

tips & tools

ANIMAL HEALTH AND WELFARE

HW02



Wetting cattle to alleviate heat stress on ships

Alleviating the detrimental effects of heat stress on non-acclimated cattle, in particular *Bos taurus* cattle, is paramount for animal welfare and improving animal performance on long-haul voyages.

Improving the efficiency of ventilation on livestock ships, the application of risk management tools and the wetting of heat stressed cattle can all contribute to minimising the detrimental effects of hyperthermia (heat stress) in cattle.

The application of water on to heat stressed cattle, in association with adequate pen air turnover (a measure of ventilation performance expressed in metres per hour), provides immediate relief to cattle, reducing the possibility of death and improving animal welfare.

What is high heat load?

Heat load is the sum of the heat generated by an animal which is affected by the ambient temperature and humidity, the heat produced from the animal's basic metabolic rate, the breed, age, weight, fat score, coat and level of production, the energy level of the diet and the level of activity by the animal.

Excessive heat load normally stresses the animal and is expressed by changes to the animal's normal body parameters, like core body temperature, and indirectly through changes to the animal's behaviour.



Key benefits

- Improve the comfort of cattle on long-haul voyages
- Reduce the risk of heat related sickness and mortality
- Minimise cattle liveweight loss

Identifying high heat load

High heat load can be identified through monitoring the microclimate of the vessel or conducting a visual appraisal of the animal itself.

Microclimate

The microclimate on ships is measured using the wet bulb temperature (see the break-out box on page 2 for a definition). The critical wet bulb temperature threshold for *Bos taurus* cattle is in the range 28–30°C. Above this threshold cattle may have difficulty in reducing their heat load. This critical wet bulb temperature, referred to as the heat stress threshold, is influenced by factors such as breed, body weight, body condition, coat length and prior exposure to high wet bulb temperatures.

Wet bulb temperature

The ambient air temperature quoted on weather reports is the 'dry bulb temperature'. It is called dry bulb because it is measured with a standard thermometer whose bulb is not wet.

Placing a damp wick over the thermometer bulb affects the reading through evaporation of moisture from the surface, giving a 'wet bulb temperature'.

Wet bulb temperature is the preferred index of environmental conditions for livestock on ships. It can be directly recorded or calculated if the dry bulb temperature and relative humidity are known.



Visual indicators

A visual appraisal is the best method for determining an animal's heat load status. Animal factors are more important than the climatic variables for assessing heat load status.

Heat load status can be categorised as mild, moderate or severe heat stress. These categories are defined below.

Clinical signs of heat stress

- **Mild heat stress:**
Drooling, increased respiration rate of 80–100 breaths per minute (bpm).
- **Moderate heat stress:**
Drooling, respiration rate of 100–120 bpm and occasional open mouth panting (panting score 1–2.5; see Table 1 for a description of panting scores).

At this stage **wetting should be considered** to prevent development of severe heat stress.
- **Severe heat stress:**
Drooling, respiration rate greater than 120 bpm, open mouth panting and tongue out (panting score greater than 2.5). Cattle will also have an agitated appearance, hunched stance and will often have their heads down.

At this stage, **wetting should be undertaken**.

Wetting should commence when more than 5% of cattle are showing clinical signs of severe heat stress.

Cattle can move from mild heat stress to severe heat stress very quickly, eg in less than 30 minutes to a few hours. Therefore if cattle are detected with mild heat stress extra vigilance is needed, ie check cattle at least every 30 minutes. If mild heat stress is detected ensure that wetting facilities are ready to go if the situation worsens.

Table 1: Panting scores for observed breathing condition

| Panting score | Breathing condition |
|---------------|---|
| 0 | No panting |
| 1 | Slight panting, mouth closed, no drool or foam |
| 2 | Fast panting, drool or foam present |
| 2.5 | As for 2 but with occasional open mouth |
| 3 | Open mouth + some drooling, neck extended and head usually up |
| 3.5 | As for 3 but with tongue out slightly |
| 4 | Open mouth, tongue out + drooling, neck extended and head up |
| 4.5 | As for 4 but head held down |



Guidelines for wetting

- Either sea or fresh water can be used.
- Water should be applied to the head and back of cattle, and enough water needs to be applied to cattle so that it is beginning to run off their backs and down their sides.
- Do not apply cold water (ie less than 25°C) to the head of cattle with severe heat stress as the cold shock may kill them.
- Do not use high pressure water jets on cattle as this may cause injury. If high-pressure hoses are to be used, the nozzle should be set to fan the water.
- The duration of the wetting will depend on the volume from the hose, water pressure and the pen stocking density.
- At all times ensure that there is normal air movement for the pen or deck – if the ventilation system fails **do not wet cattle**.
- It is recommended that cattle with severe heat stress are not moved.

Frequency of water application

- Under moderate heat stress, short duration wettings of less than 1 minute per 6 head of cattle can be effective for up to 24 hours.

- Under severe heat stress the frequency of wetting is dependent on the cattle. Short duration wetting may become less effective, therefore more than one wetting will be required in a 24 hour period.
- Once wetting has commenced it will need to be continued until severe heat stress symptoms are no longer exhibited.

Bedding

Ideally bedding should be removed prior to wetting cattle. If bedding material becomes wet and sloppy it will need to be removed immediately.

Impact of wetting on the microclimate

Wetting of cattle on ship will only have minor short-term effects on the microclimate, provided ventilation systems are fully operational.

Effect of wetting on cattle

Wetting has a positive impact on cattle comfort and welfare by reducing respiration rate, panting scores and rectal temperature.





For more information

This *Tip & Tool* is based on the research results from project LIVE.219 *Wetting cattle to alleviate heat stress on ships* November 2003. A copy of this report can be obtained by contacting LiveCorp or MLA.

Acknowledgment

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