University of Zabol

Faculty of Agriculture
Department of Animal Science

The Thesis Submitted for the Degree of
Master of Science in Animal Breeding and Genetics

Title:

Estimation of additive and non-additive genetic variance components of body weight traits by random regression

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January, 2023

Abstract

Estimation of genetic parameters for traits with high accuracy is essential in breeding programs. Regression models are used to analyze longitudinal data or repeated records over time. The aim of the present study was to genetic evaluate the body weight traits of quail with different regression models with considering dominance effects, along with direct additive genetic effects, maternal effects and the permanent environment of the bird. For this purpose, the body weight records of 3836 quails between the ages of 1 and 45 days of age with a 5-day recording interval were used in this study. After editing, the data were analyzed with different random regression models, which were different in terms of the number of effects and the order of Legendre polynomial. The appropriate model was selected using the likelihood logarithm, Bayesian information criterion (BIC) and Akaike information criterion (AIC), and variance components and genetic parameters of body weight traits at different ages were estimated with best model. The results of the model comparison showed that the model with an order of 4, 3, 1 and 1 for the direct additive genetics, maternal genetics, the permanent environment of the bird and dominance was suitable, and the maternal permanent environment was not effective on body weight traits. The increasing trend of variance components was observed with the increasing age of the birds, although they were different in terms of the amount of relative increase in different ages. The range of heritability of body weight traits was estimated to be 0.639-0.151. The ratio of maternal genetic variances, permanent environment of the bird and dominance to phenotypic variance of body weight traits was high in early ages, but their amount decreased in later ages. The estimated correlations for ages older than 20 days of age were higher than the estimated correlations before 20 days of age.Considering the estimated heritability value for body weight of 20-das of age and its genetic correlation with traits in later ages, this trait can be suggested as a selection criteria for improving body weight in later ages.

Keywords: Body weight, dominance, heritability, quail, maternal genetic.