

To whom it may concern,

Thank you for the opportunity to comment on the Australian Standards for the Export of Livestock.

While I appreciate that changes recommended by the committee will make a difference to the conditions and suffering of livestock, I do request that a ban is legislated and implemented over a 2-5 year period.

60 minutes showed once again that this industry is unwilling or unable to deliver on community expected standards. In addition there is limited regulation and often cruel deaths awaiting animals after a long and exhausting overseas voyage. In the period prior to an implemented ban I request that the guidelines are updated to include the below.

Sourcing and preparation

- No cattle should be exported from southern ports across the equator during the high risk May to October period. Conditions that are ideal for maintenance of normal body temperature; typically ~20–25°C and low humidity (Stockman 2006). *B. indicus* cattle generally sweat more than *B. taurus* cattle (Gaughan et al. 1999; Johnson 1970), and therefore have an increased capacity for evaporative heat loss from the body surface. Sheep also sweat, but because of the wool covering of their skin, even if the wool is short, evaporation of the sweat can be less effective at cooling the animal (Stockman et al. 2011a).

When ambient temperature exceeds animal surface temperature, conduction and convection become routes of heat gain. Evaporation from the skin is much more efficient the shorter the hair coat, and if the surroundings are cooler and drier than the body. In situations of high ambient humidity, less water evaporates, and this method of heat loss also loses effectiveness (Beatty et al. 2006). Panting is of particular importance when the humidity increases along with the temperature. Evaporation of water requires a diffusion gradient for loss of heat energy in the water vapour to the surrounding air, but in very humid conditions this gradient is reduced, and therefore evaporative heat loss from the skin is reduced. Sweating in woolled sheep is much less effective due to the presence of the wool cover. With an elevation in environmental temperature to 36 C, a high proportion of heat is dissipated via the ears and legs. When the physiological mechanisms of the animal fail to remove the excessive heat load, the internal body temperature increases.

At the same time, such exposure of sheep to increased heat load evokes a series of drastic changes in the biological functions, which include a decrease in feed intake efficiency and utilisation, disturbances in water, protein, energy and mineral balances, enzymatic reactions, hormonal secretions and blood metabolites (Stockman 2006). CCR experiment demonstrated considerable physiological changes in Merino sheep in response to hot and humid conditions typical of live export. Changes observed included increased core temperature, respiratory rate, panting score and associated changes in blood gas variables. Awassi sheep subjected to the same conditions demonstrated an ability to maintain homeostasis under the same environmental conditions, with few changes in core temperature or alteration in blood gas variables (Stockman 2006). Srikandakumar et al. (2003) showed similar results to those from the Awassi sheep for Omani sheep.

There are pronounced differences in capacity to withstand heat load between cattle breeds (Gaughan et al. 2010). This difference is most dramatic between *B. taurus* and *B. indicus* cattle, with *B. indicus* animals showing higher heat tolerance (Adams and Thornber 2008; Bortolussi et al. 2005; Gaughan et al. 2010). *B. indicus* cattle generally sweat more than *B. taurus* cattle (Gaughan et al. 1999; Johnson 1970), and therefore have an increased capacity for evaporative heat loss from the body surface (Beatty et al. 2006). This disparity has manifested dramatically in extreme heat load events in live export, whereby mortality rates due to heat load in *B. taurus* and *B. indicus* animals under identical conditions have been 38.4% and 0%, respectively (More et al. 2003).

When the DBT is at or above body temperature, the only method for heat loss will be via evaporation, and if the air already contains much moisture, further saturation of the air will be limited, meaning heat loss is diminished. If there is good ventilation, the hot and saturated air is blown away from the animals, and therefore there is capacity for both convective and further evaporative cooling. Thus, even if the air is as hot as or hotter than the animal, if the humidity is low, evaporative cooling can still occur (Maunsell Australia 2004).

First phase panting consists of rapid, shallow respiration, and occurs when core temperature is, on average, 0.5°C above normal, progressing to second phase or open-mouth panting when core temperature is, on average, 1°C above normal. Stockman (2006) reported that summer acclimatised sheep started showing clinical signs including open-mouth panting when core body temperature increased over 0.5°C above normal, while winter acclimatised sheep did not start open-mouth panted until they were 1°C above normal. Progression to open-mouth panting with the tongue out, in both sheep and cattle, will be accompanied by significant changes in fluid, electrolyte, and acid-base balance, and indicates an animal which is severely clinically compromised.

Excessive exposure to heat can be fatal. Livestock mortality due to heat load can occur under many conditions including in feedlots and during transport. Dangerous heat load may occur for transported livestock in any area experienced high sustained environmental temperatures. This may occur in many areas of Australia, particularly northern Australia during the southern hemisphere summer (Blackshaw and Blackshaw 1994) and has been documented for exported sheep and cattle during the northern hemisphere summer, at ports in the Persian Gulf (More et al. 2003; Stinson 2008).

