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## Characterization of indigenous chicken production system in Bengaluru division of Karnataka

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### Abstract

The present study was carried out to document the characteristics of indigenous chicken production system existing among farmers under field condition in Bengaluru division (Tumkur, Chitradurga, Davanagere and Shimogga) of Karnataka. A total of 2400 household (600 each from 4 districts) were interviewed using structured questionnaire to assess various management practices viz., flock size, housing and feeding management, egg production traits. The results indicated that average flock size per household in the division was 20.55 birds and the overall average marketing age of cock and hen were  $7.46 \pm 0.06$  and  $11.47 \pm 0.20$  months, respectively. It was evident that majority of the farmers did not provide any separate housing facility in Bangalore division, however 19, 22.8, 19.1 and 21.07 per cent of the farmers from Tumkur, Chitradurga Shivamogga and Davanagere districts provided shelter made from locally available resources. Supplemental feeding apart from scavenging was observed among farmers in Chitradurga (68.8%) followed by farmers in Davanagere (67%), Tumkur (55%) and Shivamogga (51.98%). The survey revealed that high per cent of the farmers did not vaccinate their birds (68.53%). A significant difference ( $P \leq 0.05$ ) in egg production per cycle, number of cycles per year, annual egg production and annual chick production was evident among all the four districts with higher production being recorded in Chitradurga district and the lowest in Shivamogga district. Majority of the eggs were brown (46.34%) in colour and the average egg weight was  $40.03 \pm 0.84$  grams. The results of the present study clearly indicated diversity in managemental practices within the four districts of Bengaluru division of Karnataka, indicating that the production practices varies with geographical location, climatic condition and locally available resources.

**Keywords:** indigenous chicken, housing, feeding management, field condition, Bengaluru division

### Introduction

Indian poultry industry has been considered as one of the most important and fastest growing sectors among the agriculture sectors as the industry has endured an exemplary transformation in structure and operation during the last two decades. This growth has been mainly confined to commercial poultry sector, whereas indigenous poultry production system still exists as an unorganized sector or as backyard system even though it plays a vital role in upliftment of socio-economic and nutritional status of marginal and poor people in rural areas (Kumar *et al.*, 2019) [10]. In India, approximately 65 percent of the human population lives in rural areas and hence it is essential to provide nutritious food with quality animal protein to these rural and tribal people to prevent protein malnutrition and ensure their proper growth and sound health. Hence, there is a need to develop backyard poultry farming with improved varieties of chicken or native breeds as a potential tool to alleviate protein hunger and generate subsidiary income among the rural and tribal people across the country (Rajkumar *et al.*, 2021) [17]. Backyard poultry contributes about 17.8% (18.41 billion) of the total egg production (103.32 billion) of India (BAHS, 2019) [3]. Production, reproduction and growth potential of backyard poultry is low but backyard poultry farmers prefer these birds due to better survivability, adaptability to adverse climatic condition, minimal housing facility requirements as well as high money value of their egg and meat. India has rich poultry genetic resources with more than 14 morphologically defined indigenous chicken breeds along with various nondescript varieties. These indigenous breeds are a valuable genetic resource for present and future generations since they hold several genetic advantages such as disease resistance, acclimatized to extreme environment, lower inputs and higher genetic diversity as compared to exotic and commercial broilers (Sarwar *et al.*, 2015) [18].

In addition, to the recognized breeds/ strains of indigenous birds, there are several unrecognized strains of birds often referred to as non-descript chicken that are been grown in rural parts of India, which is playing a vital role in improving the livelihood and socio-economic status of the rural/ tribal community. However, scientific data pertaining to their morphological characters, production performance viz., growth rate, egg production, housing management and health care are lacking. Hence, the present investigation has been carried out to establish baseline data about various for production parameters of these indigenous non-descript chicken four districts of Bengaluru division of Karnataka so as to make scientific attempts in improving their performance at filed level.

## Materials and Methods

The present study was carried out in four districts viz., Tumkur, Chitradurga, Davanagere and Shivamogga districts of Bengaluru division of Karnataka. The main objective of the study was to evaluate the characteristics of indigenous chicken production practices adapted by the farmers in this division with respect to managerial practices viz., flock size, housing infrastructure, feeding management, health care and egg production (egg production per cycle, number of cycles per year, annual egg production and chicks per year per female), egg quality traits (egg weight, egg colour and shell weight). A structured questionnaire was used for collection of the data. In total 2400 households' viz., 600 household per district were interviewed personally to collect various information regarding the managerial practices. Data obtained were analyzed for statistical significance using simple descriptive analysis using standard statistical software (SPSS).

