



Australian Government

Australian Quarantine and Inspection Service

Investigation into reportable sheep mortality level on voyage Fremantle to Oman, July 2007

1. Purpose

To report on the investigation into the cause of the mortalities in sheep 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 349 mortalities from 14,912 sheep loaded which equates to a mortality rate of 2.34%. The reportable mortality trigger for a 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 for the 3 consignments was 1,659 mortalities of 105,242 sheep loaded which equates to a mortality rate of 1.58 %.

The likely contributing causes were enteritis (consistent with salmonella - inanition) and heat stress.

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.

Table 1: Chronology of Events

Dates	Day of Voyage	Action	Cumulative Voyage Death Total	Cumulative% Deaths
18/6/07	N/A	NOI/CRMP submitted		
29/6/07	N/A	NOI/CRMP approved		
5/7/07	1	14,912 sheep loaded 1 death	1	0.007
6/7/07	2	5 mortalities	6	0.04
7/7/07	3	3 mortalities	9	0.06
8/7/07	4	2 mortalities	11	0.07
9/7/07	5	3 mortalities	14	0.09
10/7/07	6	6 mortalities	20	0.13
11/7/07	7	10 mortalities	30	0.2
12/7/07	8	15 mortalities	45	0.3
13/7/07	9	13 mortalities	58	0.4
14/7/07	10	14 mortalities	72	0.5
15/7/07	11	12 mortalities	84	0.6
16/7/07	12	8 mortalities	92	0.6

17/7/07	13	7 mortalities	99	0.7
18/7/07	14	11 mortalities	110	0.7
19/7/07	15	20 mortalities	130	0.9
20/7/07	16	25 mortalities	155	1
21/7/07	17	6 mortalities	161	1.07
22/7/07	18	12 mortalities	173	1.16
23/7/07	19	10 mortalities	183	1.23
24/7/07	20	16 mortalities	199	1.33
25/7/07	21	31 mortalities	230	1.54
26/7/07	22	22 mortalities	252	1.69
27/7/07	23	19 mortalities	271	1.82
28/7/07	24	15 mortalities	286	1.92
29/7/07	25	63 mortalities	312	2.09
discharge		37 mortalities	349	2.34
TOTALS		349 mortalities	349	2.34

Table 2: Mortality by deck

DECK	8L	6	5	4	3	2
DAY						
1				1		
2			3		1	1
3			2		1	
4			1		1	
5			2		1	
6			4		1	1
7			1	4	4	1
8			2	2	3	8
9			4	2	3	4
10			7		5	2
11			1	3	3	5
12			5	1	1	1
13			4		2	1
14		2	6	1	2	
15			8	2	7	3
16			16	1	1	7
17			1	1	2	2
18			5		5	2
19			4	1	1	4
20		2	6	3	2	3
21			9	5	4	13
22			6	8	3	5
23	1		5	4	4	5
24			8		5	2
25			14	4	6	2
TOTALS	1	4	124	43	68	72

* N.B. The 37 mortalities recorded in Table 1 in the 'discharge' row have not been included in this table as mortality by deck information was not available for them.
Sheep were originally loaded onto decks 2-8, but on day 22 the sheep were spread onto other decks.

Table 3: Mortalities by Class

CLASS	A Wethers	B wethers	Ram
Mortalities	213	135	1
Mortality Rate (%)	4.06	1.44	0.32

Table 4: Mortalities by Cause

Cause	Enteritis	Enteritis/Inanition	Resp.Dis.	Heat Stress	Down	Trauma	Other	Unknown	Autolysed
#	11	44	1	117	32	8	2	52	82

Days 15, 16, 21 and 22 all had approximately 20 deaths attributable to heat stress.

4. Findings

4.1 Deaths in Registered Premises

The records of the registered premises indicated low mortalities over the preparation period.

The record of rejects indicated the main reasons for rejection at the wharf were lameness, scabby mouth and eye problems. A total of 532 sheep were rejected at the wharf.

Loading

The sheep for the relevant consignment were loaded in accordance with ASEL.

4.2 Journey

The climatic condition for the sheep decks were as follows

Table 5: Climatic conditions

Date	Dry bulb (°C)	Wet bulb (°C)	Humidity (%)	Mortalities	Daily water consumption (L)	Conditions from daily reports
5/7/07	22	16.8	72	1	3	Sheep travelling well
6/7/07	25.4	21.8	70	5	3	Sheep travelling well
7/7/07	26.4	22.6	76.4	3	3.5	Sheep travelling well
8/7/07	26.8	26.4	85	2	4	Sheep travelling well
9/7/07	30.4	28.4	85	3	3.5	Sheep travelling well.
10/7/07	31.4	28.6	79	6	4	Sheep travelling well.
11/7/07	32	29	79	10	4	Sheep travelling well.
12/7/07	30.8	29	84.4	15	4.5	Sheep travelling well.
13/7/07	32	30	83	13		Sheep travelling well
14/7/07	31.2	29	79.6	14	4	Sheep travelling well.
15/7/07	31.8	29	79	12	3	Sheep travelling well.
16/7/07	31.4	29	79	8	4.2	Sheep travelling OK. Feeding chaff, heavy weather, sea spray over ship portside.
17/7/07	31.6	29.2	83.2	7	4.2	Sheep travelling OK. Rough sea, spray over ship port side.
18/7/07	33.4	30.8	82.8	11	4.5	Sheep travelling OK
19/7/07	34	31	80	20	5.4	Vessel approaching Homuz Strait Experience hot, humid conditions with following wind severe heat stress episode.
20/7/07	33.2	27.8	64.2	25	5.6	Conditions drying, arriving Kuwait.
21/7/07	36.2	27.8	53	6	4.5	Discharging in Kuwait
22/7/07	35.4	25.4	53	12	4.5	Discharging in Kuwait. Loaded 140 MT fodder

23/7/07	35	31	74	10	4	Discharging in Kuwait
Date	Dry bulb (°C)	Wet bulb (°C)	Humidity (%)	Mortalities	Daily water consumption (L)	Daily weather conditions from daily reports
24/7/07	34.2	30.2	70.2	16	5	Discharging in Bahrain.
25/7/07	34	31.8	86	31	5	Discharging in Bahrain
26/7/07	34	31.8	84.6	22	5.6	Discharging in Doha.
27/7/07	34	31.8	84.8	19	4.7	Discharging in Jebel Ali
28/7/07	35	33.6	87.6	15	4.2	Very humid conditions,
29/7/07	34	29.6	76.4	26	4.2	Discharging in Muscat

The figures reported are averages across the decks.

The number of mortalities up until day 15 was consistent with other voyages which did not have a reportable mortality level. Post mortem results for the sheep which died up until that point mainly indicated the cause of death as enteritis consistent with the salmonella inanition complex. However the cause of mortalities from day 15 onwards was mainly due to heat stress.

4. Conclusion

The factors contributing to the sheep mortalities on the vessel was heat stress and enteritis consistent with salmonella inanition complex. Heat stress is a known risk for exporting livestock from Southern Australian winter conditions to Middle Eastern summer conditions.

Additional feed was loaded whilst in the Gulf.

5. Recommendations:

Sheep exported to the Middle East on open decks during May to October are either loaded at a lower stocking rate, suggested at:

- . Mechanical Pen area turnover in the HSRA
- . ASEL plus 10% additional space.

All sheep exported to the Middle East during Northern Hemisphere summer are clean shorn.

6. 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

Number loaded	Number mortalities	Mortality rate
62,024	460	0.74%