



Australian Government
Department of Agriculture

Mortality Investigation Report 46

Sheep exported to Qatar and the United Arab Emirates in September 2013

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Summary

Mortality exceeded the reportable level in two consignments of sheep exported from Adelaide and Fremantle to Qatar and the United Arab Emirates in September 2013. The reportable level for sheep is two percent. In the Adelaide sheep consignment the mortality rate was 7.28% while in the Fremantle consignment the mortality rate was 3.00%. The main cause of mortality was heat stress.

1. Purpose

To report on the investigation into the cause of mortalities in sheep exported by sea to Qatar and the United Arab Emirates (UAE) and to determine if any action is required to reduce the likelihood of a recurrence.

2. Livestock and mortalities

For this voyage, sheep and camels were loaded in Adelaide and cattle and sheep were loaded in Fremantle. In the Adelaide sheep consignment the mortality rate was 7.28% (3,256 mortalities of the 44,713 sheep loaded). In the Fremantle sheep consignment the mortality rate was 3.00% (923 mortalities of the 30,795 sheep loaded).

Overall the voyage mortality rate was 5.53% (4,179 mortalities recorded out of 75,508 sheep loaded onto the vessel). The reportable mortality rate for sheep is 2%. Mortality in the cattle and camel consignments did not exceed the reportable level.

Table 1 below shows the daily mortality count (DMC), cumulative mortality count (CMC) and cumulative mortality percentage (CM%) for the consignment loaded in Adelaide, the consignment loaded in Fremantle as well as the total for both consignments.

Table 1 Date, day of voyage, daily mortality count (DMC), cumulative mortality count (CMC) and cumulative mortality percentage (CM %) presented for the consignment loaded in Adelaide, the consignment loaded in Fremantle and the total for both consignments.

Date	Day	Event	DMC	CMC	CM%	DMC	CMC	CM%	DMC	CMC	CM%
			Adelaide			Fremantle			Total		
17-Aug		44,713 sheep loaded in Adelaide									
18-Aug	1		1	1	0.00%				1	1	0.00%
19-Aug	2		2	3	0.01%				2	3	0.00%
20-Aug	3		1	4	0.01%				1	4	0.01%
21-Aug	4		6	10	0.02%				6	10	0.01%
22-Aug	5	30,795 sheep loaded in Fremantle	0	10	0.02%				0	10	0.01%
23-Aug	6		0	10	0.02%	0	0	0.00%	0	10	0.01%
24-Aug	7		2	12	0.03%	0	0	0.00%	2	12	0.02%
25-Aug	8		1	13	0.03%	0	0	0.00%	1	13	0.02%
26-Aug	9		1	14	0.03%	0	0	0.00%	1	14	0.02%
27-Aug	10		3	17	0.04%	0	0	0.00%	3	17	0.02%
28-Aug	11		0	17	0.04%	1	1	0.00%	1	18	0.02%
29-Aug	12		1	18	0.04%	3	4	0.01%	4	22	0.03%
30-Aug	13		4	22	0.05%	4	8	0.03%	8	30	0.04%
31-Aug	14		0	22	0.05%	5	13	0.04%	5	35	0.05%
01-Sep	15		2	24	0.05%	4	17	0.06%	6	41	0.05%
02-Sep	16		1	25	0.06%	5	22	0.07%	6	47	0.06%
03-Sep	17		1	26	0.06%	4	26	0.08%	5	52	0.07%
04-Sep	18		1	27	0.06%	6	32	0.10%	7	59	0.08%
05-Sep	19		1	28	0.06%	6	38	0.12%	7	66	0.09%

