ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 9, Issue, 01, pp.45594-45596, January, 2017

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

EFFECT OF LIGHT DURATION ON PRODUCTIVITY OF JAPANESE QUAIL

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ARTICLE INFO

Article History:
Received 17th October, 2016
Received in revised form
25th November, 2016
Accepted 10th December, 2016
Published online 31st January, 2017

Key words:

Japanese Quail,
Light Duration,
Egg Production,
Weight Gain.

ABSTRACT

The study was designed to find the effect of light duration on overall production of Japanese quails such as weight gain, feed consumption and egg production. Total one hundred and twenty Japanese quails were grouped into three and each group was intended forty birds. Group-A with a light duration of 12 hours, group-B has 16 hours and group-C was fixed for 20 hours of light duration. The experiment was designed for two months (60 days). Obtained data was statistically analyzed by using the significant difference. The useful and valuable output of this study was gain in a very low-priced and contracted experimental design that is imperative for the poultry farmers in respect of light significance. The results revealed that the final body weight of birds was higher in group-C (143.17±4.44gram) followed by group-B (136.12±3.91gram) and group-A (133.72±6.81gram). Similarly, feed intake shown increased in group-C (1358±278.77gram) followed by group-B (1092±218.68gram) and group-A (882±169.45gram). Moreover egg production percentage was recorded high (68.7±0.54) in group-C and Puberty time was recorded less in group-C where light duration was increased. Overall net profit was also seen markedly higher in group-C. In each group light duration was provided during 1-5 weeks was variable. Regarding the data on initial body weight (gram) in all experimental groups showed negligible variation. It is concluded that the prolong energy source (light) increase the productivity, reproducibility and economical performance of the Japanese quail.

Citation: Shakeel Ahmed Wagan, Waseem Ali Vistro, Nasir Rajput, Syed Khurram Fareed, Noreen Mehmood, Muhammad Farooq and Mashhood Ahmed, 2017. "Effect of Light Duration on Productivity of Japanese Quail", *International Journal of Current Research*, 9, (01), 45594-45596.

INTRODUCTION

Japanese quails (*Corturnix corturnix japonica*) are a small, domesticated avian species. Earlier records are from Japan from twelfth century where it would come out that the species was domesticated as earlier as the eleventh century (Fairchild, 2007). Japanese quails are easily adapted to rearing conditions with adverse climates, and present rapid growth, early sexual maturity (42 days of age), high egg production, low feed intake, and high resistance to diseases. However, still little information is available on the nutritional requirements, ideal weight gain during each rearing phase, lighting program, and management of Japanese quails (Molino *et al*., 2015). The light color and its duration change the physiological and breeding activity, production of poultry birds and maturity (Perera, 1992; Mills *et al*., 1997). More study investigated that the light intensity enhanced the hostile movement and cannibalism in captive birds (Buyse *et al*., 1996).

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The aim of this study is to investigate the effect of light duration on overall production of quails and in addition, also evaluate the economic significance and outcome of this short research to enhance the income of farmers.

MATERIALS AND METHODS

Study Area

The present study was carried out regarding the evaluation of effect of light duration on weight gain, feed intake, egg production, puberty rate and economic impact on laying Japonese quail.

Experimental Design

A total (*n=120*) day old Japonese quails were initially weight and randomly divided in to three groups, designated as group-A, group-B and group-C. Each group has 40 chicks which were treated under following experimental design (Table. 1). All the groups kept for two months to calculate the parameters.

Table 1. Experimental design

Treatment	Groups		
	A	B	C
Light duration	12 hours	16 hours	20 hours

The starting hours in experimental design were calculated from at early night and onward

