
Between-herd variation in cow resilience and relations to management

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Resilient cows are minimally affected in their functioning by disturbances, such as diseases or heat waves, and when affected they quickly recover. Low variance of daily deviations from expected milk yield (LnVar) indicates few fluctuations in milk yield due to disturbances and thus good resilience. Genetic variation in LnVar has been shown, and therefore we can breed for lower LnVar and thus improve resilience. However, it is unknown to what extent resilience of cows differs between herds, and how cow resilience is related to herd management. Therefore, the objectives of this study were (1) to estimate herd-year effects for the resilience indicator LnVar using a mixed animal model, and (2) to determine associations between these herd-year effects and herd parameters derived from milk production registration (MPR) data. Herd-year effects were estimated for 9,917 herd-year classes based on the LnVar of 227,615 primiparous cows. For these same herd-year classes, also herd parameters were derived from MPR data, such as average somatic cell count, proportion of cows with a rumen acidosis indication, and herd size. Correlations between these herd-year parameters and the herd-year effects on LnVar were then calculated. LnVar differed considerably between herd-years; the LnVar in the herd-year with the largest effect was more than 6 times as large as the LnVar in the herd-year with the smallest effect. The correlation between herd-year effects of subsequent years within the same farm was on average 0.69, indicating that within farms LnVar was quite consistent between years. The correlations between the herd-year parameters and the herd-year effects on LnVar showed that a high LnVar was associated with a high proportion of cows with a rumen acidosis indication ($r = 0.31$), a high average somatic cell score ($r = 0.19$), a low average fat content ($r = -0.18$), a long calving interval ($r = 0.14$), and a low survival to second lactation ($r = -0.13$). These correlations indicate that herds with a high LnVar have suboptimal management with regard to resilience. In conclusion, large differences in LnVar exist between herds, and herd-year effects on LnVar are a promising tool to inform farmers about the resilience of their cows.