Date	Day	Event	DMC	CMC	CM%	DMC	CMC	CM%	DMC	CMC	CM%
			Adelaide			Fremantle			Total		
06-Sep	20		6	34	0.08%	4	42	0.14%	10	76	0.10%
07-Sep	21	Vessel arrived in Qatar and commenced discharging sheep	3180	3214	7.19%	870	912	2.96%	4050	4126	5.46%
08-Sep	22		42	3256	7.28%	0	912	2.96%	42	4168	5.52%
09-Sep	23	Discharging sheep in Qatar completed		3256	7.28%	0	912	2.96%	0	4168	5.52%
10-Sep	24					0	912	2.96%	0	4168	5.52%
11-Sep	25					0	912	2.96%	0	4168	5.52%
12-Sep	26					0	912	2.96%	0	4168	5.52%
13-Sep	27					4	916	2.97%	4	4172	5.53%
14-Sep	28					0	916	2.97%	0	4172	5.53%
15-Sep	29					0	916	2.97%	0	4172	5.53%
16-Sep	30					0	916	2.97%	0	4172	5.53%
17-Sep	31	Vessel arrived in UAE and commenced discharging sheep				0	916	2.97%	0	4172	5.53%
18-Sep	32	Discharging sheep in UAE completed				7	923	3.00%	7	4179	5.53%

3. Findings

3.1. Preparation of the sheep

Adelaide

The sheep exported from Adelaide were assembled at two registered premises near Port Adelaide. The sheep were sourced from New South Wales, Victoria and South Australia. A total of 48,400 sheep were received. The sheep arrived at the registered premises between 13 and 15 July 2013, meaning the sheep were held at the premises for 33 to 35 days. This is much longer than the minimum five days required by the ASEL. The sheep were assembled for an extended period because the vessel was delayed.

Mortality at the two premises was low. At one premise there were 5,400 sheep and three mortalities (0.06%) and at the other premise there were 43,000 sheep and 128 mortalities (0.30%). During loading of the vessel, 577 sheep were rejected from the consignment: 548 sheep were rejected at the registered premises and 29 sheep were rejected at the wharf. The Australian Government Accredited Veterinarian (AAV) records show that 43% of rejections were due to lameness, 37% were due to pinkeye and 6% were due to diarrhoea and ill thrift.

Reports received by the department did not identify any health problems or unusual mortalities during the pre-export preparation period. Weather conditions were cold during the preparation period with temperatures ranging from 0°C to 19°C and rain was recorded on a few of the days. The reports provided indicate the sheep were eating well and did not show any signs of health problems. A Department of Agriculture veterinarian inspected the sheep at each registered premises between 13 August and 15 August 2013. The veterinarian did not note any health problems other than those already identified and for which sheep were rejected by the AAV.

Fremantle

The sheep exported from Fremantle were assembled at one registered premises. There were 31,996 sheep received at the registered premises on 15 August 2013. There were 40 mortalities recorded at the registered premises during the assembly period, a mortality rate of 0.13%.

During the loading process, 524 sheep were rejected from the consignment. The AAV's records show that 55% of the rejections were due to scabby mouth, 30% were due to lameness and 15% were due to miscellaneous reasons. Weather conditions were cold during the preparation period with temperatures ranging from 4°C to 18°C.

A department veterinarian inspected the sheep at the registered premise on 21 August 2013. No health problems were noted other than those already identified by the AAV.

3.2. Loading onto the vessel

The loading records indicate that the stocking density was in accordance with the Australian Standards for the Export of Livestock (ASEL). The records also indicate that the amount of fodder loaded was in accordance with the ASEL.

3.3. Conditions during the journey

Figure 1 shows the wet bulb temperature for each deck throughout the voyage as well as the heat stress threshold (HST) and mortality limit (ML) for adult merino sheep. Heat stress threshold is the maximum ambient wet bulb temperature at which heat balance of the deep body temperature can be controlled using available mechanisms of heat loss. Mortality limit is the wet bulb temperature at which the animal will die. For adult merino sheep the heat stress threshold is 30.6°C and the mortality limit is 35.5°C.

