

Taradon Punsanit 2010: Genetic Parameters and Effect of Proportion of Female Piglet Born Alive on Preweaning Growth Traits in a Purebred Pietrain Population in Thailand.

Master of Science (Agriculture), Major Field: Animal Science, Department of Animal

Science. Thesis Advisor: Assistant Professor Skorn Koonawootrittriron, Ph.D. 93 pages.

Piglets production data of 1,252 Pietrain sows (3,583 records), which farrowed from 2004 through 2007 and were raised under a Thai environmental condition, were used to study effect of proportion of female piglets born alive (FPB) and estimate genetic parameters for number of piglets born alive (NBA), average birth weight of the piglets (BW), average weaning weight of the piglets (WW), and average daily gain of the piglets (ADG). In this study, FPB was defined as the proportion of female to all piglets in the litter, and classified as group 1 ($0 \leq \text{FPB} \leq 20\%$), group 2 ($20 < \text{FPB} \leq 40\%$), group 3 ($40 < \text{FPB} \leq 60\%$), group 4 ($60 < \text{FPB} \leq 80\%$) and group 5 ($80 < \text{FPB} \leq 100\%$). Variance components for NBA BW WW and ADG were estimated by a restricted maximum likelihood procedure. Then those estimates were used to compute heritabilities and genetic correlations. The used model was a bivariate (2 traits) repeatability model that considered farrowing year and season, parity and FPB as fixed effects, the random effects were animal permanent environment and residual. The results revealed that the least squares means (LSM) for NBA of sows in group 3 (8.38 ± 0.07 piglets) was the highest of all litter groups ($P < 0.05$), and sows in group 2 (7.99 ± 0.08 piglets) and group 4 (7.92 ± 0.09 piglets) had higher NBA LSM than sows in group 1 (6.62 ± 0.13 piglets) and group 5 (6.44 ± 0.17 piglets). However, LSM for BW were lower for sows in group 2 (1.73 ± 0.02 kg), group 3 (1.71 ± 0.02 kg) and group 4 (1.73 ± 0.02 kg) than those for sows in group 1 (1.76 ± 0.01 kg) and group 5 (1.75 ± 0.02 kg). Similar trends were found for WW and ADG. Sows in group 1 and 2 had the highest LSM for WW and ADG and then declined towards group 3, 4 and 5. Heritability estimates for NBA BW WW and ADG were 0.07, 0.12, 0.07 and 0.07, respectively. Repeatability estimates for NBA BW WW and ADG were 0.11, 0.24, 0.15 and 0.16, respectively. Genetic correlations between NBA and BW, WW and ADG, BW and WW and ADG, WW and ADG were -0.22, -0.17, -0.33, 0.31, 0.21 and 0.99, respectively. These results implied the association between FPB and pre-weaning growth traits that could be used for increasing efficiency of pig production. However, the studied traits had low heritability. Reducing environmental variation of the production system might increase efficiency and accuracy of selection for these traits.

Student's signature

Thesis Advisor's signature