Session 11: Recent developments in genomic evaluations: New traits, new populations. Chairs: Andrew Cromie, María Jesús Carabaño

S11.O-05

GENETIC CORRELATIONS BETWEEN PRODUCTIVE AND REPRODUCTIVE COW-SISTERS PERFORMANCE AND FEED EFFICIENCY AND GREENHOUSE GASSES EMISSIONS IN GROWING BROTHERS-BULLS

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The objective of this study was to investigate how productive and reproductive performance of Italian Holstein cows would be affected by selecting for improved feed efficiency and reduced greenhouse gasses emissions of growing bulls.
The study involved 221 growing candidate bulls kept at the Genetic Centre of Italian National Breeders Association for the Holstein, Brown and Jersey dairy cattle breeds (ANAFIBJ) and phenotyped using the GreenFeed system (C-Lock Inc., Rapid City, SD, USA) and the Roughage Intake Control system (Hokofarm Group, Marknesse, The Netherlands). In addition, we included 1,686 cows from commercial farms and phenotyped for production and reproduction during routine data collection (e.g., milk yield, protein yield, days from first to last insemination, body condition score, predicted body weight). Cows were selected for the analyses because they were full-sisters, paternal or maternal half-sisters of the candidate bulls. All the individuals were genotyped using different SNP panels and then imputed to a medium density panel (~69,000 markers) using routine procedures. All the analysis were carried out using software from the BLUPf90 suite of programs. Results showed moderate positive correlations between CH_4 and CO_2 emissions in bulls and milk, fat, protein, and lactose yield in full/half-sisters. Similar correlations were found for feed intake and feeding duration. All the correlations reached the values of 0.70 at most, suggesting the possibility to increase yield in the cows while controlling intake and emissions in the growing bulls. Similarly, correlations showed the possibility of improving cow fertility while also reducing feed intake and emissions in the bulls.
In summary, the data collection performed on the growing candidate bulls appears to be a valuable option, because the direction of the correlations follows the expected values, e.g., higher yield means higher intake and emissions. However, these within-breed across-population genetic correlation estimates, being lower than 1.00, suggest the possibility of improving cow productivity and fertility while also improving efficiency and environmental impact in the bulls.