat through evaporation by panting.
Solar radiation	Heat produced by solar radiation can significantly exceed the metabolic heat produced by the animal.
Wind speed	Heat stress is increased in calm air conditions because convective heat loss is dramatically decreased.
Night-time temperature	High night-time temperatures prevent loss of heat gained during the day, increasing the risk of heat stress.

Animal Factors

Factor	Influence on Heat Stress
Fleece	Adequate protection from heat is only conferred when the fleece length reaches 30–40mm. In sheep with shorter wool, radiant energy easily passes through to the skin.
Breed	Breeds originating from cool regions, with compact bodies, short legs and necks, and small ears, are more susceptible to heat stress.
Age	Lambs are very susceptible to heat stress because of their high metabolic heat production, higher normal respiration rate, large surface area relative to their mass and limited fleece length.
Pregnancy	The increase in metabolic heat production during late gestation can predispose ewes to increased heat stress.

When does heat stress occur in sheep?

Typically, when sheep are outdoors, they can normally maintain their body temperature within a safe range without any problems due to their fleece, not only does it insulate the sheep's body to help maintain constant body temperature, but it also provides protection from temperature extremes, both hot and cold.

A sheep with a thick fleece is relatively immune to changes in ambient temperature due to the thick insulating layer surrounding its body. However, if body heat production is suddenly increased it can have difficulty in losing sufficient heat to maintain a constant body temperature and may become heat stressed. On the other hand, a sheep which has been shorn is susceptible to extremes of climatic temperature and can easily become either cold stressed or heat stressed if exposed to extreme weather conditions and will need access to shade/shelters.

Management plays an important role in safeguarding the welfare of sheep in various circumstances. Flock management procedures such as housing, gathering, shearing, and transporting can all increase vulnerability to heat stress.

Assessment

We know that sheep can be exposed to a range of conditions and management procedures that can influence heat load, therefore recognising the early signs of heat stress is critical.

Two components that need to be closely monitored are:

- Climatic conditions/weather forecasts – has the Met Office forecasted a period of high temperatures or a heatwave?
- Panting assessment and sheep behaviour

Panting assessment

An easy visual sign that sheep are becoming heat stressed is a change in breathing. The degree of panting indicates the extent of heat stress suffering if the animal's body temperature continues to rise it will eventually collapse and die.

- Mild heat stress – sheep may show mild to fast panting, but with a closed mouth. Rapid chest movements will be easily observable.
- Moderate heat stress – sheep show fast panting, progressing to mouth slightly open, but the tongue is not extended beyond the lips. Rapid chest movements will be easily observable.
- Severe heat stress – rapid, open-mouth panting will be seen, with the neck extended, head held up and tongue extended.

- Extreme heat stress – open-mouth panting will be seen, with the tongue fully extended and the head often lowered. Deeper breathing will occur, with a reduction in the panting rate for short periods.

Sheep behaviour

The second assessment method is observing changes in sheep behaviour. Sheep will change or adapt their behaviour to maximise heat loss. These changes can be used together with panting assessment to assess the impact of heat on the animals.

Signs that may be seen in sheep as they are progressively exposed to heat conditions include:

- Shade seeking
- Increased standing
- Decreased food intake
- Crowding of water troughs
- Increased water intake
- Bunching to seek shade from other sheep
- Changes to, or increased, respiratory rate
- Immobility or staggering

Heat stress management strategies

In buildings

- Provide the correct conditions for housed ewes. This includes good ventilation without draughts, adequate space allowance and dry bedding to avoid excessive humidity and do not over-stock.
- If the building is prone to heating, consider winter shearing or reduce the stocking rate.
- Provide fresh, clean water always.
- Feeding housed ewes outdoors should be avoided as some days they will get wet leading to high humidity in the building. Do not house wet sheep. Ensure adequate drainage and bedding to keep the lying area dry.
- When sheep are gathered/transported for housing, allow plenty of time so that they are not stressed and panting when put into their pens. Do not house wet, muddy sheep. Allow them to dry off and settle first.
- Ewes which are housed in winter in full fleece are frequently under some heat stress, therefore be vigilant.

Outdoors

- Provide shade and easily accessible clean, water for all animals.
- Maximise shade and water for ewes in late gestation, and for stock under 1 year old as these animals are particularly vulnerable to heat stress.
- Know which fields provide the most shade and better air flow and move your animals there early. Graze fields without shade before hot conditions develop.
- Use low-stress stock handling techniques, to reduce physical heat. If it is necessary to gather or move the flock during periods of hot weather, only do so in the early morning or evening and do not drive hard.
- If your rams are working during the summer consider resting them indoors during the hottest part of the day as heat stress reduces libido and can cause sperm damage, reducing fertility which will affect flock production.

During shearing

- When shearing in hot weather, ewes should be brought into the shearing area in small batches, allowing a period of rest before shearing.

- Newly shorn sheep must have access to shade/shelter as they no longer have the protection of the fleece.
- It is important that winter-shorn ewes are not exposed to draughts or rain. They should not be turned out within two months of shearing, and only then in suitable weather conditions with adequate shelter.

During transportation

- Only load animals at the cooler times of day. Do not overstock and ensure adequate head room.
- Keep the vehicle moving as much as possible and do not park in direct sunlight.

Heatwave Strategies

- Ensure that there is unlimited access to clean, cool water for all animals.
- Minimise handling and disturbance of animals.
- Undertake essential activities at the coolest times of the day – usually early in the morning or later in the evening.
- Do not load or transport stock.
- Highly important, if affected animals show no signs of improvement, seek immediate expert advice.