Australian Government

Australian Quarantine and Inspection Service

Investigation into reportable sheep mortality level on a voyage Adelaide, Fremantle, Kuwait, Bahrain, Doha (Qatar), Jebel Ali (UAE), Muscat (Oman), June 2007

1 Purpose

To report on the investigation into the cause of the mortalities in sheep exported 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 level of mortalities on board the vessel was investigated. There were 593 mortalities of the 27,626 sheep loaded which equates to a mortality rate of 2.15%. There were three consignments of sheep exported on the voyage. One other consignment had a reportable mortality rate. The investigation is number 16 on the summary of completed investigations document and had a mortality level of 2.34%. The third consignment had a mortality rate of 0.83%.

Overall for the vessel, there were 1,659 mortalities of the 105,242 sheep loaded on the vessel which equates to a mortality rate of 1.58%.

The likely causes of the mortalities for the consignment loaded in Adelaide were enteritis (consistent with salmonellosis) followed by heat stress.

3 Background

The investigation into the mortalities was completed 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 from the AQIS certifying veterinarian
6. Report from salmonella research consultant

Table 1: Summary of chronology of events

Action	Date
Sheep loaded Adelaide	29 June 2007
Sheep loaded Fremantle	5 July 2007
Sheep unloaded Kuwait	22 July 2007
Sheep unloaded Bahrain	24 July 2007
Sheep unloaded Doha	26 July 2007
Sheep unloaded Jebel Ali	27 July 2007

Sheep unloaded Muscat.	29 July 2007

Table 2: Chronology of Events

Dates	Day of Voyage	Action	Cumulative Voyage Mortality Total	Cumulative% Mortalities
		NOI/CRMP submitted		
		NOI/CRMP approved		
29/6/07	1	27,626 sheep loaded Fremantle	0	0
30/6/07	2	10 mortalities	10	0.04
1/7/07	3	9 mortalities	19	0.07
2/7/07	4	15 mortalities	34	0.12
3/7/07	5	13 mortalities	47	0.17
4/7/07	6	26 mortalities	73	0.26
5/7/07	7	3 mortalities	76	0.28
6/7/07	8	16 mortalities	92	0.33
7/7/07	9	13 mortalities	105	0.38
8/7/07	10	18 mortalities	123	0.46
9/7/07	11	16 mortalities	139	0.50
10/7/07	12	16 mortalities	155	0.56
11/7/07	13	26 mortalities	181	0.66
12/7/07	14	36 mortalities	217	0.79
13/7/07	15	13 mortalities	240	0.87
14/7/07	16	12 mortalities	252	0.91
15/7/07	17	7 mortalities	259	0.94
16/7/07	18	14 mortalities	273	0.99
17/7/07	19	8 mortalities	281	1.02
18/7/07	20	13 mortalities	294	1.06
19/7/07	21	55 mortalities	349	1.26
20/7/07	22	41 mortalities	390	1.41
21/7/07	23	13 mortalities	403	1.46
22/7/07	24	41 mortalities	444	1.61
23/7/07	25	17 mortalities	461	1.67
24/7/07	26	6 mortalities	467	1.69
25/7/07	27	50 mortalities	517	1.87
26/7/07	28	24 mortalities	541	1.96
27/7/07	29	32 mortalities	573	2.07
28/7/07	30	3 mortalities	576	2.08
29/7/07	31	11 mortalities	587	2.12
TOTALS		**587**		**2.12**

