



Investigation into reportable sheep mortality level on a voyage Portland, Fremantle, Kuwait, Bahrain, Doha, Jebel Ali, July 2007

1. Purpose

To report on the cause of the mortalities in sheep on an export voyage and to make recommendations with the objective of reducing the likelihood of a recurrence.

2. Summary

The cause of the reportable number of mortalities on board the vessel was investigated. There were 653 deaths from 25,872 sheep loaded which equates to a mortality rate of 2.52%. The reportable mortality trigger for a long haul sheep voyage is 2 per cent.

There were three consignments of sheep exported on the voyage. The two other consignments did not have a reportable level of mortalities. The overall voyage result was 1,330 mortalities of 77,464 sheep loaded which equates to a mortality rate of 1.72%.

The likely contributing causes of the mortalities were enteritis (consistent with salmonellosis) followed by heat stress whilst entering and transiting the Persian Gulf.

3. Background

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

1. AQIS accredited veterinarian's (AAV) end of voyage report.
2. AAV Daily Reports
3. Report from the exporter.
4. Records from the registered premises.
5. Report by the master of the vessel.
6. Report from the AQIS certifying veterinarian.

Table 1: Summary of chronology of events

| Action | Date |
|--------------------------------|-------------------|
| Sheep loaded Portland | 18 July 2007 |
| Sheep loaded Fremantle | 23 July 2007 |
| Sheep unloaded in Kuwait. | 7 - 8 August 2007 |
| Sheep unloaded into Bahrain | August 2007 |
| Sheep discharged into Doha | August 2007 |
| Sheep discharge into Jebel Ali | August 2007 |

Table 2: Chronology of Events –

| Dates | Day of Voyage | Action | Cumulative Voyage Death Total | Cumulative % Deaths |
|-------|---------------|--------|-------------------------------|---------------------|
|-------|---------------|--------|-------------------------------|---------------------|

| | | | | |
|---------------|-----|------------------------------|------------|-------------|
| 20/6/07 | N/A | NOI/CRMP submitted | | |
| 12/7/07 | N/A | NOI/CRMP approved | | |
| 18/7/07 | 1 | 25,872 sheep loaded Portland | 9 | 0.03 |
| 19/7/07 | 2 | 22 mortalities | 31 | 0.09 |
| 20/7/07 | 3 | 10 mortalities | 41 | 0.16 |
| 21/7/07 | 4 | 9 mortalities | 50 | 0.19 |
| 22/7/07 | 5 | 8 mortalities | 58 | 0.22 |
| 23/7/07 | 6 | 18 mortalities | 76 | 0.29 |
| 24/7/07 | 7 | 8 mortalities | 84 | 0.32 |
| 25/7/07 | 8 | 14 mortalities | 98 | 0.38 |
| 26/7/07 | 9 | 14 mortalities | 112 | 0.43 |
| 27/7/07 | 10 | 11 mortalities | 123 | 0.48 |
| 28/7/07 | 11 | 18 mortalities | 141 | 0.54 |
| 29/7/07 | 12 | 18 mortalities | 159 | 0.61 |
| 30/7/07 | 13 | 17 mortalities | 176 | 0.68 |
| 31/7/07 | 14 | 9 mortalities | 185 | 0.72 |
| 1/8/07 | 15 | 17 mortalities | 202 | 0.78 |
| 2/8/07 | 16 | 8 mortalities | 210 | 0.81 |
| 3/8/07 | 17 | 12 mortalities | 222 | 0.86 |
| 4/8/07 | 18 | 8 mortalities | 230 | 0.89 |
| 5/8/07 | 19 | 95 mortalities | 325 | 1.26 |
| 6/8/07 | 20 | 200 mortalities | 525 | 2.04 |
| 7/8/07 | 21 | 66 mortalities | 591 | 2.28 |
| 8/8/07 | 22 | 19 mortalities | 610 | 2.37 |
| 9/8/07 | 23 | 14 mortalities | 624 | 2.41 |
| 10/08/07 | 24 | 17 mortalities | 641 | 2.47 |
| 11/08/07 | 25 | 9 mortalities | 650 | 2.51 |
| 12/08/07 | 26 | 3 mortalities | 653 | 2.52 |
| TOTALS | | 653 mortalities | 653 | 2.52 |

