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Impact of different floor space on age and body weight at sexual maturity of Japanese quail

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Abstract
An experiment of was conducted, utilising 180-day old Japanese quail chicks, which were subjected to three density levels groups i.e. S_1 (150 cm2/ bird), S_2 (200 cm2/ bird) and S_3 (250 cm2/ bird) each having 2 replicate (30 chicks/ replicate) to evaluate the influences of floor space on Japanese quail weight at sexual maturity and age at sexual maturity. The data for all measured variables were analyzed using one way ANOVA procedure of SPSS version 20. The results revealed that the group reared in S_2 showed significantly early sexual maturity as compared to rest of the groups. However highest value on body weight at sexual maturity was observed in S_2 and S_3 as compared to S_1. So it could be concluded that Japanese quail reared in higher floor space shows best growth.

Keywords: Japanese quail, sexual maturity, stocking density, replicate and significantly

Introduction
Indian Poultry Industry is one of the fastest growing segments of the agricultural sector. Japanese quail farming is gaining worldwide popularity because it has unique qualities of hardness and adaptability to various agro climatic conditions with minimal cost of rearing. They have rapid growth rate enabling them to be marketed at 5-6 weeks of age for meat purpose. In order to ensure maximum production all the managemental aspects should be monitored properly. Among all managemental aspects, housing management of birds plays an important role in economic production as it account for greater fraction of the fixed capital of quail farming Poultry rearers tend to increase the number of birds per unit of space to reduce housing, equipment and labour cost per unit of space. Stocking density is highly important economic factor due to the intensification of commercial poultry production, which resulted in decreased gain per bird housed as well as reduction in net economic return (Faitarone *et al*., 2005) [4]. Quails are reared in battery cage or deep litter systems without any adverse consequences on their welfare, growth and development, with improved biosecurity measures (Adamu *et al.*, 2015; Ojedapo 2013; Olawumi 2015) [1, 5, 6]. Bessie and Reiter, 1992; Cravener *et al*.1992) [2, 3] observed the effects of high stocking density on body performance, mortality and some economic indexes of broilers and reported that high stocking density leads to increase ammonia production, foot pad lesions, litter moisture, locomotion, heat stress and preening.

Materials and Methods
Experimental procedure
For the study 180-day old Japanese quail chicks, which were randomly kept in three density levels groups i.e. S1 (150 cm2/ bird), S_2 (200 cm2/ bird) and S_3 (250 cm2/ bird) each having 2 replicate (30 chicks/ replicate) to evaluate the influences of floor space on Japanese quail weight at sexual maturity and age at sexual maturity as shown in table 1.

Table 1: Treatment groups

S.No.	Treatments Groups		Treatment details	Number of birds (Japanese quail)
1.	S_1	S_1R_1	Stocking density (150cm^2/bird)	30
		S_1R_2	Stocking density (150cm^2/bird)	30
2.	S_2	S_2R_1	Stocking density (200cm^2/bird)	30
		S_2R_2	Stocking density (200cm^2/bird)	30
3.	S_3	S_3R_1	Stocking density (250cm^2/bird)	30
		S_3R_2	Stocking density (250cm^2/bird)	30

Parameters to be studied

The following observations were recorded during the period of the experiment.

Age at sexual maturity (day)

The age at sexual maturity, which is determined by egg production in quails, which was evaluated as the age when the first egg will be laid. Age at first egg is important since it indicates the sexual maturity age.

Sexual maturity weight (g)

Sexual maturity weight was recorded when the quails laid their first eggs in each pen.

Statistical Analysis

The experimental data were subjected to analysis of variance (Snedecor and Cochran 1989). Means showing significant differences were compared by Duncan's New Multiple Range Test (DNMRT) (Duncan, 1955). Statistical significance was accepted at $P \leq 0.05$. The results were interpreted and expressed as means ± SEM.

Results and Discussion

The data on various parameters recorded during the present investigation had been statistically analyzed and the observed results are presented and discussed under the following headings:

Age at sexual maturity (days)

The age at sexual maturity of Japanese quail reared on different floor space has been presented in Table 2 and shown in fig 1. Age at sexual maturity (days**)** in three density levels groups i.e. S1 (150 cm2/ bird), S_2 (200 cm2/ bird) and S_3 (250 cm2/ bird) was 45.5^b, 39.67^a and 41.17^a respectively. The statistical analysis of data revealed highly significant (P<0.01) effect of floor space on age at sexual maturity of Japanese quail. Quails reared on stocking density S_2 (200 cm2/ bird) showed significantly early age at sexual maturity and is statistically similar to S_3 (250 cm2/ bird) as compared to birds on stocking density S_1 (150 cm2/ bird). This might be due to the reason that group in higher floor space get proper area for movement and other activities and also decreased competition for food which lead to better growth at early age.

