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# **Genetic analysis of incidence of clinical mastitis in New Zealand dairy cattle**

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## ABSTRACT

The aim of this thesis was to estimate genetic parameters and examine the effect of different dairy breeds and heterosis on the incidence of clinical mastitis in New Zealand dairy cattle. The data set used in this study was records of clinical mastitis collected during 2005/06 to 2008/09 seasons. The data set consisted of 92,961 lactations from 53,419 Holstein Friesian, Jersey and HF x JE crossbred cows. The cows were the progeny of 641 sires from 167 dairy herds that participated in a progeny-testing programme for sires. Cows with at least one event of clinical mastitis during the season were coded 1 and cows without mastitis were coded 0. The collective incidence of clinical mastitis was 11% for 92,961 lactations. A mixed model was used to estimate heritability, repeatability and breed effects for the incidence of clinical mastitis. The model included the fixed effects of contemporary group (herd and year), calving month, breed, parity, breed composition and heterosis effect of crossbred cows. The random effects included were additive animal and permanent environment of cow.

Heritability for the incidence of clinical mastitis was  $0.015 \pm 0.003$  and repeatability was  $0.070 \pm 0.005$ . By breed comparison, Jersey cows had 2.9% less incidence of clinical mastitis than Holstein-Friesian cows and the heterosis effects in crossbred cows had 13.4% less than the average of the parental breeds. The results from this study suggest that selection for resistance to clinical mastitis will result in a low rate of genetic gain but using Jersey sires of low breeding values can be an alternative to increase genetic resistance to clinical mastitis in New Zealand dairy cattle.

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## TABLE OF CONTENTS

Abstract	ii
Acknowledgements	iii
List of tables and figures	vi
List of abbreviations	vii
<b>CHAPTER 1:</b>	
1 Introduction	1
<b>CHAPTER 2:</b>	
2 Literature reviews	4
2.1 Mastitis in dairy cattle	5
2.1.1 Pathway of infection	6
2.1.2 Major pathogens causing mastitis	7
2.1.3 The association between mastitis and SCC	9
2.1.4 Factors affecting mastitis	9
2.1.5 Costs of mastitis	11
2.1.6 Effects on milk yield and milk composition	12
2.1.7 Mastitis detection	15
2.1.8 Mastitis control	17
2.2 Proposed approaches to improve mastitis resistance	19
2.2.1 Breed differences for clinical mastitis	19
2.2.2 Heterosis effects for mastitis resistance	21
2.2.3 Genetic selection for mastitis resistance	25
2.3 Current practice and its limitation	29
<b>CHAPTER 3:</b>	
3 Materials and methods	30
3.1 Data	31
3.2 Statistical Analysis	31
<b>CHAPTER 4:</b>	
4 Results	35

**CHAPTER 5:**

5 Discussion	42
5.1 Breed differences and mastitis incidence	43
5.2 Lactation periods and the incidence of CM	45
5.3 Selection for CM	46
5.4 Heterosis effect and its potential in combatting mastitis in dairy cattle	48

**CHAPTER 6:**

6 Conclusion	51
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<b>REFERENCES</b>	<b>53</b>
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## LIST OF TABLES AND FIGURES

### CHAPTER 2:

Table 2.1	Main changes in the production and composition of milk caused by mastitis.....	13
Table 2.2	Loss of production due to increased SCC for an average mixed age cow in New Zealand.....	14
Table 2.3	Hybrid vigour estimates for three first crosses of cows, expressed in genetic standard deviation (SD) units.....	23
Figure 2.1	Genetic trend for SCC in the national cow population.....	24

### CHAPTER 4:

Table 4.1	Daily milk, fat and protein yields and SCS of breeds of New Zealand cows.....	36
Table 4.2	Incidence of CM for different breeds in New Zealand.....	37
Table 4.3	Phenotypic correlations (1 <sup>st</sup> row) and p-value (2 <sup>nd</sup> row) between milk traits, SCS, and incidence of CM in New Zealand dairy cows.....	37
Figure 4.1	Number of cases of CM during the lactation.....	38
Table 4.4	Estimates of incidence of CM in different lactation number.....	39
Table 4.5	Estimates of variances, heritability and repeatability for incidence of CM in New Zealand dairy cows.....	39
Table 4.6	Descriptive statistics of sires to EBVs for CM and breed.....	40
Figure 4.2	Distribution of sires according to EBVs for CM and breed (HF = Holstein-Friesian, JE = Jersey).....	40
Table 4.7	Breed and heterosis effects for incidence of CM in New Zealand dairy cows.....	41

### CHAPTER 5:

Table 5.1	Trend in the percentage of inseminations of each major breed for the last 40 seasons.....	49
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## LIST OF ABBREVIATIONS

### Abbreviations

AY	Ayrshire
BS	Brown Swiss
BV	Breeding value
BW	Breeding worth
CG	Contemporary group
CM	Clinical mastitis
CMT	Californian Mastitis Test
DairyNZ	Dairy New Zealand
EBVs	Estimated breeding values
F <sub>1</sub>	First cross
HF	Holstein-Friesian
IMI	Intra-mammary infection
JE	Jersey
kg	Kilogram
LIC	Livestock Improvement Cooperation
MAS	Marker-Assisted Selection
ms	Milksolids (fat + protein)
NR	Norwegian Red
SAS	Statistical Analysis Software
SCC	Somatic cell count
SCM	Subclinical mastitis
SCS	Somatic cell score
SD	Standard deviation
<i>Staph. aureus</i>	<i>Staphylococcus aureus</i>
<i>Strep. agalactiae</i>	<i>Streptococcus agalactiae</i>
<i>Strep. dysgalactiae</i>	<i>Streptococcus dysgalactiae</i>
<i>Strep. uberis</i>	<i>Streptococcus uberis</i>
WMT	Wisconsin Mastitis Test
XB	Crossbred of Holstein-Friesian and Jersey