
Performance of Gramapriya poultry birds under different systems of management

Nishant Patel¹, Dilip Kumar Jha^{*}, Ashok Kumar Shrivastava¹ and Kathirvelu Baskar²

¹Department of Livestock Production and Management, College of Veterinary Science and Animal Husbandry., Birsa Agricultural University, Ranchi, Jharkhand-8340062, India, ²Entomology Research Institute, Loyola College, Chennai-600 034, India

Nishant Patel, Dilip Kumar Jha, Ashok Kumar Shrivastava and KathirveluBaskar (2013) Performance of Gramapriya poultry birds under different systems of management. Journal of Agricultural Technology 9(5):1769-1774.

A study was conducted to see the effect of different farming systems of management on growth rate, egg production, egg weight, disease incidence and mortality. All chicks were brooded up to two months of age under deep litter system of management and thereafter transferred into three group's i.e. deep litter, semi- Intensive and backyard system of management. There was variation in growth rate, FCR, egg production and mortality pattern of birds under different systems of management. Deep litter system of management had significantly ($P<0.05$) higher body weight, higher feed intake, better egg production rate, early sexual maturity and higher egg weight than semi intensive system followed by backyard systems of management.

Keywords: Gramapriya birds, performance, mortality, growth rate, egg production

Introduction

Indian agriculture sector contributes 28 per cent to the gross domestic production income (GDP) in India, among which 17% of income comes from poultry. Today India is the third largest egg and fifth largest in broiler production in the world. The Indian poultry industry is growing at the rate of 8 to 10% for eggs and 15 to 20% for broiler production (Shrivastava, 2011). The knowledge of performance of economic traits in chicken is important for the formulation of breeding plans for further improvement in production traits. Growth and production traits of a bird indicate its genetic constitution and adaptation with respect to the specific environment. Gramapriya bird was developed at Project Directorate on poultry at Hyderabad for backyard poultry production in rural and tribal areas (Reddy *et al.* 2002).

*Corresponding author: Dilip Kumar Jha; e-mail-drdilipvp@rediffmail.com; suribaskar@hotmail.com

It is an egg type bird preferred by rural farmer for their colored plumage with better growth rate, more eggs production, larger egg size and brown egg shell. Gramapriya bird is suitable for free range system and backyard farming provided with low cost inputs in nurseries to deliver optimal performance in rural condition (Giri and Sahoo, 2012). A study was conducted to see the performance of Gramapriya birds under Deep litter, Semi Intensive and Backyard system of farming.

Materials and methods

A total of 300 day old Gramapriya chicks were hatched and brooded upto two months of age under deep litter system of management. After two months of brooding, these chicks were transferred into three group's i.e. Deep litter, Semi- Intensive and Backyard system of management. In each system of management 100 birds were kept randomly. Standard management and healthcare practices were followed throughout the experimental period. The experiment was conducted at Ranchi which is located between $22^{\circ} 45'$ - $23^{\circ} 45'$ North latitude to $84^{\circ} 45'$ - $84^{\circ} 50'$ East longitude. It experiences subtropical climate, characterized by hot summer from March to May and well distributed rain fall during southwest monsoon from June to October.

All the chicks were immunized against Ranikhet disease on 5th and 28th days using F₁ and Lasota strain respectively. Gumboro (IBD) disease vaccine was done on 14th and 22nd days using intermediate strain and other vaccination and deworming as per Chauhan and Roy (2003). The weekly body weights and mortality pattern of chicks were recorded. Relative growth rate of chicks were assessed based on the weekly body weights. The weight of pullet when first egg lay, pullet egg weight and egg weight at 40 weeks of age were recorded. Date of laying first egg and number of eggs laid in 40 weeks period were recorded. The egg quality traits like shell thickness, egg weight, shape index, albumin index, yolk index were estimated. The data were analysed as per methods described by Snedecor and Cochran (1994).

Results

The fertility and hatchability percentage of Gramapriya birds were 80.34 and 65.77 respectively on total egg set basis. The hatchability percentage on fertile egg set basis was 89.21. The mortality rate up to 8 weeks of age was within permissible limit (4.6%) under nursery management. Mortality in the present study was mainly due to yolk sac infection, coryza, colibacillosis and coccidiosis. There was no outbreak or deaths due to specific diseases were observed during the course of study. The survivability rate of birds in deep litter

management system (91.95%), semi-intensive system (86.10 %) and backyard system (82.85 %) of management were recorded.

The growth performance of Gramapriya birds under deep litter system of management was significantly ($P < 0.05$) higher than semi-intensive and backyard system of management. The average ages at sexual maturity (ASM) in our finding were 151.58, 153.32 and 168.83 days respectively in deep litter, semi intensive and backyard system of poultry farming. Pullet egg weight, egg weight at 40 weeks of age and total number of egg laid in 40 weeks were higher in deep litter than semi intensive and backyard farming as shown in Table 1. The egg quality traits viz. Egg shape index, Albumin index, Yolk index and Shell thickness (mm) were observed to be 77.28, 0.15, 0.45 and 0.36 respectively in deep litter system of management, 76.27, 0.15, 0.44 and 0.35 respectively semi intensive system of management and 77.61, 0.13, 0.45 and 0.34 respectively for backyard system of management. The value of yolk index obtained in this study indicates fairly good quality of egg yolk of Gramapriya birds.