Table 3: Mortality by deck

| DECK DAY | 9 | 8 | 5 | 4 hold 3 | 3 hold 2 | 3 hold 3 | 2 hold 3 | 1 hold 3 |
|-----------------|----------|----------|----------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 1 | 2 | 5 | | | | 2 | | |
| 2 | 2 | 19 | | | | 1 | | |
| 3 | 1 | 8 | | | 1 | | | |
| 4 | 1 | 7 | | | | 1 | | |
| 5 | 5 | 2 | | | 1 | | | |
| 6 | 2 | 12 | | 1 | | 1 | | 1 |
| 7 | 3 | 3 | | | 2 | | | |
| 8 | 2 | 10 | | | 1 | 1 | | |
| 9 | 4 | 9 | | 1 | | | | |
| 10 | 1 | 10 | | | | | | |
| 11 | 4 | 12 | 1 | | | | 1 | |
| 12 | 3 | 14 | | | 1 | | 1 | |
| 13 | 2 | 13 | | | 1 | | 1 | |
| 14 | 2 | 6 | | | 1 | | | |
| 15 | 5 | 11 | | | | 1 | | |
| 16 | 3 | 5 | | | | | | |
| 17 | 7 | 4 | | | 1 | | | |
| 18 | 2 | 6 | | | | | | |
| 19 | 5 | 87 | 3 | | | | | |
| 20 | 21 | 168 | 3 | 3 | 2 | 3 | | |
| 21 | 9 | 52 | 2 | 1 | 2 | | | |
| 22 | 4 | 12 | | | 1 | 2 | | |
| 23 | 3 | 6 | 1 | | 3 | 1 | | |

| | | | | | | | | |
|---------------|----|------------|----|---|----|----|---|---|
| TOTALS | 92 | 481 | 10 | 7 | 18 | 13 | 2 | 1 |
|---------------|----|------------|----|---|----|----|---|---|

4. Findings

4.1 Deaths in Registered Premises

The sheep exported from Portland were present at the registered premises from 09 July 2007 onwards. The records of the registered premises indicated low number of mortalities during the preparation period. The record of rejects indicated the main reasons for rejection at the wharf were lameness and pinkeye.

4.2 Loading

The sheep were loaded in accordance with the Australian standards for the export of livestock.

