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An evaluation of traits other than production and its association with the survival of dairy cows milked once a day in New Zealand

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Abstract

New Zealand dairy cows have traditionally been milked twice a day (TAD). However, an increasing number of dairy farms have shifted to once a day (OAD) milking in the last few years for several reasons. A particular emphasis has been placed on the cow's conformation and its management during the milking routine in OAD dairy farms, as these factors might have altered the culling decisions of herds after shifting from TAD to OAD milking. This thesis evaluates production traits and traits other than production (TOP) in the herd of Massey University Dairy 1 since the start of OAD milking and for three consecutive seasons (2013-2015), with an assessment of the influence that these traits have on the cow's survival. Results showed a significant effect of breed, season and lactation on TOP. The scores for most udder traits showed a gradual decrease over lactations. The main reasons for culling were low fertility (37.2%), poor udder conformation (19.9%) and low production (12.8%). Hazard ratios from a Cox proportional hazard model showed that Holstein-Friesian and crossbred cows had a higher likelihood of culling than Jerseys, which also had the highest scores for most udder traits. For some TOP, such as adaptability to milking, rump angle and udder support, higher scores were associated with a lower likelihood of culling. However, intermediate scores were optimum for traits such as body capacity and leg conformation. The results of this thesis are the first to show culling reasons and risk factors for survival in cows recently shifted from TAD to OAD. The analyses of TOP over seasons and over lactations are also unique to this thesis as most studies on this topic only include TOP on first lactation cows. The findings of this thesis indicate that TOP would have a higher priority to make culling decisions in OAD herds during the transition from TAD to OAD milking, compared to TAD herds and also established OAD herds that have used this milking frequency for several seasons. Furthermore, besides body capacity and udder support, traits such as adaptability to milking, rump angle and leg conformation could also potentially be included in a new selection index for OAD dairy cattle.

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“ . . . Hence, if man goes on selecting, and thus augmenting, any peculiarity, he will almost certainly modify unintentionally other parts of the structure, owing to the mysterious laws of correlation”

Charles Darwin

Contents

Abstract	3
Acknowledgements	5
Contents	7
List of tables	9
List of figures	11
List of appendix tables and figures	13
List of Abbreviations	15
Chapter 1 General introduction.....	1
Chapter 2 Literature review	5
2.1 Introduction	7
2.2 Advantages and disadvantages of the OAD system.....	9
2.3 The effect of OAD on the udder.....	11
2.4 Evaluation of traits other than production in dairy cattle.....	12
2.5 Functional conformation in dairy cows.....	13
2.6 Traits other than production in New Zealand dairy cattle.....	15
2.7 Comparison of TOP scores between New Zealand and other countries	18
2.8 Inclusion of TOP within the genetic evaluation for dairy cattle in New Zealand.....	20
2.9 Phenotypic and genetic parameters for TOP	22
2.10 Correlations of TOP with production, fertility, udder health and survival	24
2.11 Relationship between longevity and culling in dairy herds	27
2.12 Longevity of New Zealand dairy cattle.....	28
2.13 Culling reasons and optimal replacement rate in New Zealand dairy herds.....	29
2.14 Culling reasons in dairy cows milked OAD and variability in the response to OAD ..	30
2.15 Summary and formulation of research problem.....	32
Chapter 3 Effect of season, lactation number, breed and culling on traits other than production in dairy cows milked once a day	35
3.1 Abstract	37
3.2 Introduction	38
3.3 Materials and methods	39
3.4 Results	44
3.5 Discussion	61
3.6 Conclusions	67

Chapter 4 Analysis of factors that influence the survival of dairy cows milked once a day ..	69
4.1 Abstract	70
4.2 Introduction	71
4.3 Materials and methods	72
4.4 Results	77
4.5 Discussion	84
4.6 Conclusions	91
Chapter 5 General discussion.....	93
5.1 Use of BW and PW for culling decisions in OAD dairy farms	96
5.2 Traits other than production in OAD dairy farms	96
5.3 Improvement of TOP in OAD dairy farms	98
5.4 Inclusion of TOP in selection indices for OAD dairy farms.....	100
5.5 General conclusions	102
References.....	103
Appendix.....	111

