RESEARCH ABSTRACT

ANIMAL SCIENCE

Title: Mitigation of seasonality of sow reproductive performance via genomic selection - **NPB #16-103**

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Scientific abstract:

The present study used four independent sow nucleus populations to assess the presence and magnitude of genetic control over the tolerance to heat stress, as generally defined. We focused on farrow traits, such as Total Number Born (TNB), Number Born Alive, and litter average Birth Weight (BW). A set of environmental covariates was tested, which provide an overview of the impact of temperature, humidity and temperature-humidity index over the development of the litter in the intra-uterine period. We found that humidity is a much stronger stressor than temperature, and we proceeded with using few environmental covariates per population-trait combination.
Implementing Single-Step Random-Regression Animal Models, we estimated variance components for the intercept and slope terms. We used Single-Step back solving to obtain marker effects and therefore the proportion of variance explained by each regions in the genome.

The presence of GxE was supported by the change in heritably over the range of the environmental covariate and the non-unity genetic correlations among the breeding values over the environmental covariate itself.

The genetic correlations among the intercept and slope terms Miami plots suggests the different genetic architecture between the two genetic components. This means that selection for improved reproductive performance should not be detrimental to the tolerance to heat stress.

In prediction, models behaved as expected, with lower accuracies for TNB and NBA and higher for BW, as a reflection of the heritability of the trait. It was not possible to find a consensus over the different traits for the best model. In some cases, all models performed equally, in some G outperformed all other models, but never the non-additive matrices (D, ROH5 and ROH10) outperformed the additive matrices.