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Title of the presentation

Animal breeding sustainability: the Italian Holstein experience

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Session: Sustainability in the context of animal recording

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ABSTRACT

Livestock farming, especially the breeding of dairy ruminants, has a significant influence on environmental balance, accounting for about 50 % of greenhouse gases (GHG) emissions from the primary sector. To increase the environmental sustainability of the dairy sector, even in the face of a growing and continuous awareness and sensitivity of the consumer towards this topic, a holistic approach is needed. Furthermore, it is necessary to consider that GHG recording is complex, expensive and time consuming.

In this contest the national breeding program and the genetic improvement can provide relevant contribution. Since 2018, the National Association of Italian Holstein, Browns and Jersey Breeders (ANAFIBJ) has started to measure methane emissions on young Italian Holstein genotyped bulls candidates to the artificial insemination (AI) in Italy using the GreenFeed system (C-Lock Inc., Rapid City, SD) at the Genetic Centre. This activity has allowed to obtain a dataset of more than 10,250 phenotypic information on 138 young bulls. Preliminary analyses showed that animals emitted 225 g of CH4/d with a heritability (h2) of 0.346. ANAFIBJ wants to contribute further and to lay the foundations for a continuous recording of these phenotypes through the implementation of experimental protocols to be applied in commercial farms and experimental stations. Methane emissions will be estimated in 3,000 genotyped Italian Holstein dairy cows (some of them daughters of the young bulls recorded at the Genetic Centre) distributed in 100 commercial farms throughout the country using Laser Methane Mini (LMM, Crowcon, Abingdon, UK). At experimental stations, methane emissions of about 200 genotyped Italian Holstein young bulls will be quantified using the GreenFeed system (C-Lock Inc., Rapid City, SD) and LMM. In addition, the main biometric measures will be recorded and samples of ruminal fluid and feces will be collected. Biological samples will be frozen and stored at -80°C, then they will be destined to the laboratory for instrumental and bioinformatic analysis.

Activities in commercial farms and in experimental stations described above will allow to study in deep the knowledge of the microbiome-host and environment-microbiome interaction and to evaluate the reliability of feces as a proxy of rumen sample. Furthermore, it will be possible to estimate the genetic parameters and to develop models for genetic and genomic evaluations of methane emissions

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