University of Zabol
Graduate school
Faculty of Agriculture
Department of Animal Science

Thesis Submitted for the Degree of Ph.D in Animal Breeding and Genetic

Survival genetic analysis and determination of the survival distribution functions using linear, threshold and proportional hazards models in Japonica quail

Supervisors:
Dr. Mohammad Rokouei
Dr. Gholam Reza Dashab

Advisor:
Dr. Hadi Faraji-Arough
Dr. Davoud Ali Saghi

By:
Razieh Saghi
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Abstract
Increase in world population, the need for protein production is increasing. This has led to the use of animals whose meat can be consumed by humans for industrial breeding. With its unique characteristics, quail was able to achieve an important position in both production and consumption, and today it is a profitable industry. Survival in the herd is one of the most important issues of breeding units and the net profit of these units is significantly affected. Increasing herd survival reduces costs associated with raising and purchasing alternative animals, but can also increase average production. The aim of this study was to analyze survival and its relationship with mean body weight gain, egg weight traits and daily weight gain in Japanese quail. For this purpose, the data of 1854 Japanese quail over 4 generations were used. In order to determine the effects of factors affecting survival and calculate the risk of elimination at different times, two statistical packages (Survival) and (cmprsk) were used and to estimate the variance components of the survival trait, MCMCglmm software package was used. Genetic parameters of traits were estimated using single and bivariate analysis through Gibbs sampling. The results of the analysis of continuous survival data showed that the mean mortality of the breeding period was 0.206 and the average survival rate was 0.793. The mean heritability in single and bivariate analysis was estimated to be 0.216 and 0.153, respectively. The range of heritability of body weight in single trait analysis was estimated between 0.307 to 0.135 with an average of 0.219. In the bivariate analysis, heritability of body weight ranged from 0.155 to 0.014. The highest genetic correlation was -0.311 (between body weight and daily weight gain) and the lowest genetic correlation was -0.0277 (between survival and daily weight gain). In survival analysis using discrete survival data and linear and threshold models of heritability, egg weight trait in the studied flock was 0.04 and the heritability range for survival traits at birth up to 42 days (0.399 - 0.138) was obtained. Genetic correlation between egg weight and survival traits (exception survival up to 7 days) was negative and the highest correlation between egg weight and survival up to 14 days (-0.704) was estimated. The highest and lowest heritability for weight gain traits were observed for 1 to 7 days (0.583) and 7 to 14 days (0.116) weight gain, respectively. In the analysis of daily weight gain traits with survival traits at different ages, the highest and lowest genetic correlations between 1 to 7 day weight gain and 7 day survival (0.638) and 1 to 7 day weight gain and 14 day survival (0.015) was obtained. Based on the results of this study, optimal management of environmental factors is effective in reducing the risk of elimination and genetic selection for survival trait can improve the genetic potential of survival. Due to the high and positive genetic correlation between weight gain and survival up to 7 days in birds, selection for daily weight gain traits in this period can also indirectly improve quail survival.
Key words: Gibbs sampling, Japanese quail, Survival, Threshold model, Weight gain