VETS AGAINST LIVE EXPORT

INFORMATION SHEET

WHAT IS HEAT STRESS IN SHEEP?

In understanding heat stress, two definitions are important:

1. Wet bulb temperature (WBT) – the lowest temperature which can be reached under current ambient conditions by the evaporation of water only. The WBT depends on both heat and humidity and is always lower than the dry bulb temperature (the temperatures given on weather bulletins) unless the humidity is 100% and no evaporation possible. Sheep can often cope with high dry bulb temperatures but not with high WBT.

2. Heat stress threshold – the maximum WBT at which the animal's body temperature can be controlled using available mechanisms of heat loss. Body temperature increase indicates that an animal is exposed to an unacceptable heat load. In the field, it is more practical to assess respiratory rate than body temperature.

The normal respiratory rate (RR) of a sheep is less than 40 breaths per minute (bpm). In hot conditions, rapid shallow panting (RR>40 bpm) will occur. On land, this is seen when sheep are mustered or yarded on a hot day for example and this is often adequate to allow the sheep to cope with the increased heat load, usually only applied over short periods.

However, once the heat stress threshold in sheep is exceeded, their core body temperature increases and sustained "high RR" panting occurs. The panting rate increases up to about 200-250 breaths per minute before they transition to a "slow" deep panting with open mouth breathing in a desperate effort to try and drag air into their lungs. As heat stress progresses further, sheep start gasping, collapse and then die.

Heat stress onboard live export ships has some additional complications. There is no active cooling onboard and under the Middle East conditions extreme WBTs are often maintained at night. This greatly increases the risk of catastrophic heat stress events as the animals have no chance to cool. In addition, sheep with heat stress have a massively increased water intake which results in increased urination. Onboard a ship with high humidity, urine cannot evaporate so the sheep, struggling to survive, also become bogged in their own faeces.

Heat stress isn't just about hot sheep – it is about sheep doing all they can both behaviourally and physiologically to survive.

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For more information read the scientific article written by VALE: Caulfied et al (2014) Heat stress: A major contributor to poor animal welfare associated with long-haul live export voyages. *The Veterinary Journal* 199:223-228.