



Australian Government

Australian Quarantine and Inspection Service

Investigation into the reportable sheep mortality level, on the voyage from Fremantle to Kuwait, Bahrain, Doha and Jebel Ali, July 2006

1. Purpose

To report on the investigation into the cause of the mortalities in this consignment of sheep, and to make recommendations with the objective of reducing the likelihood of a recurrence.

2. Summary

For the consignment of 20,701 sheep exported, 449 sheep died which corresponds to a mortality rate of 2.17%. The vessel was loaded with a total of 72,210 sheep and had an overall mortality rate of 1.97%.

The cause of the high number of mortalities of this consignment of sheep was investigated. The likely contributing cause was heat stress.

3. Background

The investigation into the mortality was carried out by reviewing the following information:

1. Veterinarian's end of voyage report.
2. Report from AQIS Audit of the exporter.

The vessel carried horses, sheep and cattle consignments sourced from four different exporting companies (see Table 1).

Table 1: Chronology of Events Summary Table

| Action | Dates |
|---|--------------|
| Sheep, horses and cattle loaded at Portland | 29 June 2006 |
| Sheep loaded Fremantle | 4 July 2006 |
| Sheep unloaded Kuwait | 20 July 2006 |
| Sheep unloaded Bahrain | 22 July 2006 |
| Sheep unloaded Doha | 23 July 2006 |
| Sheep unloaded Jebel Ali | 24 July 2006 |

Table 2: Chronology of Events

| Dates | Action | Voyage Death Total |
|--------------|------------------------------|---------------------------|
| 21 June 2006 | NOI and CRMP submitted | |
| 28 June 2006 | NOI and CRMP approved | |
| 4 July 2006 | 20701 sheep loaded Fremantle | |

| | | |
|--------------|--|-----|
| 5 July 2006 | 1 sheep deaths | 1 |
| 6 July 2006 | 1 sheep death | 2 |
| 7 July 2006 | 4 sheep death | 6 |
| 8 July 2006 | 2 sheep death | 8 |
| 9 July 2006 | 3 sheep death | 11 |
| 10 July 2006 | 7 sheep death | 18 |
| 11 July 2006 | 4 sheep death | 22 |
| 12 July 2006 | 5 sheep death | 27 |
| 13 July 2006 | 9 sheep death | 36 |
| 14 July 2006 | 1 sheep death | 37 |
| 15 July 2006 | 6 sheep death | 43 |
| 16 July 2006 | 11 sheep death | 54 |
| 17 July 2006 | 167 sheep death | 221 |
| 18 July 2006 | 104 sheep death | 325 |
| 19 July 2006 | 83 sheep death | 408 |
| 20 July 2006 | 6 sheep death | 414 |
| 20 July 2006 | sheep unloaded Kuwait | |
| 21 July 2006 | 10 sheep deaths | 424 |
| 22 July 2006 | 8 sheep deaths | 432 |
| 23 July 2006 | 17 sheep deaths | 449 |
| 24 July 2006 | sheep unloaded Jebel Ali | |
| 24 July 2006 | Notice of a notifiable incident received by AQIS | |

4. Loading

4.1 Journey

The climatic condition for the sheep decks for this consignment are included in Table 3.