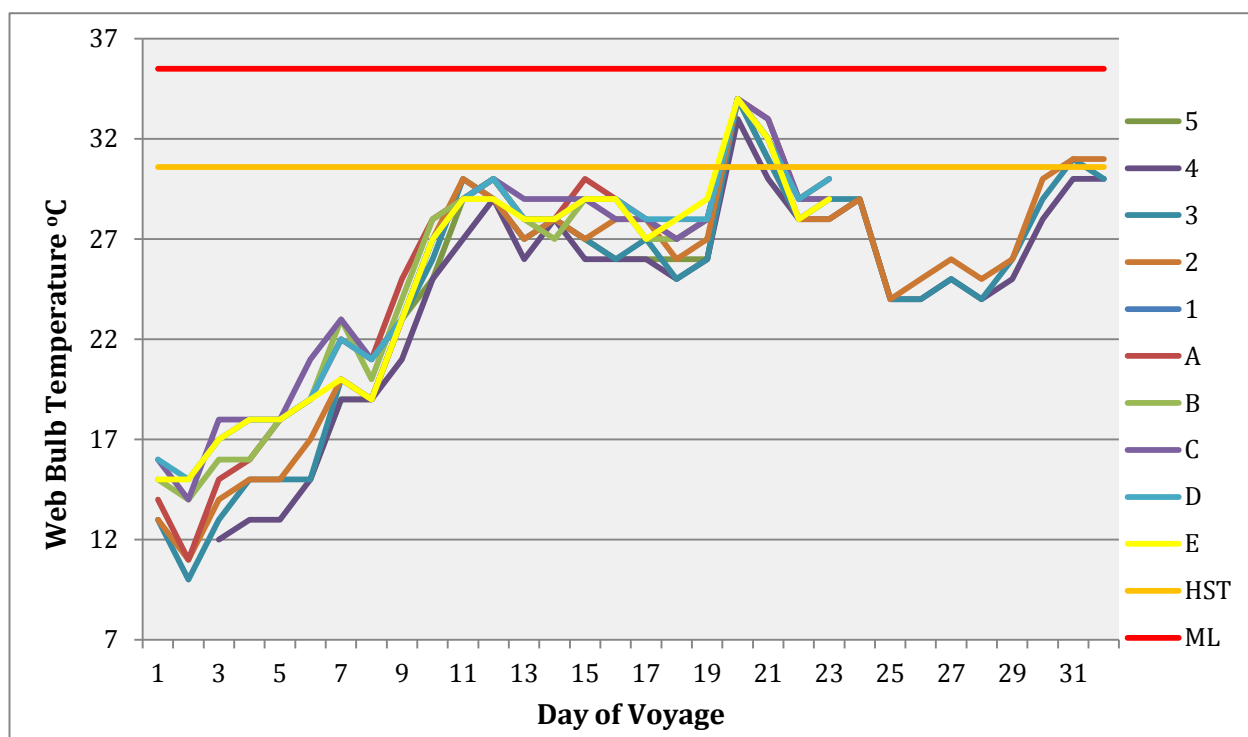


Figure 1 Mid-morning wet bulb temperatures by deck and day, heat stress threshold (HST) and mortality limit (ML).

The available information indicates that the sheep were exposed to temperatures above the heat stress threshold on days 20-21 and 31-32. During days 20-21 the vessel was in the Arabian Gulf heading towards the port of Doha, Qatar. During days 31-32 the vessel was discharging sheep in Jebel Ali, United Arab Emirates. Figure 1 shows the recorded wet bulb temperatures from the

AAV's daily reports. Temperatures are usually taken for the daily reports mid-morning. The AAV reported that a heat stress incident occurred during the afternoon of day 21 of the voyage and that during this time some wet bulb temperatures were as high as 38 degrees.

3.4. Mortality by cause

The causes of mortalities were reported in the AAV's daily reports and end of voyage report. Post mortems were performed throughout the voyage. According to the veterinarian's end of voyage report 97% of the mortalities were due to heat stress. The remaining 3% of mortalities were due to enteritis, pneumonia, inanition and trauma. Heat stress was the major cause of mortality in sheep, accounting for 98% of deaths in the Adelaide sheep and 94% of deaths in the Fremantle sheep.

