Effectiveness of selection for lower somatic cell count (SCC) in herds with different levels of SCC

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Health risks for high producing dairy cows can partly be reduced by selection on health traits, such as SCC. In breeding value estimation, SCC is commonly log-transformed to somatic cell scores (SCS) for statistical reasons. Our objectives were to investigate selection responses for reduced SCC in herds with different levels of SCC and whether breeding values on the SCS scale fully represent those selection responses. Sires breeding values for SCS were estimated using 282,078 lactations of 3379 herds in the Netherlands. Differences in daughter average SCC, between the worst and best bulls for SCS, were respectively 39,600 and 65,800 cells/ml in the 25% of herds with lowest and highest SCC. This scaling effect indicates that selection on SCS is more effective in herds with high SCC, which can be interpreted as a form of genotype by environment interaction. On the SCS scale, ranges of daughter average performance were comparable in herds with different SCC levels, indicating that the log-transformation removed the scaling effect and consequently the information that explains the environment specific selection response. The hypothesis of this work is that reaction norm models, taking this genotype by environment interaction into account directly on the scale of SCC, may provide a better prediction of the true breeding values in different herds.