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## **PREDICTION OF SUCCES OF INSEMINATION WITH PAST DAILY MILK YIELD WITH A FUNCTIONAL GENERALIZED LINEAR MODEL**

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In modern dairy cows farming, the recent availability of numerous automatically collected data to phenotypic functional traits opens new opportunities. Body weight, milk yield, progesterone level in milk, food intake are now often available on a daily or more frequently basis. This information which completes the traditionally manually collected one is mostly under exploited. These daily records result in new functional data from different kind of variables, which are of interest to improve animals performance and longevity. Being able to identify and analyse such interesting and original curves is then a new and exciting challenge in dairy management. Parametric approaches are traditionally used and regarding milk yield curves, Wood model (1967) is being used for decades. These models are very efficient on a population level, but are out of interest on an individual level.

B-spline modeling appear to be more accurate to perform such studies and were used to study daily milk yield in dairy lactating cattle. 362 milk yield curves of the 42 first days of lactation are available to predict success of first insemination, done after these 42 days if a heat is observed on a cow. Milk yield curves are smoothed on a basis of 21 splines and a little smoothing parameter to keep variations. A functional generalized linear model with a logit link and the binomial family is performed to predict success at first insemination. Spline smoothing functions and their first and second derivatives are considered as functional predictors. Breed (Normande or Holstein) and parity (primiparous or multiparous) are added in the model as non functional predictors. Comparing to a classical model with the milk yield sum instead of functional variables, functional model decrease the resubstitution error rate of 2%. Adding others functional variables in the model such as body weight or body condition score should improve quality prediction.