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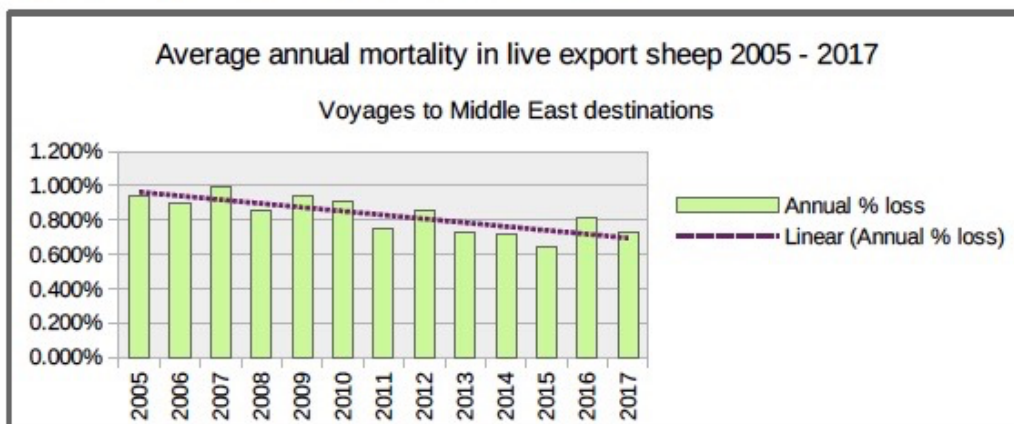
July 5 2020

Averaged data vs Summer data – live sheep export 2005 -2017

The live export animal welfare regulations in Australia are dependent upon policies derived from publicly reported outcomes. Commonly, this involves analysis of live export morbidity and mortality events by the Department of Agriculture, with subsequent adjustments to policies as deemed appropriate. However, the interpretation of the collected data appears to be flawed, with an over-reliance upon the use of annual averages to assess progress in the sector.

For example, the Department of Agriculture publishes a biannual Report to Parliament dealing with live export. Using these data from the reports between 2005-2017 (Graph 1), it can be seen that there has been a gradual decrease in average annual mortality for live sheep exports. This has led to both industry and Government concluding that their policies have been effective.

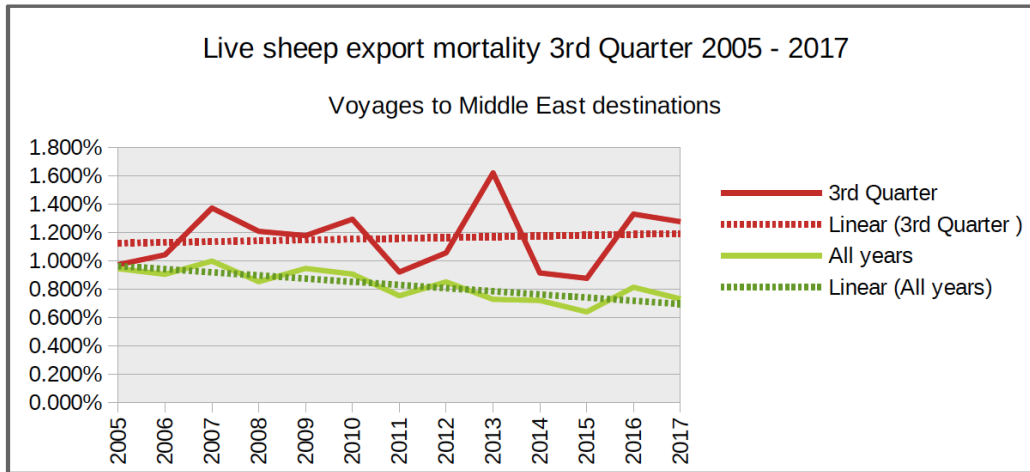
Graph 1. Average Annual Mortality in Live Export Sheep 2005-2017



However, the use of averaged annual data can lead to statistical fallacies due to the masking effect inherent in such a method. As some months in each year are either over or under represented in the number of animals exported and the number of voyages undertaken, VALE has assessed the annual data derived from the Department of Agriculture's Reports to Parliament 2005-2017 by Quarter Year (1,2,3

and 4) and by Season (summer, autumn, winter and spring). This more specific aggregation reduces the risk of a single extreme voyage distorting the overall trend.