## Results and Discussion

### Managerial practices

The data regarding the managerial practices adapted by the farmers under filed conditions in four districts of Bengaluru division are presented in Table 1.

### Average flock size

The overall average number of chicks (day one to eight weeks), grower cocks (9 to 20 weeks), grower hens, adult cocks and adult hen in Bengaluru division were  $8.12 \pm 0.19$ ,  $2.17 \pm 0.06$ ,  $3.91 \pm 0.1$ ,  $2.10 \pm 0.05$  and  $4.24 \pm 0.08$ , respectively. The average flock size inclusive of all the birds ranged from 19.77 to 21.14 birds per household. Similar findings have been recorded by researchers in India viz., 25.2 birds in Assam (Vij *et al.*, 2005) [25], 17-20 birds in Mysore division of Karnataka (Gopinath, 2013) [6], 25 birds in West Bengal (Dumrya *et al.* 2015) [5], 15.85 birds in Meghalaya (Gupta *et al.*, 2006) [7], 14.69 in Gulbarga division of Karnataka (Sudhir *et al.*, 2021) [20] and 13 birds in Bundi district of Rajasthan (Dhaka *et al.* 2017) [4]. In similar lines, the mean flock size of indigenous birds per household in other developing countries ranged between 10-24 per household. However, contrary to the findings of our study lower flock size of 6.8 birds in Namakkal, Tamil Nadu (Selvam, 2004) [19], 6.5 birds in Jammu and Kashmir (Tantia *et al.*, 2005) [21], 8-10 birds in Bareilly, Uttar Pradesh (Mandal *et al.*, 2006) [12], 5.5 birds in Kerala (Vij *et al.*, 2007) [24], 7.55 birds in Uttarakhand (Kumar and Kumar, 2007) [11], have been reported in India. The variations in the average flock size may be attributed to the changes in climatic conditions prevailing in the location of

the study area and higher flock size in our indicated the suitable environment in our study location and the attitude of the farmers in undertaking indigenous chicken rearing. In addition, availability of resources and market are the main factors that decide the size of flock.

### Housing practices

In the present study it was observed that the birds were mostly kept indoors during the night either under a bamboo basket (Mankari) or on the bare floor or sometimes with paddy straw to protect them against cold. Some farmers had separate housing for rearing indigenous birds and used shade nets to protect them from adverse climatic conditions made from locally available resources. Majority of the farmers did not provide any nests for laying eggs and some farmers provided bamboo crates spread with paddy straw. It was learnt that indigenous chicken usually lays egg on paddy straws in the cattle barns, some on top of houses, inside the house and near surrounding house and field. The per cent of farmers that provided separate housing in Bengaluru Division were viz., Tumkur (19%), Chitradurga (22.8%), Shivamogga (19.01%) and Davanagere districts (21.07%). The results of our study are in agreement with Badubi *et al.* (2006) [2] who reported that majority of the farmers (64.3 %) rearing poultry in backyard did not provide any housing. Similar findings have been reported by Mounica *et al.* (2019) [14] in rural areas of Kadapa district, Andhra Pradesh, Thangadurai and Shanmugam (2019) [22] in Dharmapuri district of Tamil Nadu and Veerannagowda *et al.* (2020) [23] in Belagaum division of Karnataka, who have indicated that majority of the farmers did not provide separate housing for indigenous chicken and they have opined that higher capital investment towards construction and rearing of only few number of birds were the reason behind non construction of separate housing facility under backyard system of rearing.

### Feeding practices

The results of the present study indicated that majority of the farmers (60.69%) in Bengaluru division provided supplemental feeding either in the form of Ragi, jowar, broken rice, wheat or kitchen waste to the indigenous chicken during morning and evening. Among the different districts studied farmers from Chitradurga (68.8%) practiced highest supplemental feeding followed by Davanagere (67%), Tumkur (55%) and the lowest being recorded in Shivamogga (51.98%). The results are in concurrence with Islam *et al.* (2021) [8] in Assam, Veerannagowda *et al.* (2020) [23] in Belagaum division of Karnataka, Sudhir *et al.* (2021) [20] in Gulbarga division of Karnataka, Mtileni *et al.* (2009) [16] in South Africa, who observed that in addition to scavenging indigenous birds were fed with leftover food, kitchen waste and crushed grains as supplement. Thangadurai and Shanmugam (2019) [22] also reported that farmers in Dharmapuri district of Tamil Nadu let the birds for foraging and the birds were offered with chopped kitchen waste and household vegetable waste in addition to scavenging.