Chart 1: Number of mortalities per day of voyage

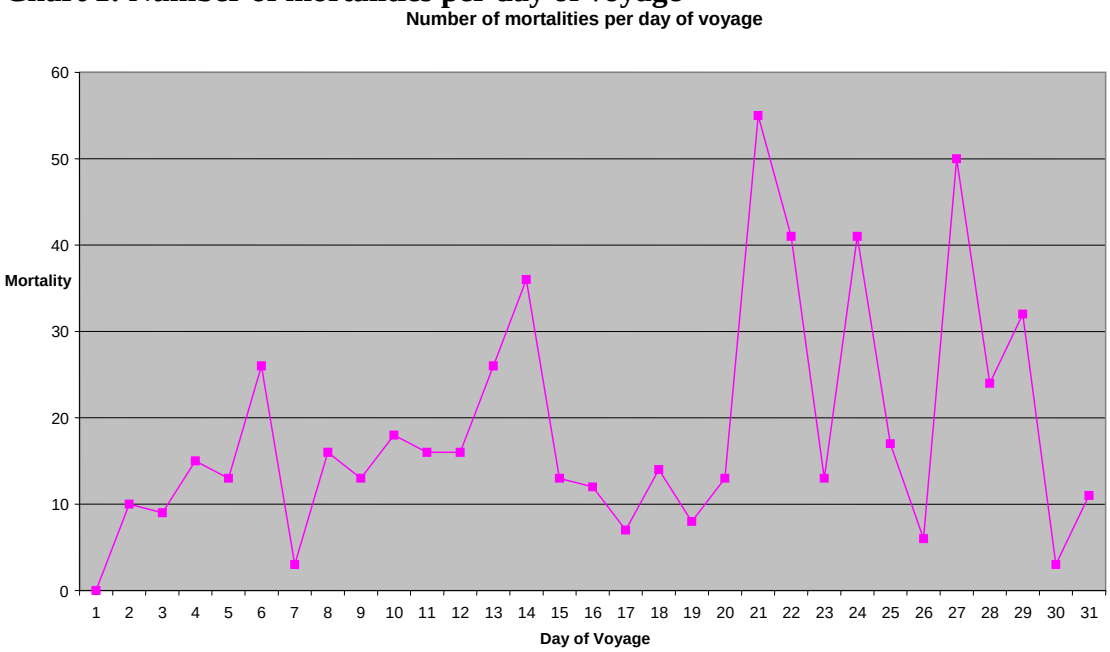

Table 3: Mortality by deck

DECK	10 U	10 L	9 U	9L	7	2	1	Totals
DAY								
1	0	0	0	0		0	0	**0**
2	0	2	4	2		1	1	**10**
3	0	3	3	3		0	0	**9**
4	5	2	2	6		0	0	**15**
5	3	3	1	2		2	2	**13**
6	7	11	2	4		1	1	**26**
7								**(3)**
8	4	1	3	6		1	1	**16**
9	2	3	2	4		1	1	**13**
10	2	6	6	3			1	**18**
11	2	2	3	6		2	1	**16**
12	3	1	7	4		1		**16**
13	1	2	9	12		2		**26**
14	4	5	14	12		1		**36**
15	3	3	1	2		2	2	**13**
16	3	1	4	2			2	**12**
17	1	1	2	1		1	1	**7**
18	1		1	3		5	4	**14**
19	1		1	4		1	1	**8**
20		1	8	1		2	1	**13**
21	7	7	8	12		4	17	**55**
22	4	4	9	9		8	7	**41**
23	1	2	5	1		3	1	**13**
24	5	10	7	13		4	2	**41**
25	1	1	2	2		3	8	**17**
26	1	1				1	3	**6**
27	1	8	12	8		9	12	**50**
28	1	2				6	15	**24**
29					4	1	27	**32**
30					3			**3**
31			1		4	6		**11**
TOTALS	**60**	**79**	**116**	**118**	**11**	**64**	**107**	**587**

* N.B. - The number of mortalities as calculated from the daily voyage reports is 587 mortalities. The total number of reported mortalities for this voyage is 593.

Table 4: Mortalities by Cause

Cause	Enteritis	Enteritis/Inanition	Heat Stress	Down	Trauma	Other	Unknown	Autolysed
#	73	139	154	51	14	11	65	86

4 Findings

4.1 Mortalities in Registered Premises

The sheep exported from Adelaide were present at the registered premises from 21 June 2007. The records of the registered premises indicated low number of mortalities (26 in total) over the preparation period. The registered premises are a paddock based system and the wet weather conditions during the preparation favored the proliferation of salmonella in the environment.

The record of rejects indicated the main reasons for rejection were lameness, scouring and eye problems.

4.2 Loading

The records indicate the sheep were loaded in accordance with ASEL.

