

Abstract

The aim of this study was to determine the best model describing egg production curve during thirteen weeks and predict of egg number in thirteenth week using of first week production, weight and age of sexual maturity by artificial neural network (ANN). For this purpose, daily egg production records of 314 quail during thirteen weeks were used for curve fitting. Seven nonlinear logistic function (NL), incomplete gamma (Wood)(W), McMillan (MC), Modification of Wood (MW), Lokhorst (LO), Narushin and Takma 2 (NT2), logistic (Nelder) (LN) fitted by computer program R and best function was selected via BIC, AIC and MSE. Age of sexual maturity (ASM), weight of sexual maturity (WSM) and weight of first egg (WFE) classified in three groups of low, medium and high, then egg production in 13 weeks, coefficients of NT2 and Lo model were compared in different groups. Prediction of maximum production in thirteenth week with using of other traits was performed via Statistica software. The results showed that the highest rate laying related on the fifth week (92.2 percent). Based on the criteria used, NT2 (lowest MSE, AIC and BIC) and MC model (highest MSE, AIC and BIC) are the best and worst models for describe the curve egg production in these weeks. According to NT2 model, peak time and egg production in peak was estimated the sixth week and 6.562 eggs. However, peak time was predicted one week posterior than actual production, but it had minimum difference in prediction production in peak rather than actual production (6.493). Quails with low ASM, medium WSM and medium WFE had higher egg production than other groups. Coefficient of decreasing slope in LO model in low ASM, high WSM and high WFE different than other groups. Sensitivity analysis by ANN showed the final egg production in the thirteenth week depends on the number of eggs in the second, third, fourth, first week, ASM and WSM. Generally, the results indicate that egg curve description of quails using a NT2 model was appropriate and should be noted to egg production in the second and third week in predicting the eventual production.

Keywords: Egg production, Age of sexual maturity, Artificial neural network, Logistic.



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**Study of egg production curve by using of
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productive and reproductive traits in
Japanese quail**

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