RESULTS

The results in relation to growth trails and egg production of Japanese quail is presented that the average initial body weight of Japanese quails in group-A was 7.035±0.19g, group-B has 7.15±0.29g, and group-C was recorded as 7.27± 0.20g. This shows a negligible variation in the initial body weight of experimental chicks. However, in all the groups the average final body weight after fifth week flock of Japanese quails were elevated in various light effects i.e, in group-A it was 133.72±6.81g/bird followed by group-B 136.12± 3.91g/bird, while in group-C it was highest as 143.17±4.44g/bird. The feed consumption or intake during the two months duration of Japanese quail in group-A was recorded less i.e. 882±169.45g/bird, in group-B it was estimated as 1092±218.68g/bird, and in group-C it revealed 1358±278.77g/bird during 20hrs of light effect. The egg production percentage of Japanese quail was also recorded high in group-C as 68.7±0.54/bird followed by group-A (46.8±0.47/bird) and group-B (62.5±0.57/bird). Overall production results are seems to be increased with long light duration (20 hours of light). In given findings the value (mean ±SE) Bearing various superscript in row not significant difference (P>0.05). In each group light duration was provided during 1-5 weeks was variable.

Economic Significance

Similarly the economic significance of the experiment was calculated that was also profitable in group-C as described in Table 1.

Table 1. Economic impact of experimental design

Parameters	Group A	Group B	Group C
No. of birds/Group	40	40	40
Cost of chicks (Rs).	10	10	10
Feed intake/group (kg)	22.05	27.3	33.95
Time of puberty (days)	32	31	29
Egg production (%)	46.8	62.5	68.7
Net profit per group (Rs).	2242	2508	2718
Net profit per bird (Rs)	56.05	62.7	67.95

This economic feasibility is based on the production performance of birds during two months experimental period.

DISCUSSION

The findings of the present research indicate that the final body weight was higher in group-C followed by group-B and less live body weight was found in group-C with minimum duration 12hrs of light. These results are supported by Ahmed *et al.* (2011) and Senaratna *et al.* (2011) which found that source and duration of light significantly affect the bird performance. Moreover, red color light up to 21 days showed efficient output on weight gain and carcass quality ? (Senaratna *et al*., 2011; Nara *et al*., 2014). Feed intake of Japanese quail influenced significantly with the duration of light and birds provided with 12 hours light took low amount of feed, while highest feed intake was recorded in quails given long duration of light (20 hrs), it may be assumed that the artificial light (energy) may reduce the stress condition and in response of this birds demand more feed intake as indicated by Ahmed *et al.* (2011) that the light of energy savers enhance the broiler poultry production. Similarly, the sufficient light effect in poultry house round the clock was for obtaining higher bird growth (Firouzi *et al*., 2014). The studies of Ahmed *et al.* (2011) reported that the reproductive health of hens was markedly affected by the light intensity and light duration. Visser, (2000) concluded that change in feeding behavior and growth of Japanese quail is expected with the light intensity and light duration; while Rozenboimet *et al*. (1999) depicted that light duration has proved one of major welfare aspects for the poultry birds rearing. Fairchild (2007) suggested more than 15 hrs of light per day increased the egg production while less 15 hrs of light caused less egg production or possible cessation of lying. Chaturvedi *et al*. (2006) found in his study that duration of light provision in the poultry house significantly improve the productive and reproductive performance of birds.

Contrary, Pyzak *et al.* (2003) concluded that the wavelength of light may influence egg production, egg components and shell quality of the domestic lying hen. However, in another investigation of Pieter, (2003) that application of a longer photoperiod would therefore favor san egg production system and similarly Renema *et al.* (2001) found that reduction in light duration resulted in reduced egg production and lying sequence length. The studies of Charles *et al*. (1992) showed that type of light, its intensity and duration markedly affect the birds health; while Siopes and Proudman (1992) concluded that there was no improvement to the use of high intensity light during short day light restriction of the prepay duration on subsequence reproductive efficiency. Hawes *et al.* (1991) percentage of eggs per hen per day (%HDP) was significantly decreased by the AHM treatment of the periods 23 to 26 weeks and 31 to 34 weeks, this reduction caused a significant cumulative effect on %HDP (68.9 for CON 66.2 for AHM).

Conclusion

Overall it is concluded that the overall net profit was markedly higher in Japanese quails provided light for longer hours as compare to those given light for lesser duration.

Acknowledgement

The authors are grateful to Dean Faculty of Veterinary and Animal Husbandary, Sindh Agriculture University, Tandojam for his financial assistance.

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