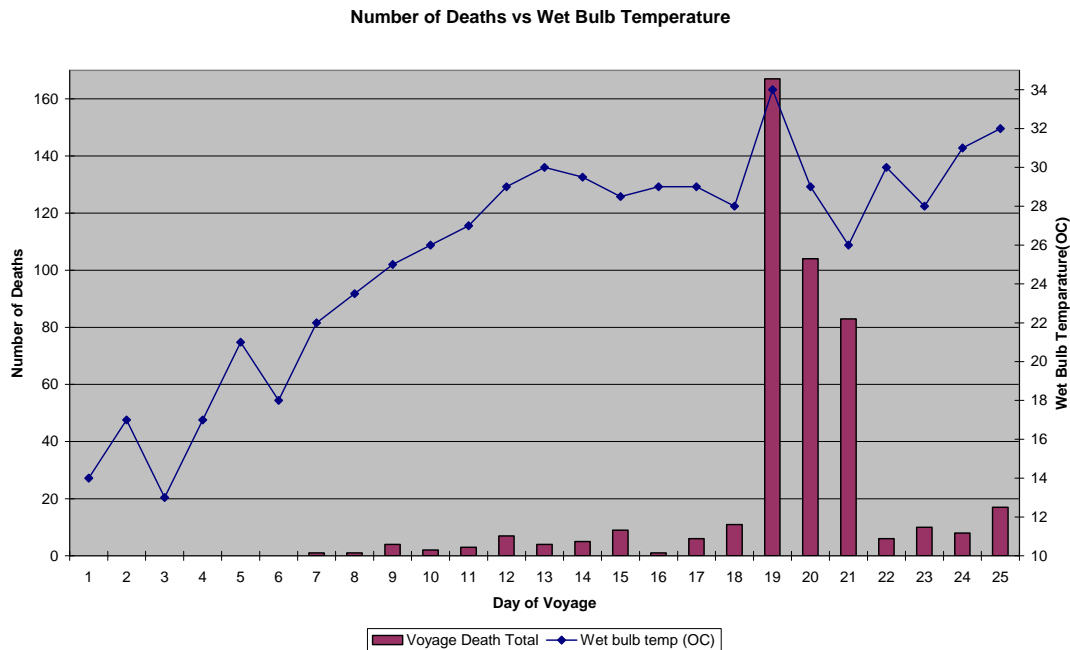
Table 3: Climatic Conditions

| Day of voyage | Dry bulb temp (°C) | Wet bulb temp (°C) | Humidity | Deaths | Daily water consumption | Comments |
|---------------|--------------------|--------------------|----------|------------|--|---|
| 7 | 25 | 22 | 75 | 1 | Ad lib | Heat stress nil. PM: no findings |
| 8 | 26.5 | 23.5 | 77 | 1 | Ad lib | Heat stress nil. PM: no findings |
| 9 | 28 | 25 | 80 | 4 | Ad lib | PM: enteritis x 1. Nil heat stress. |
| 10 | 29 | 26 | 73.5 | 2 | Ad lib | PM: Salmonellosis signs x 2. Nil heat stress |
| 11 | 30 | 27 | 79 | 3 | Ad lib | PM: enteritis x 1; pneumonia x 1. Nil heat stress |
| 12 | 31 | 29 | 83 | 7 | Ad lib | PM: heat stroke x 1; pneumonia x 4. Nil heat stress |
| 13 | 32 | 30 | 83 | 4 | Restricted: decks 7,8,9. ad lib: decks 3F, 4A, 4F. | Heat stress low. |
| 14 | 32 | 29.5 | 83.5 | 5 | Ad lib | Heat stress low. PM: pneumonia x 1. |
| 15 | 31 | 28.5 | 84 | 9 | Ad lib | Heat stress low. PM: inanition x 2; 1x heat related. |
| 16 | 32 | 29 | 81 | 1 | Ad lib | Heat stress low. PM: nil findings |
| 17 | 31 | 29 | 83 | 6 | Ad lib | Heat stress low. PM: pneumonia x 1; heat related x 3; others autolysed. |
| 18 | 31 | 28 | 83 | 11 | Ad lib | Heat stress medium on decks 4F and 3F, low on all other decks |
| 19 | 36 | 34 | 87 | 167 | Ad lib | V hot since yesterday afternoon - deck 2-5 pens opened to spread sheep on deck ramps etc. All stock under considerable heat stress. |
| 20 | 33 | 29 | 72 | 104 | Ad lib | Ran into Shamal (dry desert wind) at 16:00 yesterday with drying effect throughout ship decks overnight. Heat stress v high yesterday & part of last night – now OK as conditions dry out. |
| 21 | 38.4 | 26 | 34 | 83 | | Hot & dry – decks gradually drying out –top – down –although v hot conditions low humidity giving stock much relief |
| 22 | 34 | 30 | 74 | 6 | Ad lib | Heat stress medium-high all decks. Conditions on board getting increasingly hot & humid as today goes on. Some dispersal of stock on board but limited by maintaining ship stability. Expect high risk heat conditions today and likelihood of high mortality. |

| | | | | | | |
|----|----|----|----|----|--------|-----------------------------|
| 23 | 36 | 28 | 60 | 10 | Ad lib | Heat stress medium. PM: nil |
| 24 | 35 | 31 | 74 | 8 | Ad lib | Heat stress high (at noon). |
| 25 | 36 | 32 | 75 | 17 | Ad lib | Heat stress high |

The temperature and humidity in this table reflect the median of the six decks.

Chart 1: Relationship between number of deaths and wet bulb temperature



The reportable mortality trigger for a long haul sheep voyage is 2 per cent. The reportable mortality level was triggered some time between 19 and 20 July but likely on 20 July. The mortality rate increase corresponded to the very hot weather experienced from day 19 onwards.

From the “Development of a Heat Stress risk management model final report”, published by Meat and Livestock Australia, a 40 kg shorn adult merino has a heat stress threshold of 30.6 °C and Mortality Limit of 35.74 °C. The temperatures on day 19 of the voyage were listed in the daily report ranged from 32 °C to 36 °C and the AAV commented “All stock under considerable heat stress”.

5. Conclusion

The mortality rate up to day 17 of the voyage (17 July 2006) was a satisfactory level of 0.22%. At that stage there was no indication of any abnormal level of disease such as salmonella, inanition or pneumonia.

AQIS audited the exporter following the incident. The audit of the exporter concluded the sheep were loaded in accordance with the ASEL and the Heat Stress risk assessment.

Over days 18, 19 and 20 of the voyage, 354 sheep died which corresponds to a mortality rate of 1.7%.

The factor contributing to the sheep mortalities on this voyage was heat stress.

Action

AQIS audited the exporter. The records indicated the sheep were loaded in accordance with the ASEL and heat stress risk assessment.