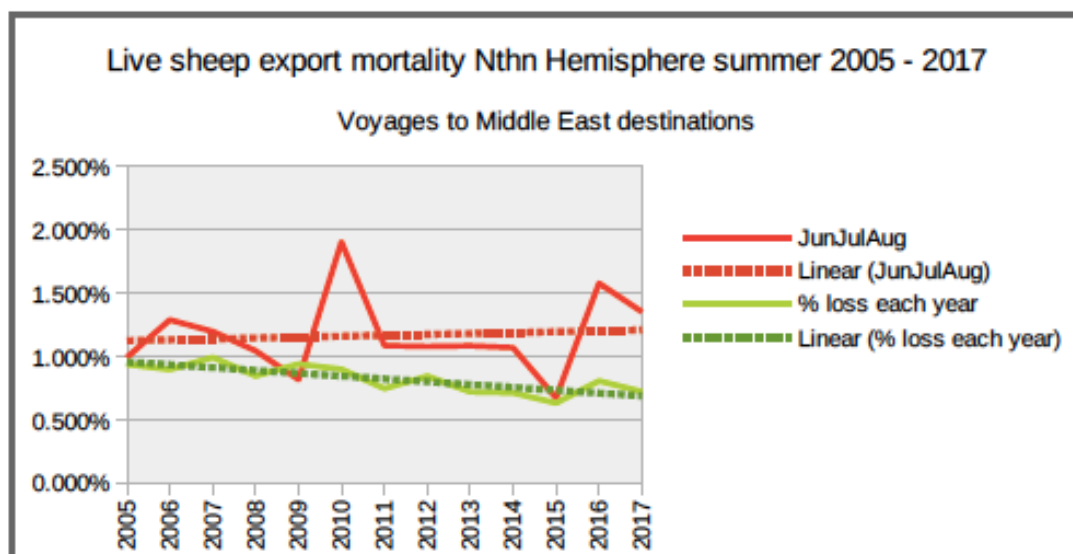
Graph 2. Live Sheep Export Mortality 3rd Quarter (Jul-Sept) 2005-2017



Graph 2 demonstrate that there is increasing mortality in the third quarter and greater fluctuations in 3rd quarter losses from 2005 and 2017. This worsening and more unpredictable performance of the industry has been hidden by the reliance upon averaged annual statistics. It is also important to note that this worsening 3rd quarter performance has occurred despite the decline in average annual mortality and improved outcomes in the other quarters.

Seasonal grouping of the same data produces a similar result (Graph 3).

Graph 3. Live sheep export mortality in Northern Hemisphere (Jun-August) 2005-2017



The above dissection of the data raises two issues for policy direction in live export regulation:

1. Despite industry claims of improved welfare and mortality in the sheep export trade, and despite considerable resources being directed towards combating 'heat stress' in shipments during the Northern Hemisphere summer, the death rate during this period has increased.
2. The declining annual mortality trend is due to factors other than 'heat stress' abatement.

There are a number of explanations:

1. The 'heat stress' policies are ineffective and the worsening average or extreme temperatures in the region (eg with climate change) have led to a worsening in mortality
2. The "heat stress" policies themselves have worsened the losses during the northern hemisphere summer
3. That extreme temperature and humidity were not the primary causes for the rising death rate in export sheep during this period and that there is another as yet identified factor resulting in mortality.

Regardless, the fact remains that industry and Department of Agriculture claims of improvements to heat stress and reduced annual mortality because of these changes are inaccurate. This is perhaps not surprising given that even the current Panting Score used by the Department of Agriculture (EAN 2018-11) has an incorrect respiratory rate for normal resting sheep (25-80) and designates sheep in discomfort with respiratory rates from 100-160 as "heat affected" rather than "heat stressed" (ignoring the heat stress threshold used in their own heat stress risk assessment, Hotstuff that was derived from scientific studies that showed inability to control body temperature by physiologic mechanisms (heat stress) at this Panting Score). The failure to Government to appropriately and scientifically acknowledge heat stress exacerbates inappropriate veterinary assessments by shipboard veterinarians, inured to panting as "normal". The "heat affected" category in EAN 2018-11 has effectively reduced the prevalence and thus seriousness of heat stress in sheep.

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