

Genetic evaluation of early egg production and maturation traits using two different approaches in Japanese quail.

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ABSTRACT

The objective of the current study was to evaluate a multi-trait selection program based on aggregated breeding values using an animal model Best Linear Unbiased Prediction (BLUP) in Japanese quail. The estimated genetic gain was compared by both mixed model and least squares methods. Data of 1,682 female Japanese quails were collected through four consecutive generations to estimate genetic gain, depending on aggregated breeding values, for age at first egg (AFE), body weight at sexual maturity (BW_{SM}), and days needed to produce the first ten eggs (DN_{10}). Estimates of cumulative selection response were favorable for all the studied traits and significant for AFE (-3.03) and BW_{SM} (10.38), but not significant for DN_{10} (-0.15). Estimates of direct heritability were moderate for AFE (0.21) and BW_{SM} (0.25) but low for DN_{10} (0.08), while estimates of maternal heritability were moderate for AFE (0.19) but low for BW_{SM} (0.04) and DN_{10} (0.01). High (0.45 to 0.56) genetic and low (-0.01 to -0.18) phenotypic correlations were observed among the studied traits. Negative (-0.23 to -0.95) correlations between additive genetic and maternal genetic effects were observed for all traits. Genetic trends were -0.76 ($P = 0.031$), 2.54 ($P = 0.037$), and -0.06 ($P = 0.052$) with calculated product-moment correlations between breeding values, estimated by BLUP and phenotypic selection methods, of 0.78 ($P = 0.002$), 0.77 ($P = 0.004$), and 0.61 ($P = 0.007$) for AFE, BW_{SM} , and DN_{10} , respectively. Aggregated breeding value estimation based on animal model BLUP could be an effective method of constructing a selection program to achieve a favorable selection response in egg production traits in Japanese quail.

Key words: Japanese quail, selection, BLUP, genetic parameter and egg production