Comparison of on-line SCC analysers and herd testing for estimating mastitis detection rates

IL Zhang[1], JH Williamson[2], SJ Lacy-Hulbert[2]

[1]*Livestock Improvement Corporation, Private Bag 3016, Hamilton 3240, New Zealand*
[2]*DairyNZ Ltd., Private Bag 3221, Hamilton, New Zealand*

Summary

On-line somatic cell count (SCC) analysers enable automated SCC testing during milking for individual cows, providing farmers with more numerous measurements than conventional herd testing. The purpose of this study was to determine the effect of increased frequency of milk sampling on detecting elevated SCC due to mastitis. We compared the rate of detection of mastitis events using on-line SCC analysers versus conventional herd testing with a simulated dataset of 100 random herds of 1,000 cows. Five herd test scenarios (two, four, six, eight, or ten herd-test dates per lactation) were compared to 20 on-line SCC analyser scenarios (cows milked once or twice daily, varying the proportion of on-line SCC analysers installed on bails, ranging from 2% (i.e. one in 50 bails) up to 100%). Random mastitis events for each cow were modelled based on composite cow SCC and individual quarter bacteriological data derived from a dataset of 2,345 cow-lactations. We then calculated the average probability of on-line SCC analysers or herd testing detecting these mastitis events, assuming 280 days of lactation. Herd testing four times or ten times per lactation was found to detect 47% and 75% of mastitis cases, respectively. On-line SCC analysers installed on 10% of bails with once-a-day milking detected 84% of cases. We observed that installing on-line SCC analysers, even on a small proportion of bails was more likely to detect mastitis events than standard herd testing, in a simulated dataset.

Keywords: mastitis, on-line SCC analysers, herd testing, automated milk sensors, simulation, somatic cell count, bivariate distribution, copula