Effect of Dietary Protein on Fertility and Hatchability in Breeder Quail (Coturnix coturnix japonica)*

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Japanese quail farming is one of the upcoming poultry business activities in several parts of India especially in Tamil Nadu. In commercial breeder farms, the number of quail chicks per dam decides the profitability of the breeder for which fitness traits like fertility and hatchability are of foremost important. Protein, one of the costliest nutrients in breeder rations is exercising substantial influence on breeding performance through fertility and hatchability. Due to cost factors of protein based feed ingredients, identifying the optimum protein levels for superior production and economics is a critical issue to be explored.

Materials and Methods

A study for a period of 30 weeks was conducted to find out the effect of dietary protein level on fertility and hatchability in breeder Japanese quail. The study period was divided into three phases, namely brooding (0-3 weeks), growing (4-6 weeks) and breeding (7-30 weeks) periods. 800 day old Japanese quails were procured from a single hatch, individually weighed, wing banded and randomly allotted to two treatments with eight replicates of 50 birds each at brooding and offered two dietary protein levels (22 and 24 per cent).

At the end of brooding period of three weeks, the birds of treatment 1 and 2 were further divided into two to get four treatment groups with four replicates in each treatment and offered two dietary protein levels (18 and 20 per cent) up to six weeks of age. At the end of the sixth week, the four treatment groups of grower were further divided in to 12 groups with three groups in each treatment with two replicates (7 males and 14 females per replicate) and offered three different dietary protein levels (17, 19 and 21 per cent) during breeding period. The above diets at each phase were maintained isocaloric (brooder -2750, grower-2650 and breeder-2700 kcal metabolizable energy per kg diet). The birds were maintained in colony cages during breeding period and standard managemental practices were followed. The breeding period of 24 weeks (7-30 weeks) was divided into six periods of four weeks each (28 days). The hatching eggs were collected treatment-wise for seven consecutive days during the end of each 28 days period and set for incubation. Standard incubation procedures were followed and treatment-wise hatch was recorded and unhatched eggs were subjected for post-hatch break open analysis under bright sunlight to record the fertility data. The collected data were subjected to factorial ANOVA design analysis.

Results and Discussion

Mean per cent fertility of breeder Japanese quails fed various dietary protein levels during brooding, growing and breeding differed significantly within each phase. Quails fed 22 per cent dietary protein during brooding

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recorded higher per cent fertility than 24 per cent. 17 per cent dietary protein group recorded significantly (P<0.05) lower fertility. Lee et al. (1981) observed that 24 per cent dietary protein recorded significantly (P<0.05) higher fertility than lower and higher protein groups. Shrivastav et al. (1993) and Abaza et al. (2009) did not observe any significant variation in fertility in breeder Japanese quail with varying dietary protein combinations. Among the periods, 10th to 22nd week recorded significantly (P<0.01) higher fertility compared to the later age groups. Seker et al. (2004) observed that age significantly influenced fertility. Over all mean fertility was 90.14 per cent. Bhanja et al. (2006) reported comparable values of mean fertility. Lower per cent fertility values were reported by Chidananda et al. (1986) and Vali et al. (2005).

The best hatchability on total eggs set of 84.35 per cent was recorded in the dietary protein groups of 22, 18 and 21 per cent at brooding, growing and breeding periods which was significantly (P<0.01) different from other groups. The same indicated that dietary protein during breeding period influenced the hatchability the most. It was observed that the dietary protein group fed 21 per cent during breeding period recorded significantly (P<0.01) higher hatchability on total eggs than the other dietary protein groups. Shrivastav et al. (loc. cit) reported no significant difference and observed some incremental increase in hatchability on total egg set with increase in protein level. Similarly, Abaza et al. (loc. cit) reported a linear increase in hatchability on total eggs set with increase in dietary protein level. Between periods, the highest mean per cent hatchability on total eggs set was witnessed at 14 weeks age and the same decreased significantly at 26 and 30 weeks. Seker et al. (loc. cit) reported a negative correlation between age of the bird and hatchability on total eggs set. Over all mean hatchability on total eggs set was 81.85 ± 0.36 per cent.

Summary

Fertility was found to be significantly (P<0.01) influenced by dietary protein regimens and the birds fed the lowest protein levels (22 and 18) during brooding and growing had shown in the highest fertility levels. Birds fed 21 and 19 per cent during breeding had shown comparable and significantly higher fertility levels than 17 per cent group. Hatchability on total eggs set was found to be higher for 22, 18 and 21 per cent dietary protein groups which indicated that lower protein during growing stages and higher protein of 21 per cent is required for optimal breeding performance in breeder Japanese quails.

References