List of tables

Table 2.1. Milking frequencies of cows with more than three herd tests during the 2014-2015 production season in New Zealand	7
Table 2.2. Comparison of breed composition and age structure between herds milked OAD and TAD in New Zealand	9
Table 2.3. Predicted productive performance for Holstein-Friesian (F) and Jersey (J) cows milked OAD or TAD for 4 years	10
Table 2.4. Traits other than production recorded by farmers and inspectors in New Zealand dairy farms	16
Table 2.5. Means and standard deviations (SD) for traits other than production (TOP) of dairy cattle in New Zealand and other countries.....	19
Table 2.6. The relative weighting (%) of traits in international breeding programmes	21
Table 2.7. Replacement rates and culling reasons in New Zealand dairy farms over three seasons from 1998 to 2000	30
Table 3.1. Sample size (N) and breed proportion (%) of the herd at Massey University Dairy 1 by season.....	39
Table 3.2. Mean, standard deviation (SD), minimum and maximum for production traits, fertility traits and herd characteristics of cows from Massey University Dairy 1 over three seasons	44
Table 3.3. Mean, standard deviation (SD), minimum and maximum for traits other than production of cows from Massey University Dairy 1 over three seasons	45
Table 3.4. Mean and standard error (SE) of production traits, fertility traits and herd characteristics of cows from Massey University Dairy 1 over three seasons.....	46
Table 3.5. Mean and standard error (SE) of production traits, fertility traits and herd characteristics of Holstein-Friesian (F), Jersey (J) and crossbred cows (FxJ) from Massey University Dairy 1 over three seasons	47
Table 3.6. Mean and standard error (SE) of production traits, fertility traits and herd characteristics over lactations of cows from Massey University dairy farm No. 1.	48
Table 3.7. Mean and standard error (SE) of production and fertility traits and herd characteristics of retained and culled cows from Massey University dairy farm No. 1 over three seasons.	49

Table 3.8. Mean and standard error (SE) of traits other than production of cows from Massey University dairy farm No. 1 for three seasons	50
Table 3.9. Mean and standard error (SE) of traits other than production of Holstein-Friesian (F), Jersey (J) and crossbred cows (FxJ) from Massey University dairy farm No. 1 over three seasons	52
Table 3.10. Mean and standard error (SE) of traits other than production over lactations of cows from Massey University dairy farm No. 1	54
Table 3.11. Mean and standard error (SE) of traits other than production of retained and culled cows from Massey University dairy farm No. 1 over three seasons	56
Table 3.12. Phenotypic correlations between traits other than production, production and fertility traits in cows from Massey University dairy farm No. 1 over three seasons	57
Table 3.13. Phenotypic correlations among traits other than production in cows from Massey University dairy farm No. 1 over three seasons	59
Table 3.14. Repeatability of traits other than production in cows from Massey University dairy farm No. 1 for three seasons	60
Table 4.1. Sample size (N) and breed proportion (%) of the herd at Massey University Dairy 1 by season.....	73
Table 4.2. Culling reasons for three seasons in the herd at Massey University Dairy 1	77
Table 4.3. Number of censored and uncensored cows from Massey University Dairy 1 by season in which OAD started.....	79
Table 4.4. Parameters for the Cox proportional hazards regression model on the survival of cows from Massey University Dairy 1	80
Table 4.5. Hazard ratios and 95% coefficient interval of risk of culling by breed, fertility and milk production in cows from Massey University Dairy 1.....	81
Table 4.6. Hazard ratios and 95% coefficient interval of risk of culling by score for traits other than production in cows from Massey University Dairy 1	82
Table 5.1. Weightings for selection indices of dairy cattle in twice and once a day milking herds in New Zealand	101

List of figures

Figure 2.1. Regional distribution of OAD herds in New Zealand for the season 2014-2015 ..8	
Figure 2.2. Graphic illustration of traits other than production evaluated in New Zealand dairy cattle.....17	
Figure 3.1. Trend of management and conformation traits from cows at Massey University Dairy 1 over three seasons.....51	
Figure 3.2. Trend of conformation traits from cows at Massey University Dairy 1 over lactations.....55	
Figure 4.1. Kaplan-Meier curve for survival of cows milked once a day from Massey University Dairy 1 over the entire three seasons78	

List of appendix tables and figures

Appendix tables

Table A1. Heritability, genetic and phenotypic correlations among traits other than production in New Zealand and overseas dairy cattle	¡Error! Marcador no definido.
Table A2. Genetic correlations between TOP, production and fertility traits in New Zealand and overseas dairy cattle	114
Table A3. Proportion of skewness and kurtosis reduced by using Snell scores obtained with the definition of three different groups of observations in cows from Massey University dairy farm No 1.....	115
Table A4. Snell scores for TOP obtained by using production season as groups of observations in cows from Massey University dairy farm No 1.....	116
Table A5. Variance inflation factors for the potential explanatory variables of survival of cows from Massey University dairy farm No 1.....	117
Table A6. Summary of the stepwise selection with the variables retained and removed in the last step of model building.....	119
Table A7. Effect of explanatory variables on the survival of cows from Massey University dairy farm No. 1.	120

Appendix figures

Figure A1. Eigenvalues and cumulative variance explained by potential predictor variables of culling in Massey University Dairy 1	118
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List of Abbreviations

BW	Breeding worth
BCS	Body condition score
DM	Dry matter
EBV	Estimated breeding value
EV	Economic value
FY	Fat yield
F	Holstein-Friesian
FxJ	Holstein-Friesian and Jersey crossbred
J	Jersey
LIC	Livestock Improvement Corporation
LWT	Liveweight
MSY	Milk solids yield
MY	Milk yield
NI	Net income
OAD	Once a day
PV	Production value
PW	Production worth
PY	Protein yield
SCC	Somatic cell count
SCS	Somatic cell score
SMFS	Interval from start of mating to first service
SR21	Submission rate at 21 days after the start of breeding
SR42	Submission rate at 42 days after the start of breeding
TAD	Twice a day
TOP	Traits other than production

