A COMPARISON OF METHODS FOR THE DIAGNOSIS OF BOVINE SUBCLINICAL MASTITIS WITHIN NEW ZEALAND DAIRY HERDS

A thesis presented in partial fulfilment of the requirements
for the degree of Doctor of Philosophy in Veterinary Clinical Science
at Massey University.

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1990

ABSTRACT

During the 1986-1987 and 1987-1988 dairy seasons, milk samples were taken from cows within three New Zealand dairy herds. Individual quarter foremilk samples were taken using aseptic precautions, and whole udder, composite samples were obtained using a milk meter, at monthly intervals.

The three herds differed with respect to herd size, milking shed design, use of teat spraying, and the incidence of mastitis, both past and present.

The bacteriological status of each quarter was determined, and the ability of the following parameters to distinguish between infected and uninfected quarters, and between infected and uninfected cows was ascertained.

(1) Somatic cell count
(2) Sodium concentration
(3) Potassium concentration
(4) Electrical conductivity
(5) pH
(6) Lactose concentration
(7) N-acetyl-ß-d-glucosaminidase activity
(8) α1-antitrypsin concentration

With the exception of the antitrypsin concentration, the concentration of each parameter in the milk changed during the course of milk removal. The effect of this variation on the composition of the composite milk sample is discussed.

The stage of lactation at which the sample was taken exerted a significant effect on the level of each parameter in quarter foremilk samples. Similar effects were observed with composite samples, although statistical significance was not reached in every instance. Both infected and uninfected udder quarters were affected by the stage of lactation.

The age of the cow exerted a significant effect on the levels of a number of the parameters within quarter foremilk samples. The effect of age of the cow on the level of each parameter within composite milk samples was generally not significant.

The bacteriological status of the udder quarter exerted a significant effect on the level of each parameter in at least one of the three herds. The effect of the bacteriological status on the pH and on the potassium concentration of the milk was smaller in degree than was the effect on the remaining parameters.

The herds differed with respect to bacteriological findings. Herd A showed a lower incidence of infection than did herds B or C. The incidence of infection with minor pathogens was highest within herd B, while the incidence of infection with major pathogens was highest within herd C. The incidence of infection tended to increase with the age of the cow.

While each of the eight parameters showed high specificity, the sensitivity was generally lower. An exception to this finding was the somatic cell count which showed both high sensitivity and high specificity.

The somatic cell count was able to correctly classify more than 75 % of quarter foremilk samples in each of the three herds, being more consistent in this respect than were any of the other parameters, the diagnostic abilities of which varied between herds.

The addition of second parameter to a model containing the somatic cell count generally did not increase the diagnostic accuracy of the system.

The threshold value was found to vary both between herds, and between stages of the lactation, this variation being greatest for the somatic cell count. Providing that the threshold is adjusted for the stage of lactation, the somatic cell count is able to accurately predict the infection status throughout the dairy season. The selected threshold should take into account the level of bacterial infection within the particular herd to which it will be applied.

ACKNOWLEDGEMENTS

The work reported in this thesis was carried out with the generous financial assistance of the Livestock Improvement Corporation of the New Zealand Dairy Board.

Sincere thanks are due to the following persons:

Mr Ian Steffert and Dr Colin Holmes, my two supervisors, provided invaluable advice, constructive criticism and support during the course of the project.

Members of the Somatic Cell Counting Subcommittee of the Livestock Improvement Corporation, including Mr Harry Brown, Dr Graeme Morris, Mr Ian Hook and Dr Brian Wickham were very supportive.

Professor Robert Anderson and Dr John Rendel offered advice regarding the application of statistical procedures, and the use of the Massey University mainframe computer.

Professor Robert Jolly was very supportive throughout the project, and was responsible for supervising a course on the anatomy and pathology of the mammary gland. Similarly, Dr Duncan McKenzie is responsible for my knowledge of lactational physiology.

Cheryl Cooper and Jenny Wickham helped with the milk sampling, often under trying circumstances. Dr Bob Greenway, Geraldine Borrie, Janice Rumbal and Margaret Scott provided technical advice concerning the various assays, and were always very patient.

The somatic cell counting was carried out by Chris Bedford, Raewyn Smith and Joanne Jeffrey at the Wellington-Hawkes Bay Livestock Improvement Corporation, and latterly by the staff of the Hillcrest Testing Center in Hamilton.

Lynne Cullinane provided advice, encouragement, and invaluable assistance with word-processing and printing of the thesis, while Jan Schrama spent many hours making the bacteriological media, often at short notice, but always in good

humour. Rose Law and Peter Wildbore assisted with the ordering of chemicals and media.

The staff of the Massey University Computer Center provided a very professional, yet friendly service.

Special thanks are due to the owners and managers of the three dairy farms without whose co-operation this project would not have been possible. The sampling procedures caused disruption to the normal milking routine, and their tolerance and patience was sincerely appreciated.

Finally, a huge debt of gratitude is due to my family for their patience and support during the course of the project.

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