4.3 Journey

The climatic condition for the sheep decks were as follows

Table 5: Climatic conditions – EMS Consignment

Date	Dry bulb (°C)	Wet bulb (°C)	Humidity (%)	Daily water consumption (L)	Daily weather conditions from daily reports
29/6/07	17	16	90	3	Sheep travelling and eating well.
30/6/07	18	16	80		
1/7/07	20	18	81		
2/7/07	16	15	63/89		Cold weather
3/7/07	22	18	73/81		
4/7/07					
5/7/07					
6/7/07	23.4	20.2	73.4	3	Sheep travelling well.
7/7/07	24.8	21.8	75.6	3.5	Sheep travelling well feeding chaff.
8/7/07	26.4	26.2	85	4	Sheep travelling OK, feeding chaff.
9/7/07	29.4	28	85	3.5	Sheep travelling OK, feeding chaff. Treating Pink eyes
10/7/07	30.6	27.6	79	4	Sheep travelling OK, feeding chaff.
11/7/07	31.4	28	79	4	Sheep travelling OK, feeding chaff.
12/7/07	29.4	27	82.6	4	Sheep travelling OK, feeding chaff.
13/7/07					
14/7/07	31	28	79	4	Sheep travelling OK, feeding chaff.
15/7/07	30	26	79	3	Sheep travelling OK, feeding chaff.
16/7/07	29.6	27	79	4.2	Sheep travelling OK, feeding chaff. Heavy weather, sea spray over ship port side.

17/7/07	29.6	27	84	4.2	Sheep travelling OK, feeding chaff. Heavy weather, sea spray over ship port side.
18/7/07	33.4	30.6	81.2	4	Sheep travelling OK.
19/7/07	33.6	30.6	80	5.4	Hot, humid conditions with following wind severe heat stress episode.
20/7/07	33.6	27.8	64.4	5.6	Conditions drying, arriving Kuwait.
21/7/07	35.6	27.4	55	4.5	Discharging in Kuwait, Requested more fodder
22/7/07	36.4	27.4	51	4.5	Discharging in Kuwait loaded 140 MT fodder.
23/7/07	34.4	30	71.6	4	Discharging in Kuwait.
24/7/07	34.5	30.4	72.8	5	Discharging in Bahrain. Discharging operation slow.
25/7/07	32	30	85	5	Discharging in Bahrain.
26/7/07	33	30	84.2	5.5	Discharging in Doha.
27/7/07	33	30	84.2	4.7	Discharging in Jebel Ali.
28/7/07	34	32	86	4.2	Very humid conditions.
29/7/07	33.5	30	88	4.2	Discharging in Muscat

The figures reported are averages across the eight decks. No data available for days 4 – 5 July and day 15.

The reportable mortality trigger for a long haul sheep voyage is 2 per cent. The reportable mortality level was triggered around 27 July 2007.

The AQIS Accredited veterinarian reported that the cause of the mortalities in the first 20 days were mainly due to enterits (consistent with salmonellosis). From day 21 the cause of mortality was mainly due to heat stress.

5 Conclusion

The likely cause of the sheep mortalities was enteritis (consistent with salmonellosis) and heat stress.

The information available confirms the fodder loaded was in accordance with the ASEL but the fodder was rationed on the last 10 days of the voyage. The shortage of fodder was mainly caused by a longer than anticipated voyage.

The wet weather conditions during the preparation favored the proliferation of salmonella in the environment and subsequently resulted in a greater challenge. This was reflected in the enteritis in the first part of the voyage. The cause of mortalities early in the voyage was enteritis (consistent with salmonellosis). The registered premise in Adelaide is paddock based.

The climatic conditions were hot and humid during passage of the Straits of Hormuz and in Bahrain. The mortalities in the latter part of the voyage were mainly associated with heat stress.

6 Recommendations

Industry considers the stocking density of sheep to the Middle East during May to October or other methodologies to manage the risk of heat stress especially in open decks.

Consider whether ASEL fodder contingency is adequate for multi port loading and discharges. The current requirement in ASEL is for 3 days additional fodder. AQIS would recommend a total of 7 days additional fodder (ie add 4 days more than the current ASEL).

7 Actions

The investigation report was forwarded to the Livestock Export Standards Advisory Committee.

The next consignments 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 voyages with additional conditions were as follows:

Number loaded	Number mortalities	Mortality rate
59,865	1,251	2.09%
55,842	335	0.6%
20,080	150	0.75%
67,987	849	1.25%