These results are similar with those of Tozluca (1993), who indicated that quails kept in high stocking density had late sexual maturity.

Table 2: Effect of floor space on Age at sexual maturity (days)

Treatment groups	Age in days	SE
S_1 (150 cm2/ bird)	45.5^b	0.764
S_2 (200 cm2/ bird)	39.67^a	0.843
S_3 (250 cm2/ bird)	41.17^a	0.601

Means having different superscripts in a column differ significantly ($P \leq 0.01$)

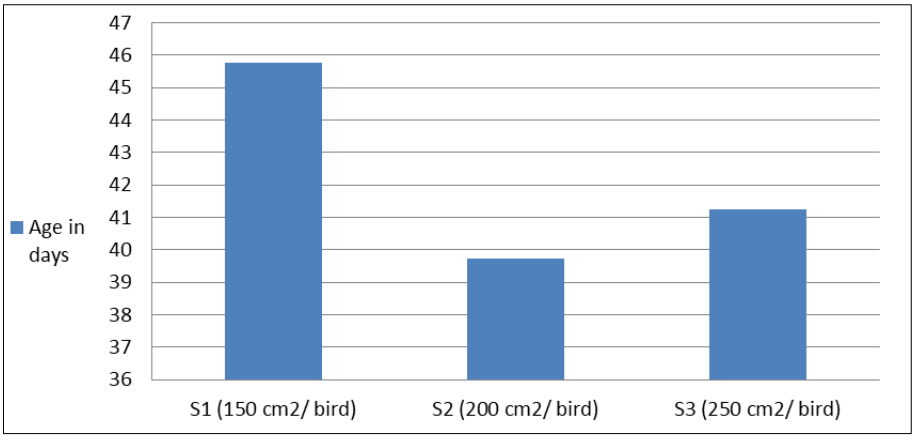

Fig 1: Effect of floor space on Age at sexual maturity (days)

Body weight at sexual maturity (days)

The body weight at sexual maturity of Japanese quail reared on different floor space has been presented in Table 3 and shown in fig 2. Body weight at sexual maturity (days**)** in three density levels groups i.e. S_1 (150 cm2/ bird), S_2 (200 cm2/ bird) and S_3 (250 cm2/ bird) was 180.85^a, 201.53^c and 192.67^b respectively. The statistical analysis of data revealed highly significant (P<0.05) effect of floor space on weight at sexual maturity of Japanese quail. Quails reared on stocking density S_2 (200 cm2/ bird) showed significantly higher weight at sexual maturity followed by S_3 (250 cm2/ bird) and least in birds on stocking density S_1 (150 cm2/ bird).

Similar results were obtained by Faitarone *et al*., 2005 [4] who concluded that this improvement in body weight and age at sexual maturity could be attributed to decrease in the competition to obtain feed intake and increase bird's welfare at low stocking density than those at high density.

Table 3: Effect of floor space on weight at sexual maturity (gm)

Treatment groups	Body weight (gm)	SE
S_1 (150 cm2/ bird)	180.85[a]	2.546
S_2 (200 cm2/ bird)	201.53[c]	0.863
S_3 (250 cm2/ bird)	192.67[b]	2.814

Means having different superscripts in a column differ significantly ($P \leq 0.05$)

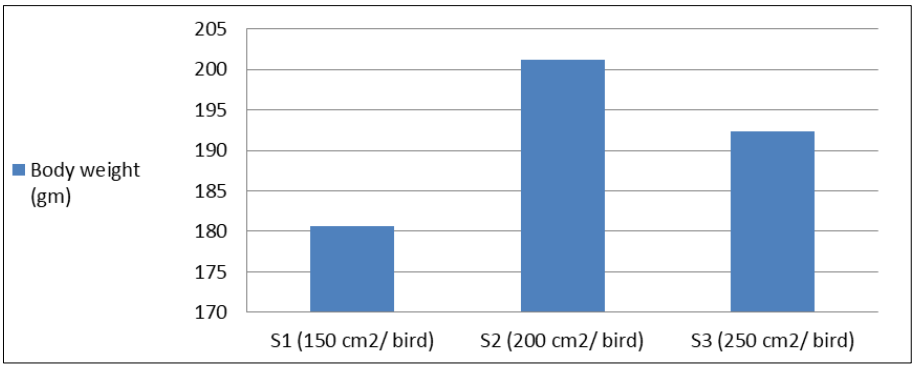

Fig 2: Effect of floor space on body weight at sexual maturity (gm)

Conclusion

From the present study it could be concluded that among all the three treatments, Japanese quail kept in high floor space showed early age of sexual maturity and higher body weight at sexually mature age.

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Conflict of Interest

The authors declare that there is no conflict of interest.

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