4.3 Journey

The climatic condition for the sheep decks were as follows

Table 4: Climatic conditions

| Date | Dry bulb (°C) | Wet bulb (°C) | Humidity (%) | Deaths | Daily water consumption | Conditions from daily reports |
|---------|---------------|---------------|--------------|--------|-------------------------|--|
| 18/7/07 | 14 | 7.5 | 61 | 9 | Ad lib | Cold and rough. PM: Deck 8 and 9 enteritis. Deck 3 hold 3 enteritis x 2. |
| 19/7/07 | 14 | 11 | 61 | 22 | Ad lib | PM: enteritis Inanition, Pneumonia/enteritis. Deck 8: suspect salmonellosis More pen space given – front pen opened and chaff fed to replace pellets |
| 20/7/07 | 20 | 17 | 78 | 10 | Ad lib | PM: enteritis, pneumonia. Deck 8 suspect salmonellosis – 5 cases, chaff being fed. sheep moved to lessen stock numbers |
| 21/7/07 | 19 | 17 | 77 | 9 | Ad lib | Deck 8 suspect salmonellosis, 5 deaths, chaff stock all fed out. |
| 22/7/07 | 20 | 17 | 74 | 8 | Ad lib | No PMs as in Fremantle loading animals. |
| 23/7/07 | 21 | 17.5 | 67 | 17 | Ad lib | PM: enteritis |
| 24/7/07 | 20 | 17 | 70 | 8 | Ad lib | PM: enteritis. salmonellosis Chaff feeding |
| 25/7/07 | 23 | 18.5 | 63 | 14 | Ad lib | PM: enteritis. Feeding chaff to control salmonellosis |
| 26/7/07 | 27 | 25 | 83.5 | 14 | Ad lib | PMs: enteritis, enteritis/pneumonia. Feeding chaff to control salmonellosis. |
| 27/7/07 | 29 | 27 | 83 | 11 | Ad lib | PMs: enteritis, enteritis/pneumonia. Feeding chaff to control salmonellosis. |
| 28/7/07 | 29 | 27 | 83 | 18 | Ad lib | PMs: enteritis, enteritis/pneumonia, Feeding chaff deck 9 to control salmonellosis. |
| 29/7/07 | 31 | 28 | 83 | 18 | Ad lib | PMs: enteritis, enteritis/pneumonia. Feeding chaff deck 8 & 9 to control salmonellosis. |
| 30/7/07 | 31 | 28 | 79.5 | 17 | Ad lib | PMs: enteritis, enteritis/pneumonia, pulmonary haemorrhages. Feeding chaff decks 8 & 9 to control salmonellosis. |
| 31/7/07 | 30 | 27.5 | 81 | 9 | Ad lib | PMs: enteritis, enteritis/pneumonia, pulmonary haemorrhages. Feeding chaff decks 8 & 9 to control salmonellosis. |
| 1/8/07 | 30 | 28 | 82 | 17 | Ad lib | PMs: enteritis, enteritis/pneumonia, pulmonary haemorrhages. |
| 2/8/07 | 29 | 27 | 85 | 8 | Ad lib | PMs: enteritis, enteritis/pneumonia, pulmonary haemorrhages. |
| 3/8/07 | 30 | 28 | 83 | 12 | Ad lib | PMs: enteritis, enteritis/pneumonia, heat stroke. |
| 4/8/07 | 29 | 27 | 84 | 8 | Ad lib | PMs: enteritis/pneumonia, |
| 5/8/07 | 34 | 32 | 86 | 95 | Ad lib | Mortality on deck 8 due to effects of heat stress on animal set back by enteritis earlier on as most deaths occurred in the same forward pens. |

| Date | Dry bulb (°C) | Wet bulb (°C) | Humidity (%) | Deaths | Daily water consumption | Conditions from daily reports |
|--------|---------------|---------------|--------------|--------|-------------------------|--|
| 6/8/07 | 35 | 32 | 77.5 | 200 | Ad lib | Deck 8 – B wethers due to heat. Due into Kuwait where hopefully it is drier. |
| 7/8/07 | 31 | 28 | 54 | 66 | Ad lib | Discharged some deck 8 wethers Discharge continuing. Animals on deck 8 & 9 spread out – conditions ok for animals – hot and dry. |
| 8/8/07 | 34 | 26 | 52 | 19 | Ad lib | Hot and dry – slight heat stress during middle of day as v hot. Animals spread out and conditions OK. |
| 9/8/07 | 35 | 30 | 68 | 14 | Ad lib | Left Kuwait 24:00. Hot and dry slight heat stress during middle of day as v hot. Animals spread out and conditions OK. |

The figures reported are averages across the decks.

The reportable mortality trigger for a long haul sheep voyage is 2 per cent. The reportable mortality level was triggered some time between 5 August 2007 and 6 August 2007.

5. Conclusion

The factors contributing to the sheep mortalities on board the vessel were multifactorial. Mortalities in the earlier part of the voyage were consistent with enteritis consistent with salmonellosis/inanition. The wet and rough conditions predisposed the sheep to the enteritis. A number of mortalities on 5/6/7 August were mainly associated with hot humid conditions on the open decks in the sheep previously effected by enteritis.

6. Recommendations

LESAC and the Industry consider the stocking density of sheep to the Middle East during May to October to manage the risk of heat stress.

Actions

The next consignment had the following additional conditions

- An extra 10% of space on board the vessel is provided for the sheep above the ASEL or heat stress risk assessment

Outcome of the voyage with additional conditions is as follows:

| Number loaded | Number mortalities | Mortality rate |
|---------------|--------------------|----------------|
| 32533 | 242 | 0.74% |