3.5. Mortality by day

Figure 2 shows the percentage of sheep loaded in Adelaide and Fremantle that died each day (this is not a cumulative mortality) and the average wet bulb temperature across all decks of the vessel. The figure shows a clear spike in mortality associated with the period of highest recorded wet bulb temperature from days 20 to 21.

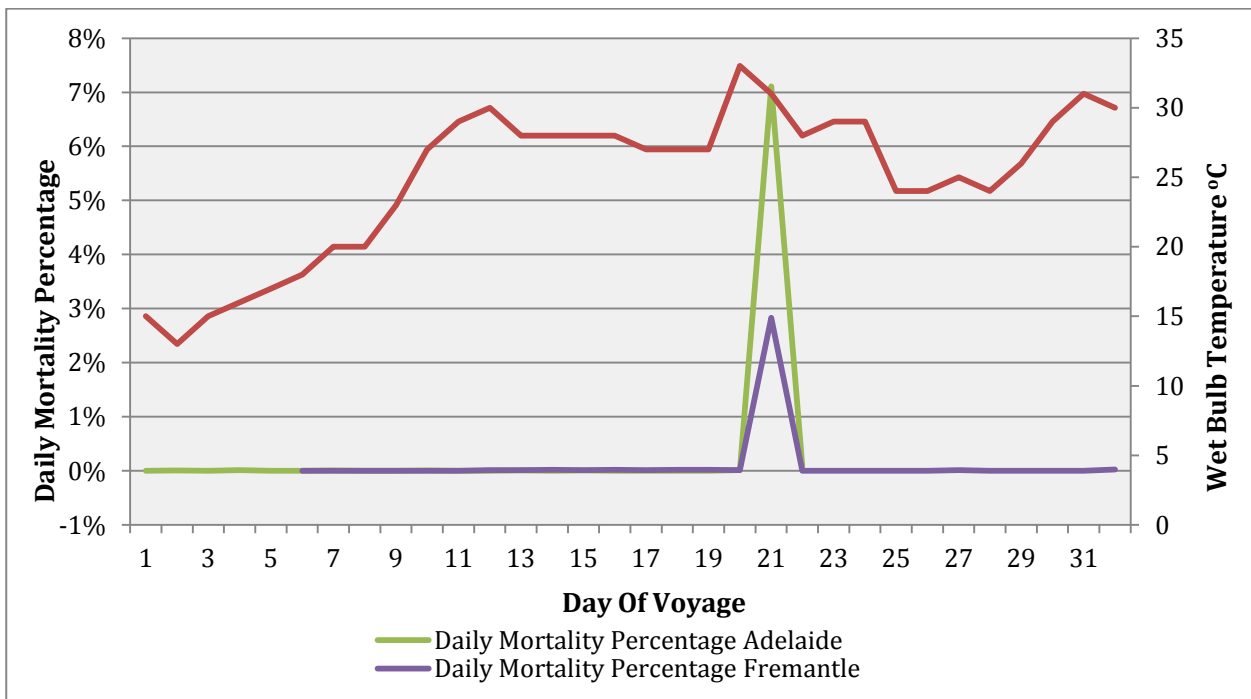


Figure 2 – Daily percent mortality and temperature

The green and purple lines indicate the percentage of sheep loaded in Adelaide and Fremantle that died each day (not cumulative). The red line indicates the average wet bulb temperature across all decks.

The AAV's reports indicated that daily mortality rates were very low leading up to day 20. Over 96% of the mortalities occurred on day 21, with all mortalities occurring on this day diagnosed as heat stress mortalities.

3.6. Mortality by class

Figure 3 shows the mortality percentage for each class of sheep. Class of sheep can refer to age, sex or breed of the sheep. There were Awassi, Merino and Merino Cross sheep included in this consignment. Mortality exceeded the reportable level of 2% in the wethers loaded in Adelaide and the lambs and young wethers loaded in Fremantle.

