



University of Zabol
Graduate school
Faculty of Agriculture

Department of Animal Science

**The Thesis Submitted for the Degree of Master of Science
(In the Field of Animal Nutrition)**

Title:

**Quantitative traits loci affecting growth traits on chromosome 3 of
Japanese quail**

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Abstract

The aim of this study was to QTL mapping of growth traits on chromosome 3 in Japanese quail (*Coturnix japonica*). Traits related to the growth of domestic animals are of great importance because of their direct relationship with economic benefits. Molecular technology based on markers indicates differences in individuals at the DNA level and can play an important role in the genetic improvement of carcass and growth traits by tracking markers or markers linked to the gene from parents to offspring in the form of various mating schemes. This study was conducted in the form of a three-generation cross pattern design based on the partial diallel cross. To create the first generation, four Japanese quail (*Coturnix japonica*) strains, including A and M Texas, Wild, Italian, and Tuxedo, were crossed in diallel cross and backcross. Then, from the crossbreeding of the first generation hybrid birds, the next generations including the second, third, and fourth were obtained. Phenotypic data included body weight from birth to 45 days with an interval of 5 days in the offspring of the fourth generation. The genotype of third and fourth generation parents and all birds from selected fourth generation parents was identified for three microsatellite markers located on chromosome three. QTL mapping was performed with three models including additive, dominance, and additive-dominance with multiple regression model with GVCBLUP software. Significance of QTLs was performed by *the Bonferroni correction method* ($P < 0.05$), and also for estimating the QTL location, bootstrap method with ten thousand series of replications was used. Hatch weights at 5, 10, 20, 25, 35, and 40 days indicate a QTL with additive effects at the beginning of the chromosome. Weight at 15 and 30 days of age indicates a QTL with additive effects at the end of the chromosome, and no change was observed at 25 days of age. Therefore, the results of this study confirm the existence of QTLs with additive and dominance effects for weight traits in quail on chromosome three, and if the genotypic information of these loci is used in estimating breeding values, the accuracy of the estimates will increase.

Keywords: Microsatellite (SSR), Diallel cross, Mapping, Marker