- I agree that sheep need time to rest prior to boarding the ship. This period should be increased to two days to ensure sheep have time to recover from the stress of shearing and transport.

Space allowance

- I support the recommendation that the ASEL adopt a science-based approach for calculating on-board stocking densities. Space must be sufficient to allow animals to lie down simultaneously, access food and water, and decrease the chance of heat stress. These are basic requirements that must be met to ensure we do not see yet another failure of the live export industry resulting in mass deaths on voyage. Heat stress risk assessment (HSRA)

- I support the recommendation that the HSRA model be applied to all voyages crossing the equator, with risk setting relating to heat stress not mortality. The current setting used is a 2% probability of a 5%

mortality due to heat stress. This setting was chosen by industry. It has recently been suggested that the risk setting should be replaced by the likelihood of an animal experiencing heat stress, not mortality, in order to achieve improved welfare outcomes (McCarthy 2018).

Voyage reporting

- Voyage reporting requirements must be updated to include overall welfare rather than just mortality.

Reporting must be accurate and transparent with no opportunity for exporters to avoid reporting negative outcomes. It has been argued by authors of several reviews that animal welfare monitoring should not be solely restricted to addressing mortalities. Rather, it has been proposed that animal welfare management should be based on ensuring the physical and mental welfare needs of exported animals are addressed throughout the entire journey (Foster and Overall 2014; Wickham et al. 2017; Australian Veterinary Association 2018). Indeed, McCarthy (2018) recently recommended that the industry moves away from using mortality as a measure to a focus on measures that reflect the welfare of the animal. Recording on-board mortality and non-compliance with ASEL (Commonwealth of Australia 2011) only indicates problems retrospectively (after any events) and does not identify areas where conditions or management decisions could be modified, or welfare improved prospectively. Thus, identifying potential issues earlier may potentially avoid negative incidents and provide solutions through pre-emptive modifications and adaptive management.

Onboard management

- Ammonia levels must be tracked with steps implemented to limit harmful levels. Ammonia is a highly irritating alkaline gas that has been associated with adverse effects on sheep on transport vessels (Costa et al. 2003; Tudor et al. 2003; Phillips et al. 2010; Phillips et al. 2012a, 2012b; Pines and Phillips 2011, 2013; Zhang et al. 2017; Zhang et al. 2018; Zhang and Phillips 2018b). Ammonia accumulates in livestock accommodation, which adversely affects feed intake, inflames mucosal tissue and causes coughing, sneezing and lacrimation (tears to flow from the eyes; Zhang et al. 2018). Ammonia can be produced in livestock bedding when organic matter ferments. An early study recommended the monitoring of ammonia levels on-board live export ships, and that ammonia levels below 20 ppm (parts per million) should be the target during live cattle export (Tudor et al. 2003). A subsequent study used on-board monitoring and animal experimentation to recommend that the maximum exposure limit for sheep and cattle should be 30 ppm (Phillips 2007).

Onboard personnel

- I support the recommendation that the number of stock handlers should be in proportion to the number of animals loaded, but the requirement should be for least one accredited stockperson per 2,500 head of cattle and 10,000 head of sheep (not 3,000 cattle and 30,000 sheep), to allow effective monitoring of stock.

- Veterinary supervision is necessary on every live export voyage, no matter its duration. Only AAVs are trained to diagnose disease and other health problems and implement appropriate treatment. The standards should require an independently appointed AAV to accompany all live export consignments. All journeys should also include an independent auditor with ultimate responsibility for reporting requirements.

Species permitted to be exported

- Sheep - the evidence is clear that, regardless of any proposed changes the standards, sheep will suffer heat stress during voyages to the Middle East in the May-October period. I urge you to ensure that the standards explicitly exclude the long-haul export of sheep during this period.

- Feral buffalo - the Draft Report indicates there are significant and serious animal welfare and mortality issues with the export of feral buffalo. It appears that these problems have gone unidentified and unaddressed because of the absence of any independent or veterinary oversight. Feral buffalo are completely unused to human contact and clearly do not tolerate handling and transport without serious welfare compromise. These problems carry over into importing countries to the point of slaughter. I urge you to amend the standards to prohibit the live export of feral buffalo.

- Feral goats, camels and deer – none of these species have been exported by sea in the past three years or more. Previous extreme mortality events have indicated that goats cope poorly at sea and similar concerns exist for deer and feral camels. There is insufficient expertise and infrastructure in the live export supply chain to manage these species at sea and such export is unnecessary when air transport is available as a safer cost-effective option. I urge you to amend the standards to prohibit the live export of feral goats, camels and deer.