145B

# Estimation of heritability and heterosis for maternal traits in crossbred swine populations

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Exploitation of heterosis through cross breeding using two or three improved breeds is a common practice in swine breeding programs. In addition additive genetic variation is exploited in selecting superior sires and dams for breeding. Present study was conducted on a large scale swine herd located in the Low country Dry Zone ($DL_3$) to estimate: 1) additive and phenotypic genetic variance components and heritability ($h^2$) for birth weight (**BW**), weaning weight (**WW**) and pre-weaning gain (**PW**) of piglings; and 2) heterosis gained by crossing Large White and Land Race breeds in terms of litter weight, pre-weaning mortality and growth of piglings. A random set of pure and crossbred piglings (n=469) were used for heritability estimation. Breed/cross and identification number of the piglings and their sires and dams were recorded. To estimate variance components, half-sib (Sire model and dam model) and full-sib (sire-dam model under cross classification) analyses were used. The traits measured on sows (maternal traits) were number born alive (**NBA**), percent mortality at birth (**BMPCT**) and at weaning (**WMPCT**), litter weight at birth (**BLWT**) and at weaning (**WLWT**), pre-weaning gain per pigling (**PWP**) and per litter (**PWL**). Effect of breed/cross on the maternal traits was determined using one-way ANOVA procedure before calculation of heterosis.

Estimates of $h^2$ for BW and WW under sire-dam model were 0.694 and 0.877, respectively. For WW and PW, sire model provided 0.432 and 0.832 estimates, respectively while dam model yielded 0.483 and 0.951 values, respectively. All other estimates of the models were above 1.0. Additive genetic variance estimates for BW, WW and PW under sire-dam model were 0.069, 1.791, 3.042 $kg^2$, respectively. Higher heritability estimates appears to be due to existence of high additive genetic variance as well as less non-genetic variability. Estimates of percent heterosis for NBA, BMPCT, WMPCT, BLWT, and PWL were 51.57, -59.45, -44.08, 40.83 and 39.45, respectively. The corresponding estimates for WLWT and PWP were considered as zero as the cross was not significantly superior to any of the pure breeds. These heterosis estimates indicate the effectiveness of the two-way cross of Large White and Land race breeds with respect to reduction of mortality and increase in litter size and weight under dry zone field conditions.

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