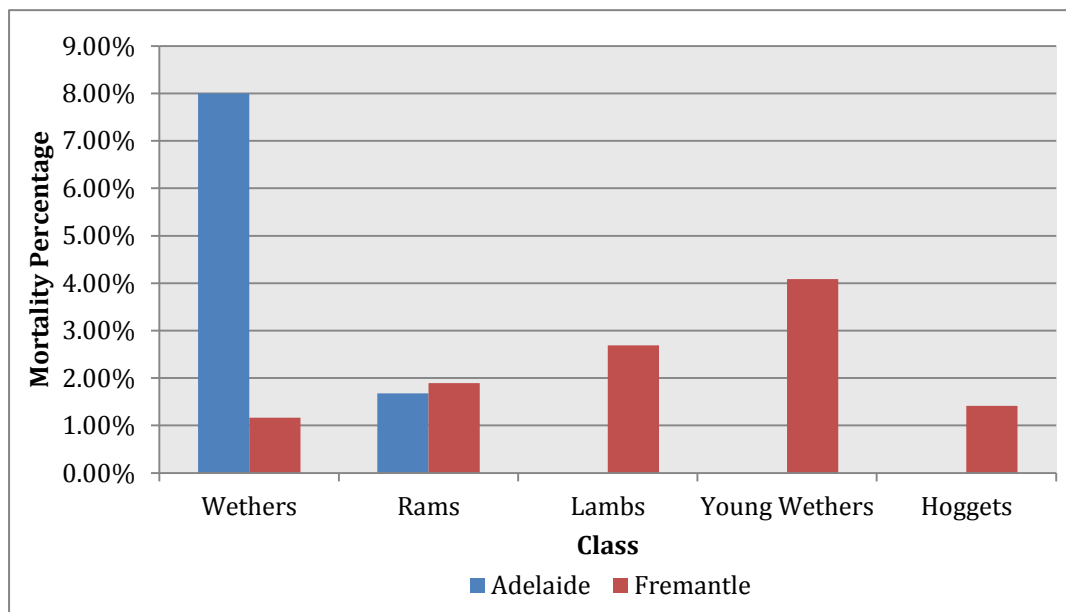


Figure 3 – Mortality percentages for each class of sheep loaded in Adelaide and Fremantle

Note – no lambs, young wethers or hoggets were loaded in Adelaide.

3.7. Mortality by deck

The vessel has 10 decks. Decks A to E are single tier enclosed decks below the main deck. Decks 2 to 5 are above the main deck and are double tiered. Figure 4 shows mortality by deck. In this graph, for the two tiered decks, 'U' stands for upper tier and 'L' stands for lower tier. The load plan was as follows:

- wethers were loaded on decks 2U, 2L, 3U, 3L, 4L, B, C, D and E
- lambs were loaded on decks 5L and 4U
- young wethers were loaded on the main deck and 5U
- rams were loaded on decks 2L and A
- ram hoggets were loaded on deck 2L.

Mortalities exceeded the reportable level of 2% in decks 5, 3, Main, B, C, D and E.

