Economical weighting of breeding objectives and definition of total merit indexes in BMC sheep breed

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Breeding goals of the French Blanche du Massif Central (BMC) sheep breed scheme have been updated by economical weighting. New weights were estimated by the expected change in profit resulting from a change of one physical unit in that trait. Inputs and outputs of a flock were modeled. The breeding objective is now composed as follows: fertility (21%), prolificacy (21%), viability and suckling ability (29%), fat depth (16%), dressing percentage (7%), conformation (4%) and growth (2%). Consequently the weights of traits in total merit indexes have been updated. Those merit indexes are used at different levels of the breed selection scheme. New traits ranking have been set based on economical weights used in breeding objectives and on genetics correlations between traits and theirs estimated breeding values. Weights of the total merit index for the on farm evaluation, which consists in prolificacy and sucking ability traits, have been updated. Rams' meat capacities are selected through performances testing in performance test stations (PTS) and through progeny testing. Maternal traits estimated on ancestry and meat traits estimated on individual performances have been combined in a new total merit index published in PTS. Thanks to a ten-year database on PTS rams, expected response to selection is composed of 37% conformation, 17% fat depth, 17% weight, 12% growth, 9% prolificacy, 8% suckling ability. The total merit index used in progeny testing has been updated on the same way. Introduction of these new indexes in the selection program of the French Blanche du Massif Central sheep breed is in progress.

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Inclusion of correlated random effects in proportional hazards frailty models with The Survival Kit

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Frailty models are an extension of the standard survival analysis models which account for unobserved random heterogeneity by including random effects. When two random effects are considered in frailty models, these can be independent from each other or related to some degree. In this case, the variances of the two random effects need to be estimated along with their correlation coefficient. Typical examples in dairy cattle are the modeling of the sire's influence on culling in early and late life or early and late lactation of their daughters, leading to estimations of 'time dependent sire' effects. We demonstrate the use of a Weibull frailty model with the Survival Kit in such cases using simulated data sets. Set1 and Set2 considered 50 and 100 levels of the random effects, respectively, with 100 records associated with each level, resulting in sample sizes of 5,000 and 10,000 individuals. The true values of the correlation coefficient were set to -0.2, -0.6 or 0.6. Two models assuming no correlation or estimating the correlation coefficient were run 200 times each. Resulting variances were somewhat underestimated (respectively overestimated) when the true correlation was negative (respectively, positive) and the correlated nature of the random effects was ignored. With the complete model, the correlation estimate was nearly unbiased. The differences between models were small, but they may be much larger when the two random effects are not as perfectly cross-classified.

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