

Association between udder health genomic breeding values and dairy and health traits in French cows

R. Lefebvre¹, S. Barbey², F Launay², M. Gaborit², L. Delaby³, P. Martin¹, D. Boichard¹

¹ Université Paris-Saclay, INRAE, AgroParisTech, GABI, 78350, Jouy-en-Josas, France

² INRAE UE326 Domaine Expérimental du Pin, 61310 Gouffern en Auge, France

³ PEGASE, INRAE, Institut Agro, 35590 Saint-Gilles, France

Mastitis is a major issue in dairy cows. Although environmental effects are preponderant, the genetic variability of mastitis resistance is important. A divergent genetic selection experiment on mastitis resistance was carried out at INRAE Le Pin experimental unit in Holstein and Normande breeds, yielding females of resistant and control lines, based on their sire breeding values. The aim of this study was to estimate the impact of udder health genomic breeding values on dairy and health traits throughout the lactation.

This study involved 584 Holstein and 343 Normande cows from the experimental facility. Cows were genotyped and characterized by their direct genomic value (DGV) for all traits routinely evaluated in France, including somatic cell score (SCS) and clinical mastitis (CM) summarized in a udder health genomic breeding values (UHg). Own performances were not included in the genomic evaluation. Milk yield (MY) and composition were recorded daily and twice a week respectively, all along their lactation, and all health events were recorded. CM and metritis data were pooled by 2 weeks-period and limited to the first 6 months of lactation for CM and 2 months of lactation for metritis.

The model included the date as a fixed effect, the DGV for the analyzed trait as a covariate, a within-parity Wilmink model of lactation curve and a regression, function of UHg and the standardized stage of lactation.

Trajectories of all traits were found to be dependent on UHg in both breeds. In the beginning of lactation, animals with high UHg (i.e. genetically more resistant) showed lower MY and SCS (-1.5 kg and -0.7 point per UHg genetic standard deviation, respectively), higher fat and protein contents (+1.2 and +0.4 g/kg, respectively) and less frequent CM and metritis. The effect of UHg was constant all along lactation for SCS, whereas it varies with days in milk for other traits. Some of these effects were unexpected and need further investigations.