Work in progress on genomic evaluation using GBLUP in French Lacaune dairy sheep breed

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Genetic parameters for live weight, ultrasound scan traits and muscling scores in Austrian meat sheep

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Heritabilities and genetic correlations were estimated for live weight (lw) and average daily gain (adg) (n=13,634), ultrasound measured eye muscle depth (emd) and back fat depth (fat) as well as muscling scores for shoulder (shoul), back (back) and hindquarters (hind) (n=6,110) in Austrian meat sheep. An across breed analysis was carried out using performance records of Merinolandschaf, Suffolk, Texel, German Blackheaded Meatsheep and Jura sheep which were routinely tested for meat performance between 2000 and 2010. Genetic parameters were estimated with multivariate mixed animal models including both direct and maternal genetic effects and permanent environmental effects of the dam (pe) as well as fixed effects. Estimated direct heritabilities were 0.07, 0.16, 0.20, 0.21, 0.03, 0.01, and 0.08 for lw, adg, emd, fat, shoul, back and hind, respectively. Maternal genetic heritabilities were very low and significant only for lw and adg, whereas pe was fitted for every trait and explained between 0.05 and 0.10 of the phenotypic variance. Lw showed highly negative genetic correlations with emd (-0.87), fat (-0.57), and hind (-0.81). The genetic correlations are more strongly antagonistic than observed from published estimates. This may be a direct result of the structure of the data used in this study where many of the records were from small herd year season groups and often confounded by sire.

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French Lacaune dairy sheep selection programme is based on an open nucleus totalizing 174,000 ewes and AI-progeny testing of 420 young rams per year. Breeding objectives are milk and udder functional traits, plus resistance against classical scrapie. The storage of DNA/blood of the Lacaune AI rams has been organized since the middle of the 90's. The Illumina Ovine SNP50 BeadChip available since 2009 makes feasible genomic selection. In January 2011, the French Lacaune reference population included 2,651 AI rams, born between 1998 and 2009, and genotyped by Labogena. The aim of this study was to compare results of pedigree- and genomic-based EBV (PEBV and GEBV respectively) of a validation population of 666 young AI rams born in 2007 and 2008, using a training population either of 1,742 AI genotyped rams born between 1998 and 2006 or 3,645 AI rams when enlarging the training population to ungenotyped rams of the same cohorts of birth. Daughter yield deviations for milk yield and contents, somatic cell score, and udder morphology traits have been used for PEBV and GEBV evaluation using GBLUPF90 software from the University of Georgia, USA. The results show that GEBV would be more efficient than PEBV: an average increase of accuracy of 14% has been found across traits. Thus selecting young unproven rams based on their GEBV could be possible. Acknowledgements: for French ANR & ApisGene (SheepSNPQTL project), and for FUI, Midi-Pyrénées region, Aveyron & Tarn departements, & Rodez town (Roquefort'in project).

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