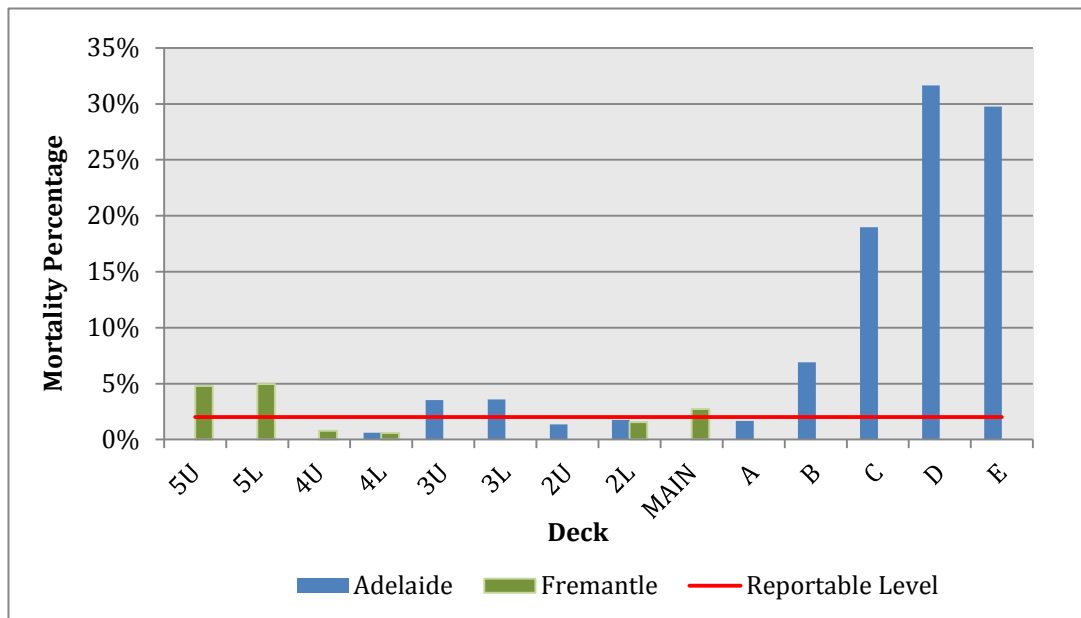


Figure 4 Mortality percentage by deck for sheep loaded in Adelaide and Fremantle U = Upper, L = Lower.

3.8. Discussion of mortality by cause, day, class and deck.

From day 1 to 20 of the voyage, mortality was lower than usual with only 34 mortalities in the Adelaide consignment (0.08%) and 42 mortalities in the Fremantle consignment (0.14%). In 2012 average mortality for sheep exported from Adelaide and Fremantle was 0.88% and 0.82% respectively.

The onboard veterinarian reported that the majority of the mortalities were caused by heat stress and occurred on day 21 of the voyage. Mortalities were highest in the merino and merino crossbreed wethers loaded on decks B, C, D and E. It was the veterinarian’s assessment that the higher mortality in these sheep was likely associated with the position of the sheep within the ship.

4. Australian Maritime Safety Authority (AMSA) evaluation of the vessel

The pre-loading inspection of the vessel by AMSA at Port Adelaide did not find any deficiencies in the livestock services. On 18 October 2013 the vessel returned to Australia and AMSA conducted an investigation that covered all aspects of Marine Order 43 including review of records and random ventilation tests. The AMSA investigation found no clear evidence to indicate that the mortality incident was a consequence of failure to comply with the Marine Orders requirements. The ship’s records were consistent with the AAV’s reports.

5. Conclusion

The main cause of mortalities for this voyage was heat stress, accounting for 97% of mortalities. Heat stress mortalities occurred on day 21 when the vessel encountered extreme weather conditions.

6. Actions

The department approved the subsequent consignment on this vessel that departed Australia in November 2013 subject to a condition that the sheep be provided with 10% additional space over minimum requirements. The result for the consignment was 182 mortalities of 77,095 sheep loaded, a mortality rate of 0.24%. The AAV reported that there was no evidence of heat stress during the voyage.

For all voyages of livestock to and through the Middle East, exporters are required to complete a Heat Stress Risk Assessment (HSRA). The acceptable level of risk in the ASEL is less than a 2% risk of 5% mortality. The purpose of the HSRA is to allow exporters to assess and manage the risk of mortality due to heat stress. It does not eliminate the risk of mortality due to heat stress. The department will continue to monitor, through daily and end of voyage reports submitted by AAVs, heat related mortality to determine if additional measures are required to manage the risk of mortality due to heat stress. This may include requiring additional space to be provided to livestock exported on vessels that record significant heat stress mortalities.

7. References

1. Maunsell Australia Pty Ltd. 2003. LIVE.116 Development of a heat stress risk management model. Meat and Livestock Australia.
2. Norris, R.T. and Norman, G.J. 2013. W.LIV.0285 2012 National Livestock Export Industry Shipboard Performance Report. Meat and Livestock Australia.