Discussion

The hatchability percentages were 89.21% and 65.77% respectively on fertile egg set and total egg set basis. The mean percent hatchability observed in this study on fertile egg set and total egg set basis was higher than the values observed by Pandian *et al.*, 2011 (85.99% and 64.48%) in bantam chicken. The mortality rate of birds in deep litter management system (8.05%), semi-intensive system (13.90 %) and backyard system (17.15 %) of management were recorded. These finding were better than the report of Jha *et al.* (2012) who reported 31.73% mortality in Gramapriya birds under intensive management system. Giri and Sahoo (2012) reported 9.65 % and 24.66 % mortality upto 8 weeks of age in Gramapriya birds under intensive and extensive system of management respectively. The body weight of a day old chicks (37.26 g) and their further progressive growth rate under different system of management were recorded as shown in table 1. These growth rates are in close agreement with the finding of Haunshi *et al.* (2009), who reported 36.65 g body weight at a day old age and nearly same type of growth rate up to 8 weeks of age.

In this study Gramapriya birds showed that they are suitable in all the three system of management. Similarly, Niranjan *et al.* (2008) reported that Gramapriya bird is suitable for free range system of management with low cost inputs in village condition. The mean body weights of birds under deep litter system of management were significantly ($P < 0.05$) higher in comparison to backyard and semi intensive system of management during the experimental

periods. The difference in results might be due to difference in management system, feed supplement and other environmental factors. Our results corroborate with Wang *et al.* (2009), who reported that there is significant effect of management system in weekly weight gain.

Average age at sexual maturity (ASM) in our finding was 151.58, 153.32 and 168.83 days in deep litter, semi intensive and backyard system of poultry farming respectively. The birds of deep litter and semi-intensive system of management started laying eggs at an early age than the birds of backyard system; it might be due to better feeding and management condition of birds maintained under deep litter and semi-intensive system of management. Previously, Haunshi *et al.* (2009) reported that comparatively higher age at sexual maturity in Gramapriya birds, 179.50 days. Niranjana *et al.* (2008) reported that 160.89 days in backyard farming and Giri and Sahoo (2012), who reported comparatively lower age of first lay, 138 days in intensive system and 142 days in extensive system of management. The lower age at sexual maturity in the layer is desirable, which may lead to the increase laying period and improving the egg production.

Pullet egg weight, egg weight at 40 weeks of age and total number of egg laid in 40 weeks were higher in deep litter than semi intensive and backyard farming as shown in table 1. The total eggs produced at 40 weeks in present study was lower than the report of Giri and Sahoo (2012), who reported 93.25 eggs in intensive system and 78.0 eggs in extensive system of management. The egg quality traits *viz.* Egg shape index, Albumin index, Yolk index and Shell thickness (mm) were observed to be 77.28, 0.15, 0.45 and 0.36 respectively in deep litter system of management, 76.27, 0.15, 0.44 and 0.35 respectively semi intensive system of management and 77.61, 0.13, 0.45 and 0.34 respectively for backyard system of management. Effects of management system were observed on the quality of egg (Albumin index, Yolk index and Shell thickness of egg). Albumin index of semi intensive system of management was significantly ($P < 0.05$) higher than that of backyard system of management. The value of yolk index obtained in this study indicates fairly good quality of egg yolk for Gramapriya birds.

The value of egg quality traits obtained in these study were more than the report of Arya *et al.* (2012) in desi and exotic crosses under backyard farming and Malik and Singh (2011) in coloured broiler sire line under agro climatic condition of Tripura. Niranjana *et al.* (2008) reported that the yolk index value ranged from 0.44 to 0.46 among rural varieties of birds. Ahmet *et al.* (2010) reported that egg shape index, albumin index and yolk index was observed to be 77.23, 0.14 and 0.45 respectively. In this study it was observed that Gramapriya birds are hardy, better growth rate, higher egg production and

higher egg weight than indigenous fowl under same management. The eggs produced by Gramapriya birds were brown in colour which has more market value.

Conclusion

The present study was conducted to compare the production performance of improved varieties Gramapriya poultry birds maintained under three different group's *i.e.* Deep litter, Semi- Intensive and Backyard system of management. Deep litter system of management had significantly ($P < 0.05$) higher body weight, higher feed intake, better egg production rate, early sexual maturity and higher egg weight than semi intensive system followed by backyard systems of management.

Acknowledgements

The authors are thankful to the Dean, College of Veterinary Science and Animal Husbandry, Birsa Agricultural University, Ranchi, Jharkhand for providing necessary facilities to conduct this study.

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(Received 12 July 2013; accepted 22 December 2013)