RESEARCHABSTRACT

ANIMAL SCIENCE

Title: Litter Size Produced by Gilts Divergently Selected on Reproductive Components – **NPB# 01-149**

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Abstract:

One of the factors that influences litter size in swine is the ability of the mother to gestate to term the major possible proportion of viable embryos. This ability has been termed **uterine capacity** and is considered dependent on the physical capacity of the uterus, fetal demand for nutrients, and the efficiency of the placenta to supply them. A selection index **(SI)** including litter size **(LS)**, birth weight **(BW),** and placental weight **(PW)** was designed to increase or decrease the efficiency of the placental function. Divergent selection was practiced with two replicates per line. The SI, the three components of SI, and placental efficiency **(PE)** measured as the ratio BW: PW, were compared between the upward **(H)** and downward **(L)** selected lines following two and three of selection. The GLM procedure of SAS was used to calculate and compare least-squares means for all variables.

At generation two, PW tended to be lower in H than L (281 g vs. 345 g, respectively; P = .07), PE was higher in H than L (5.2 vs. 4.5, respectively; P = .02), and SI tended to be higher in H than L (2.01 vs. 1.69, respectively; P = .09). At generation three, divergence between lines was not significant for PW, PE or SI (P = .99, .45 and .84, respectively). Divergence between lines was not significant for LS or BW at any generation (P > .70). Heritability, calculated by doubling the regression of offspring on dam, was not significantly different from zero for BW. Heritability of LS was negative and thus assumed to be zero. Heritability estimates (se) for SI, PW, and PE were .27 (.07), .25 (.06), and .28 (.07), respectively. Realized heritability (se) for SI, calculated as the ratio of cumulative response to cumulative selection differential, was .02 (.03). Involuntary culling reduced the selection differential for SI from 2.6 at generation one to 1.5 at generation two. This and sampling error are probable causes of the non-significant divergence for the traits studied at generation three. Information obtained from this experiment will allow the computation of genetic parameters among components of litter size. Those parameters can be used to design a selection index that maximizes response.