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Research Article

SEASONAL STUDIES ON EGG PRODUCTION IN GIRIRAJA BIRDS UNDER INTENSIVE SYSTEM OF REARING

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ABSTRACT
A study was conducted to determine the effect of season on egg production in giriraja birds. The egg production in different seasons viz. winter (December to February month), spring (March to May month), autumn (September to November month) and in summer (June to August months) were studied in organized farm located near Thanjavur throughout the year of 2013 under intensive system of rearing. When the hens reached the age at sexual maturity (156.01±0.4 days) the laid eggs were collected and the data were statistically analyzed as per the standard method. The highest egg production was found in the in the winter followed by spring, autumn and lowest in the summer. There was significant difference ($p<0.05$) observed for egg numbers obtained from selected hens in the delta region. The results of mean egg production and percentage of egg production were highest in giriraja birds when compared with desi birds available with the farmers under intensive system of rearing.

Keywords: *Giriraja, Egg Production, Season*

INTRODUCTION
Indian economy majorly contributed by livestock and poultry sector (Pathak *et al.,* 2013). Chicken rearing is one of the most suitable activities to improve the livelihoods of the poor due to the advantages it has in terms of the small amount of capital required and the relative ease to set-up such a production system in the rural communities. The housing system is an external factor that influences both the performance of hens and the egg quality characteristics (Englmaierova *et al.,* 2014). Seasonal variation is one of the principal non-genetic factors influencing performance of poultry in tropical country like India. The decrease in day-length is expected to delay the start of laying for the batch hatched in May and slightly for the batch hatched in August. When day-length begins to increase by end of December this causes an earlier start to laying for the batch hatched in November and to some degree for the batch hatched in January. The principal meteorological element commonly implicated with the adverse effect of seasonal variation on performance of poultry is ambient temperature, most especially in tropical and sub-tropical regions of the world. Synthesis of literatures demonstrated that high environmental temperature commonly called heat stress adversely affected egg production performance of commercial layers (Cosmas *et al.,* 2015). However, the research works under intensive management system on the egg production performance of Giriraja hens are scanty. Therefore, the purpose of this study was to compare and evaluate the productive performance of Giriraja birds in different seasons under intensive management system.

MATERIALS AND METHODS
The study was conducted at the organized farm located near Thanjavur district of Tamilnadu, India. The four batches used in the experiment were hatched in May, August, November and December. Thus a comparison of the performance of the hatches automatically introduces a seasonal comparison. Egg production was recorded daily and the eggs were weighed every day in the afternoon immediately after collection. The birds were fed recommended quantity of feed two times in a day, with clean and fresh drinking water *ad libitum* Birds were vaccinated against diseases according to the vaccination schedule. A total of 100 laying pullets of giriraja birds belonging to same hatch were selected at 30 weeks of age. Hens were assigned to same dietary treatments in the whole trial period. The birds were reared during a

photoperiod of 12 hours and an additional artificial light was provided for 4 hours to make total lighting period to 16 hours daily. Birds in all treatment groups were provided with identical care and management throughout the experimental period. Strict hygienic measures and sanitation programme were taken during this period. Birds were vaccinated against diseases according to the vaccination schedule followed in Tamilnadu. The collected data was entered on to a computer Excel Spread Sheet. Data was transformed and then subjected to SPSS (17.00) package and analyzed with the use of multifactorial analysis of variance (ANOVA). The arrival weights of birds were used as covariates. The significant levels were based on $p<0.05$ unless otherwise stated. The experiment was done through the year of 2013 under intensive system of rearing.

RESULTS AND DISCUSSION

The low egg production of laying birds reported by Cosmo *et al.*, compared with the result of the present study could probably be attributed to differences in prevailing climatic conditions and management systems (Table 1). Significant higher egg production in winter season in compared to summer season agrees with the earlier reports on seasonal effect on egg production of commercial egg layers. These investigators attributed poor egg production in summer season to the adverse effects of high ambient temperatures. This submission agrees with the report of (Hsu *et al.*, 1998) have limited breeding capacity during the dry season. Besides, the trend of egg production performance in the studied production whereby highest egg production was recorded in winter, followed by spring, autumn but least in summer is consistent with previous reports on seasonal effect on egg production of commercial egg layers. Results shown in the table show significant difference in egg production of giriraja birds in various months of the year 2013.

