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Evaluation of Sources of Error in Weight Records of Commercially Raised Growing Pigs

A thesis presented in partial fulfillment of the requirements for the degree of

Master of Veterinary Studies
in
Epidemiology

at Massey University, Palmerston North,
New Zealand

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2008

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.

Birgit Schauer

This thesis is dedicated to Karl Hammer, who has been a source of inspiration to me for many years

Abstract

The objective of this research was to investigate sources of errors in pig weight measurements. Three studies were conducted using data from one commercial New Zealand pig farm. In Chapter 4, finisher pigs fed ad libitum or via a computerized liquid feeding system were weighed four times a day over a four-day period. Results showed that standardization of weighing time reduced diurnal fluctuations in pig weight. However, multivariate analysis showed that there was a significant interaction between day and time of day, which indicates that diurnal fluctuations in live weight are not consistent between days, particularly in ad libitum fed pigs. Hence, Chapter 5 investigated whether overnight feed withdrawal for 11 hours (weaners) or 17 hours (growers and finishers) is effective in reducing between-pig variation in live weight and growth rate. For grower and finisher pigs, feed withdrawal was associated with a reduction in variability in live weight and growth rate by up to 11.5%, whilst the effect was inconsistent in weaner pigs. It is recommended to repeat the investigation on other farms to assess long-term effects on pig performance before general recommendations can be made.

Chapter 6 compared the magnitude of sampling error when sampling pens from batches of pigs, using different sample sizes and sampling methods. Increasing the portion of randomly selected pens reduced the sampling error, but in a diminishing manner. Purposive selection of two pens reduced sampling error by more than 64% compared with random sampling. However, purposive sampling introduces the risk of obtaining biased estimates. Thus, it is recommended to select pens from batches at random. These results may be used as an educational tool to demonstrate how to minimize errors in pig weights. Collecting more accurate weight records is likely to lead to improved interpretability of pig weights, and may promote better use of production data.

Acknowledgements

My postgraduate studies at the EpiCentre involved two projects, a German doctorate[1] and this Master thesis. These two projects evolved from my collaboration with five New Zealand pig farms between 2003 and 2005. My special thanks belong to all these pig producers, their families and farm staff who have provided me access to routinely collected growing herd data and supported me in data collection. My work with these farms has contributed a lot to my understanding of the monitoring process in the growing herd. I want to thank particularly Grant Skilton and his family for their help and for being such a great kiwi family to me. My farm stays have always been a very enjoyable experience.

I want to express special thanks to my supervisor Dr Naomi Cogger for her patience and valuable input. I gratefully acknowledge Professor Roger Morris his continuous support and his great efforts when editing the final document. Furthermore, Dr Mariusz Skorupski's experience in software development and production monitoring was very valuable during the validation process of PigGAIN®, which I used for data management and evaluation. The professional assistance of Dr Patrick Morel and Eric Neumann in critically reviewing parts of the manuscript is greatly appreciated. Besides, I am grateful to Dr David Lawton for introducing me to the pig producers and his initial encouragement.

Writing a thesis is always a challenging task. However, the friendly atmosphere and great resource capacity within the EpiCentre have always made this work place a very pleasant environment, which contributed a lot to the success of this project. I highly appreciate the great support I received from Dr Cord Heuer, Colleen Blair, Simon Verschaffelt, Christine Cunningham, Diane Richardson and Allain Scott. The financial support from the EpiCentre has enabled me to focus entirely on my work and released some financial pressure from my family.

With warm and loving feelings, I want to acknowledge all the effort and understanding of my family who have always supported me in my decisions over the years. Finally, I would like to thank my partner Ian as well as his family for their love, patience and encouragement. We love it!

[1] At http://edoc.ub.uni-muenchen.de/archive/00006596/01/Schauer_Birgit.pdf

1BAcknowledgements

Abbreviations

ADG	Average daily gain, growth rate (kg/d)
AIC	Akaike's information criterion
AL	Ad-libitum (feeding system)
AR(1)	First order Autoregressive covariance term
CI	Confidence interval
CL	Computerized liquid (feeding system)
CV	Coefficient of variation
d	Day(s)
df	Degrees of freedom
IQR	Interquartile range
kg	Kilogram(s)
ln	Logarithm to the base of e (natural logarithm)
MJ	Mega joule
ML	Maximum likelihood
n	Number or sample size
P	P-value
R^2	Squared correlation, R-squared value
RMSE	Root-mean-squared error
SD	Standard deviation
SE	Standard error
Wgt	Weight

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