

Sheep behaviour during pre-export phase of live export.

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Livestock are exposed to several stressors during the pre-export phase of the export supply chain. As sheep are usually raised in extensive systems, the processes of yarding, transport and exposure to novel environments can be stressful (Norris *et al.* 1989). Assessing morbidity, mortality and environmental factors alone cannot provide a comprehensive welfare assessment (Phillips and Santurtun, 2013; Wickham *et al.*, 2017). Therefore, establishing methods that evaluate animal behaviour and demeanour during their journey is an important step for the development of welfare assessments. Wethers (n = 240) from four farms were marked with stock marker to allow identification of animals for filming. Behaviour and video footage of the wethers were recorded pen-side at four time points; on farm (6-8hrs after mustering), upon arrival at the feedlot (day 1), prior to road transport to the port (day 5), and 30 minutes after loading onto the ship. An ethogram was used to assess sheep behaviour pen-side, concurrently while sheep were filmed. Using Qualitative Behaviour Assessment, 12 observers scored the sheep using 10 descriptors per 45sec video clip. Principal Component Analysis (PCA) was used to analyse the 576 assessor scores. Repeated measures ANOVA and Tukey's post hoc analysis determined if PC scores significantly differed between locations. Spearman's rank correlations were used to see if correlations between PC scores and pen-side data occurred. Sheep were scored as significantly more *agitated* and *nervous* on the farm than the other timepoints on PC1 (30.5% variation) (Figure 1A). Sheep were found to be significantly more *interested* and *alert* at the feedlot on PC2 (24.5% variation) than on farm or ship (Figure 1B). More sheep were found to be eating at the feedlot locations ($F_{3,8} = 8.74, p < 0.001$), ruminating at the second feedlot timepoint and on the ship ($F_{3,8} = 12.05, p < 0.001$), and have more ocular discharge at the ship ($F_{3,8} = 3.29, p = 0.03$), compared to all other locations. For PC1, sheep that were scored as more *relaxed* and *calm* were also found to have ocular lesions, or to be eating and ruminating, and have a larger gut fill, while those that were scored more *agitated* and *nervous* were more likely to be belching, coughing, salivating, drooling and vocalising. For PC2, sheep that were scored as more *interested*, *alert* and *sociable*, were more likely to be ruminating, while those scored as *bored* and *lethargic* were more likely to be vocalising.

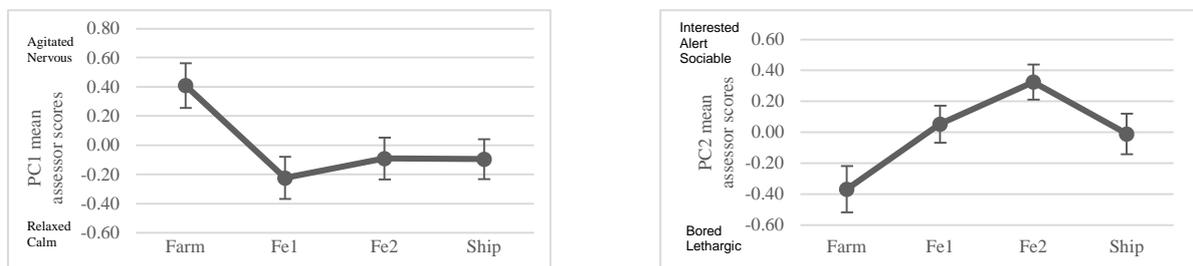


Figure 1. Position of wethers on PCA for dimensions 1 and 2 obtained from assessor's qualitative behavioural assessments

The Australian public requires clear and unbiased information regarding animal welfare during sea transport (Wickham *et al.*, MLA report), however, the fear of negative reporting has previously resulted in a lack of industry transparency. This project provided the first pen-side and video assessments of sheep under live export up until vessel loading. This initial step is critical to the development of feasible and repeatable welfare assessments that are applicable to all stages of this complex industry.

References

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