Table 1: Seasonal variation in performance of Giriraja Hens

Season	Months	Egg production	Egg production (%)
	December	2940	98
	January	2790	93
Winter	February	2576	85.86
	Mean ±SD	**8306±457.84[a]**	**92.28[b]**
	March	2558	85.26
	April	2432	81.06
Spring	May	2416	80.53
	Mean ±SD	**7406±77.77[a]**	**82.28[b]**
	June	2196	73.2
	July	2002	66.73
Autumn	August	1893	63.1
	Mean ±SD	**6091±153.47[a]**	**67.67[b]**
	September	1716	57.2
	October	1657	55.23
Summer	November	1639	54.63
	Mean ±SD	**5012±40.27[a]**	**55.68[b]**

[a, b] Means with different superscripts are significantly (P < 0.05) different

Studies had revealed adverse relationship between high ambient temperatures, plasma reproductive hormonal levels and potency of reproductive hormones regulating egg production mechanisms in female poultry (Bharambe *et al.*, 2012). In similar vein, Pathak *et al.*, (2013) attributed low egg production of heat-stressed female poultry to the fact that attempts by egg-type poultry to offset the physiological stress induced by high environmental temperature is accompanied by alteration and disruption of hormonal equilibrium of laying hens thereby resulting in inefficient and impairment of the entire mechanism involved hence poor egg production of heat stressed hens (Figure 1).

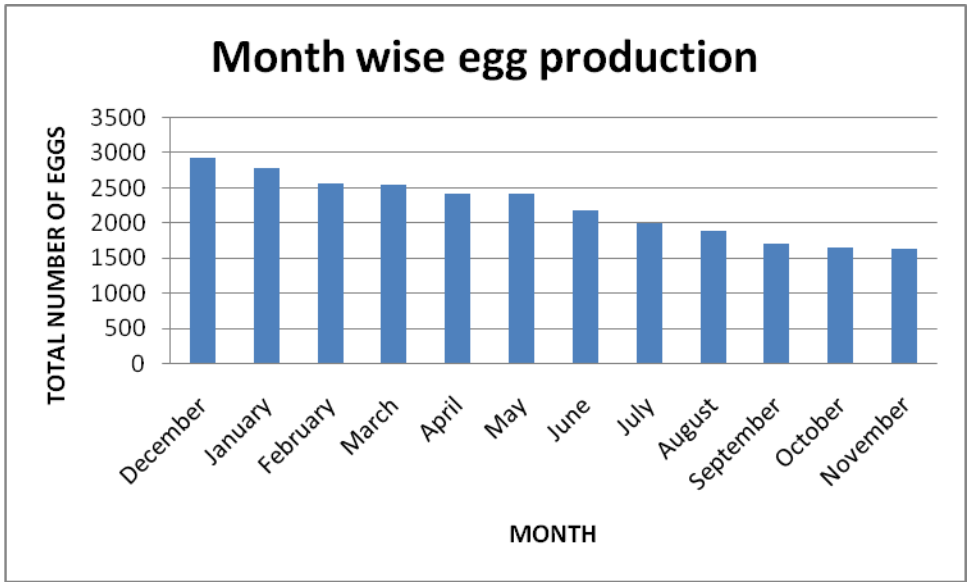

Figure 1: Month wise egg production in giriraja birds

According to Garces *et al.*, (2001), high environmental temperatures limit the performance of chickens irrespective of whether they are kept intensively or extensively. The results reported by Garces *et al.*, (2001) indicate that climatic environment is one of the primary factors that affect egg production and this is testified to by the fact that chickens that started laying in summer produced fewer eggs as compared to the chickens that started laying in winter. Mashaly *et al.*, (2004) explained that the eggs from hens housed in a hot chamber were significantly fewer than the number of eggs produced in controlled chambers meaning that egg production was inversely related to level environmental temperature. This was confirmed by the fact that in an experiment conducted by Star *et al.*, (2008) the hens that were exposed to a high temperature had a laying percentage that ranged from 83.6 to 83.8 as compared to the birds in the control group which had a laying production of 93 to 93.2%.In the present study percentage of egg production in winter season is 98% and it reduced to 54.63% in summer season. This result resembles the above investigators.

In support of other researchers, Hsu *et al.*, (1998) demonstrated that high ambient temperatures normally depress egg production as a result of low feed intake when it is hot. Smith (2005) also reported that the temperatures that exceed 32oC would normally result in a decline in egg production. The report by Usayran *et al.*, (2001) highlighted that egg production of chickens under a constantly high temperature was 74.7% while the ones that were kept at an average ambient temperature had an egg production of 79.1%. Rozenboim *et al.*, (2007) stated that a significant reduction of 20% was observed in the laying production of the chickens that were exposed to heat as opposed to their control counterparts. Contrary to other studies, the results from Persia *et al.*, (2003) established insignificant differences in egg production caused by heat stress.

In conclusion, it is evident that seasonal variation affects egg production of laying birds. Adoption of improved management systems to mitigate adverse effects of heat stress most especially in dry season months would enhance optimal performance of laying birds and all-year-round production of eggs of birds reared intensively. Further investigation of seasonal influence on reproductive hormones of this giriraja fowl is recommended to give insight to relationship between the studied meteorological indices and reproductive hormones connected with egg production.

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