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Genetic parameters for β-hydroxybutyrate concentration in milk in Spanish dairy cows

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Nowadays, breeding for disease resistance is a priority in most breeding programs across species. Subclinical ketosis is diagnosed by an increase of β-hydroxybutyrate (BHBA) concentration in blood, due to a negative energy balance at the early lactation. Spanish Holstein Association (CONAFE) is collecting BHBA concentration in milk since 2013. The objective of this study was to evaluate the genetic component of β-hydroxybutyrate concentration in milk as a proxy for a potential selection criterion against subclinical ketosis. Dataset contained a total of 872,302 records of 317,522 different cows from 5 to 68 days in milk (DIM). The analyses were performed separately for first lactation (L1), second lactation (L2) and third or more lactations (L3+). The BHBA was log transformed. The tested models included DIM (as covariate or as discontinuous variable), year (10 levels), region (8 levels), herd (between 1,886 and 1,740 levels), herd-year (between 7,678 and 6,700 levels), region-year (between 35 and 37 levels), age at first calving in days and parturition number (14 levels) as fixed effects in different combinations. Herd-year and environmental permanent effects were included as random variables besides residual and additive genetic effects. The ASReml v.4.2 and VCE6.0 software were used to estimate genetic parameters. The pedigree contained a total of 665,876 individuals. Model election was based on Akaike Information Criterium (AIC). Best model included age at first calving, DIM (as covariate for L2 and as discontinuous effect for L1 y L3+), region-year and parturition number (L3+) as fixed effects. The heritabilities ranged between 0.044 (0.003) for L1 to 0.027 (0.002 for L3+). The ratio of herd-year was higher that the genetic component, being 0.06 for L1 and 0.05 for the rest of traits. Environmental permanent effect ratio ranged between 0.08 for L2 and 0.03 for L3+. These preliminary results indicated that the genetic component of BHBA concentration is low, but enough to include the Spanish Holstein breeding programs, and a genetic evaluation could be performed in following steps for this trait.

Comparison of self-assessment and objective indicators of attributes driving farms resilience

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Strengthening farming systems' resilience is on the top of the EU and national political agendas. Given the relative novelty of resilience research field, several approaches have been proposed to develop this concept, but there is a lack of methodological consensus to assess resilience at a farm level. Commonly, resilience assessments have been based on objective or subjective measures, assuming that each approach have different strengths and weaknesses. However, very little is known about how subjective self-assessment and objective indicators-based resilience measures compare. Our study aims to fill this research gap in the farming system's field by providing a comparison of both measurement approaches. We understand resilience as result of farm and personal attributes contributing differently to farm robustness, adaptability, and transformability, through the resilience principles set by the Resilience Alliance: system reserves, diversity, tightness of feedbacks, openness, and modularity. Based on this, we identified attributes as specific factors measuring each principle and we did an evaluation of them using self-assessed statement and objective indicators separately. Finally, statistical analyses were based on 149 face-to-face farmer surveys covering four representative small ruminant farming systems in Spain. Results show a moderate correlation between indicators and self-assessed measures, which vary across attributes (-0.27/0.45), suggesting that the two types of measures are not interchangeable. However, in most cases, a positive correlation exists. The clearest alignment between the two measurements is found in attributes of social capital, redundance, and knowledge networks, while the highest discrepancy is found in farmer life quality. We argue that our results have new highlights for the understanding of farm resilience assessments.