

Genetic evaluation of reproductive efficiency traits in Portuguese Holstein Cattle

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Increased milk production has been the main objective of most breeding programs for the Holstein breed. In Portugal for the last 50 years, selection of dairy cattle coupled with management improvements resulted in a production increase of almost 6,000 kg of milk/cow/year. However, reproductive efficiency has decreased over the years with a steady increase in the number of artificial inseminations per pregnancy, on calving to 1st AI interval (CAI), on days open (DO), and on calving intervals (CI). Initially, the program of genetic improvement took into account only production parameters (milk and milk components), functional characteristics (somatic cells count), and conformation, to construct the Total Merit Index (MÉT). Routine genetic analysis for those reproductive traits including daughter pregnancy rate (DPR) defined as the percentage of oestrus cycles of 21 days, needed to get a pregnancy after 42 days of voluntary waiting period, are now established with 2 official genetic evaluations per year. Phenotypic mean \pm SD for 2021 were 427 \pm 84 d for CI, 88 \pm 32 d for CAI, 124 \pm 53 d for DO and 28 \pm 17% for DPR. Heritability for these traits were low and varied between 0.05 and 0.09 with negative genetic correlation with production traits (CI-milk: -0.04, CAI-milk: -0.16, DO-milk: -0.08). Larger CI, CAI, DO represent lower reproductive efficiency, and inversely, higher DPR indicates increased reproductive efficiency making it more ease to understand in a selection index context. CI, CAI, and DO had an almost coincident pattern for the genetic progress curve over the years, while the curve for DPR is almost the inverse. Genetic progress for DPR have been improving in recent years, with positive trend of 0.4%/year in males and 0.3%/year in females. This improvement may be the result of indirect selection due to the use of imported semen from sires selected for high fertility. Since 2022, reproductive traits are also included in IPT, a new total merit index for dairy cattle in Portugal.

Effect of cow resting time during dry period on colostrum production and quality

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Colostrum quality is crucial for adequate transfer of passive immunity to the new-born calves, and it may be influenced by several animal and management factors: among others it may be affected also by cows resting time, during the dry period. The aim of the study was to investigate the effect of dry period length, parity number and resting time during cow dry period, on colostrum production and quality. In addition, the effect of colostrum production on the quality was investigated. Data were collected in two dairy farms, located in Lombardy (Italy), where dry cows were reared in a free-stall pen, either with cubicle housing system or deep litter system. Activity of 37 cows were automatically recorded by individual 3-axes acceleration loggers (HOB0 Pendant G Data Loggers, Pocasset, MA), throughout the duration of dry period. Colostrum quality was measured both by electrophoresis, as immunoglobulins concentration (IgG g/l), and by digital refractometer as Brix %. Data were analysed by Proc GLM, using SAS 9.4. The results highlight that colostrum quality, in terms of IgG concentration, was significantly affected by resting time ($P=0.0597$), number of parity ($P=0.0028$) and colostrum production ($P=0.0118$). In particular, a higher IgG concentration was associated with a shorter resting time (67.6 vs 47.1 g/l, for resting time <767 and >767 minutes/day, respectively), higher number of parity (74.3 vs 40.3 g/l, for multiparous and secondiparous cows, respectively) and lower colostrum production (71.3 vs 43.4 g/l, for <8 and >8 l of colostrum, respectively). No effect of dry period length on IgG concentration was detected. However, colostrum quality, as Brix%, was significantly affected only by colostrum production ($P=0.0047$), with higher Brix percentage in the presence of lower colostrum production (26.6 and 21.7% Brix, for <8 and >8 l of colostrum, respectively). Colostrum production was not significantly affected by animals resting time during the dry period, nor by the other parameters tested. Acknowledgements: The study was supported by Progetto MAGA Regione Lombardia, OPERAZIONE 16.1.01 – Gruppi Operativi PEI.