GENETIC PARAMETERS FOR TRAITS DERIVED FROM BEHAVIORAL TESTS FOR LACTATING SOWS

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J. Kecman[1], J. Neu[2], N. Göres[2], F. Rosner[1], B. Voß[3]
N. Kemper[2] and H. H. Swalve[1]

[1]Martin Luther University Halle-Wittenberg, Institute of Agricultural and Nutritional Sciences, Animal Breeding, Theodor-Lieser-Str. 11, 06120 Halle, Germany
[2]University of Veterinary Medicine Hannover, Foundation, Institute for Animal Welfare and Farm Animal Behaviour, Bischofsholer Damm 15, 30173 Hannover, Germany
[3]BHZP GmbH, An der Wassermühle 8, 21368 Dahlenburg-Ellringen, Germany

Introduction

Due to animal welfare, loose farrowing systems and free-movement-pens for lactating sows gain importance. However, the sows' protective instinct during the lactation period can represent a serious risk for humans entering the pens or handling the animals.

Aim of the present study, within the "FreeSow" project framework, was to estimate genetic parameters for different behavioral traits in lactating sows that characterize their reaction towards humans during routine management activities.

Material und Methods

The study was carried out on a nucleus farm (BHZP GmbH) with purebred landrace sows (db.01), kept in single housing free-movement pens. Data was collected from October 2016 until December 2018.

Three behavioral tests were performed. The "Dummy Arm Test" (DAT) evaluated the aggression of sows towards humans when their piglets were handled. The "Towel Test" (TT) was used to analyze the sow's response to novel objects. The "Trough Cleaning Test" (TCT) assessed the sow's reaction on routine management procedures.

All data was analyzed using SAS version 9.4 and ASReml 3.0. Estimation of variance components was performed univariately using a linear animal model. The following fixed effects were considered in addition to the random animal effect and random permanent environmental effect: batch, parity of sows, observer and status of pen (open/closed). Genetic correlations between behavioral traits were estimated with a multivariate animal model.

Results

Estimates of heritability were 0.17 for aggressive behavior of sows towards humans (DAT), 0.19 for response of sows on novel objects (TT) and 0.13 for reactions on routine activity (TCT), Table 1.

Table 1 Additive genetic (σ^2_a), permanent environmental (σ^2_{pe}), residual (σ^2_e) variance components and heritabilities (h^2) for behaviour traits of sows

Behavioral tests	σ^2_a	σ^2_{pe}	σ^2_e	h^2 (SE)
DAT 770 sows, 1444 observations	0.073	0.055	0.309	**0.167** (0.049)
TT 772 sows, 2847 observations	0.125	0.091	0.453	**0.187** (0.043)
TCT 772 sows, 2805 observations	0.036	0.057	0.181	**0.131** (0.038)

Additive genetic correlations (SE) ranged from r_g= 0.59 (0.37) between TT and TCT to r_g= 0.77 (0.30) between TT and DAT.

Conclusion

Behavioral traits of lactating sows could be used as new phenotypes for genetic selection on gentle and easy to handle sows. The genetic correlations point in the same direction giving a hint for related reaction patterns. Further investigations will include an analysis of the relationship between behavioral traits and rearing performance of sows.

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