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Prevalence of Potential Animal-Based Indicators of Poor Welfare Status

in

New Zealand Bobby Calves

A thesis presented in partial fulfilment

of the requirements for the degree of

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In

Physiology

at Massey University, Manawatū,

New Zealand.

Anna Louise Palmer

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I hereby certify that the thesis has not been submitted for a higher degree at any University or Institution and work embodied in this thesis is my work unless noted otherwise in the acknowledgements.

Anna Louise Palmer

Abstract

The dairy industry is a major contributor to the New Zealand economy. Agricultural production systems have typically focussed on supply, price and competition. However, an increasing public awareness of the welfare of production animals has raised ethical concerns. Of particular concern are the calves, called bobby calves, which are surplus to the need of the dairy and beef industries and sent to slaughter at a very young age, typically four to seven days old. These calves are transported live from the farm to commercial processing plants where they are held in lairage before slaughter. Their young age at removal from the dam, mixing and transport mean that there are numerous opportunities for welfare compromise of these animals to occur.

While mortality (death and condemnation) of calves during transport and lairage is very low (e.g. 0.12% in 2016), this is the only indicator of bobby calf welfare routinely measured in New Zealand. Mortality is a crude measure of welfare and the calves that do not die before they reach the slaughter line may also experience poor welfare. The overall aim of this study was to determine the prevalence of proposed health and welfare indicators in bobby calves in lairage at commercial meat processing plant facilities in New Zealand prior to slaughter.

A systematic mapping of the literature was conducted to develop an understanding of research associated with identifying potential welfare indicators that could be used to monitor the calf welfare. The literature was systematically searched and identified a total of 99 potential nutritional, environmental, health and behavioural indicators from 253 relevant articles.

A large scale observational study conducted to assess the welfare status of bobby calves in lairage prior to slaughter at selected processing plants across New Zealand from July to October 2016. The study investigated firstly, the prevalence of potential animal-based ante-mortem indicators of calf health and welfare at the

processing plant in lairage. Secondly, selected indicators were investigated to evaluate the effect of time spent in lairage before observation and week of the study on their prevalence. The study used potential indicators identified during the systematic mapping that were able to be applied quickly and without equipment in lairage facilities of commercial meat processing plants. Observations were made at 12 meat processing plants across New Zealand, and included 102 pens of calves and 504 individual assessments that accounted for a total of 5910 calves. From this observational study, dehydration measured using a skin tent test, faecal soiling, increased respiratory rate and ocular/nasal discharge were found to be prevalent in bobby calves in lairage and may be useful indicators of aspects of calf welfare. The logistic regression model recognised the prevalence of nasal discharge, faecal soiling and dehydration (two second cut off) increased later in the season. The prevalence of increased respiration rate was inversely proportional to time in lairage, and the prevalence of lying down increased with time in lairage. Future research is recommended to identify the aetiology of indicators of health and behaviour in order to reduce the number of calves experiencing compromised welfare.

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List of Abbreviations

>	Greater than
<	Less than
≤	Less than or equal to
NZ	New Zealand
MPI	Ministry for Primary Industries
95% CI	95% Confidence interval
OR	Odds ratio
SE	Standard error