Abstract Submission Form

Title (Mr./Mrs/Dr./Prof.)   Mrs

Presenting author   Lucia Trapanese

Institute

> Institute/company: University of Federico II, Department of Electrical Engineering and Information Technologies

> Adress: Via Claudio, 21 Napoli

> ZIP/Postal code: 80125   City: Naples

> Country: Italy

Insert all authors and institutions

L.Trapanese (1), N.Pasquino (1), A.Salzano (2), and M.Hostens (3,4)

(1) Department of Electrical Engineering and Information Technologies, University of Naples Federico II, Italy
(2) Department of Veterinary Medicine and Animal Production, University of Naples Federico II, Naples, Italy
(3) Department of Animal Sciences and Aquatic Ecology, Faculty of Bioscience Engineering, Ghent University, 9000 Ghent, Belgium
(4) Department of Animal Science, College of Agriculture and Life Sciences, Cornell University, United States

Preferred presentation

> Oral

Preferred session

> Session 1: WG Animal Data Exchange – Decision Support Tools of the Future – Promoting Sustainability Farm Management

Email of corresponding author   lucia.trapanese2@unina.it

Title of your paper   Assessment of Mediterranean buffalo lactation curves shape using lactation models

Insert ABSTRACT text

"Mozzarella di bufala Campana DOP" is the main dairy product of Italian buffalo, and thanks to its organoleptic properties and taste, it is appreciated and demanded worldwide. To cover this production request, an increased yield is beneficial. In light of this, more analytical tools are needed to assess Buffalo herd productivity . In Italy, the number of buffalo has increased by the 173% from 1996 until now with a total of around 425000 buffaloes. In contrast to dairy cows, adoption of new technology such as

automatic systems is limited. Milk yields are recorded by hand making it time-consuming and error prone. As a result, few data are available in buffalo lactations. The analysis of lactation curve shape has been shown to be useful for technicians and farmers to understand the production of milk yield and helps making better management decisions. Lactation curve models have not yet been explored in buffaloes opposed to dairy cows where lactation curve models have been adopted by the entire industry such as the Wood, Wilkmink or Milkbot equations. The aim of our work is to explore lactation curve models applied to Mediterranean Italian buffaloes by performing a comparative assessment of Wood and Milkbot equations. Given the low number of recordings in Buffaloes, we explored the impact of low frequent sampling schemes on the overall goodness-of-fit of the models. The analysis was performed on a large dataset containing the milk yield, calving date, lactation number and days in milk from 379 buffalo herds, 96342 animals, and 1182919 observations over a 4 year period from 2013 until 2016. Animals with at least five observations per lactation were chosen to ensure coherent fitting with at least the number of observations equal to the number of the regression parameters of the model. All data processing was done through R software (version 4.3.2).

To start the fitting process, priors for the regression parameters were chosen based on a literature review and adjusted for buffalo species. Next, both Wood and Milkbot models were fitted using priors based on literature. After the first fitting step, mean and standard deviation (sd) of regression parameters from the results were used to fit all lactations for a second time. Performance of these two final models was done using the coefficient of determination (R^2). Wood's model performed slightly better than Milkbot model with $R^2 = 0.75 \pm 0.01$ and 0.72 ± 0.01, respectively which show the good ability of the models to fit buffalo daily milk production. These results encourage adopting a more analytical approach in buffalo breeding to obtain in-depth phenotypes on their milk productive capacity. Although, Milkbot performed slightly worse than Wood, Milkbot directly provides information on the loss of productivity capacity which can be converted into a measure of persistency. In conclusion, we proposed the first study to describe lactation curves in buffaloes to promote dissemination of precision methods from the Holstein to Buffalo livestock sector.