### Marketing age of indigenous chicken

The survey regarding the age at which the birds were sold revealed a significant difference ( $P \leq 0.05$ ) between the marketing age of male and female birds, with female being marketed later as compared to males. In males it ranged from  $6.96 \pm 0.06$  in Shivamogga to  $8.34 \pm 0.09$  in Chitradurga and in females it ranged from  $10.07 \pm 0.06$  in Shivamogga and

12.46±0.31 in Chitradurga. The overall marketing age of male and female birds in Bengaluru division was 7.46±0.06 and 11.47±0.20 months, respectively. It has been documented that majority of the indigenous birds were marketed at an age ranging from 12 to 24 months of age in India (Kalitha *et al.*

2011)<sup>[9]</sup>. Similarly, Sudhir *et al.* (2021)<sup>[20]</sup> observed that the average market age of male birds in Gulbarga division ranged from 7.20 to 8.11 months and that of female birds was 9.94 to 10.91 months.

**Table 1:** Managemental practices adapted by farmers involved in indigenous chicken rearing in Bengaluru division of Karnataka

District	Average Flock size	Housing provision (%)	Additional feeding (%)	% birds vaccinated	Marketing age of Cocks (months)	Marketing age of Hens (months)
Tumkur	20.29	19.00	55.00	28.01	7.06±0.05 <sup>a</sup>	11.33±0.31 <sup>a</sup>
Chitradurga	21.02	22.8	68.80	32.8	8.34±0.09 <sup>b</sup>	12.46±0.31 <sup>b</sup>
Shivamogga	19.77	19.01	51.98	24.07	6.96±0.06 <sup>a</sup>	10.07±0.06 <sup>c</sup>
Davanagere	21.14	21.07	67.00	31.47	7.46±0.05 <sup>c</sup>	12.00±0.10 <sup>ab</sup>

Means with different superscripts (a, b, c...) column wise indicate significant difference (p≤0.05).

**Table 2:** Egg production and quality traits of indigenous chicken under field condition in Bengaluru division of Karnataka

District	Egg production per cycle	Cycles per year	Annual egg production	Chicks per year per female	Shell colour			Egg weight (g)
					Creamy	Light brown	Brown	
Tumkur	14.37±0.12 <sup>a</sup>	2.24±0.04 <sup>a</sup>	51.94±0.76 <sup>a</sup>	29.08±0.21 <sup>a</sup>	11.58	41.83	46.59	38.90±0.85 <sup>a</sup>
Chitradurga	17.75±0.23 <sup>b</sup>	2.99±0.04 <sup>b</sup>	58.72±0.63 <sup>b</sup>	31.56±0.19 <sup>b</sup>	13.22	39.41	47.37	42.40±0.72 <sup>b</sup>
Shivamogga	12.97±0.07 <sup>c</sup>	2.08±0.03 <sup>c</sup>	49.30±0.42 <sup>c</sup>	25.37±0.22 <sup>c</sup>	19.47	37.33	43.2	38.40±0.85 <sup>a</sup>
Davanagere	15.00±0.15 <sup>d</sup>	2.47±0.03 <sup>d</sup>	55.07±0.45 <sup>d</sup>	29.07±0.18 <sup>a</sup>	15.93	35.87	48.2	40.40±0.95 <sup>ab</sup>

Means with different superscripts (a, b, c...) column wise indicate significant difference (p≤0.05).

### Egg production traits

The data regarding the egg production traits are presented in Table 2. The overall average egg production per cycle, number of cycles per year, average egg production per year and number of chicks produced per year per hen in four districts of Bengaluru Division was 15.02±0.14, 2.45±0.04, 53.76±0.57 and 28.77±0.20, respectively. A significant difference (P≤0.05) was observed with respect to all the egg production traits with better production traits being observed in Chitradurga district followed by Davanagere, Tumkur and Shivamogga. The results of the present study are supported by the findings of Agarwal *et al.* (2020)<sup>[1]</sup> in native chicken of Chotanagpur plateau of Jharkhand, Veerannagowda *et al.* (2020)<sup>[22]</sup> in Belagaum division of Karnataka, Sudhir *et al.* (2021)<sup>[20]</sup> in Gulbarga division of Karnataka, Moussa *et al.* (2018)<sup>[15]</sup> in Nigeria and Kalitha *et al.* (2011)<sup>[9]</sup> in indigenous chicken of Assam. The annual egg production of indigenous birds have been reported by Weyuma *et al.* (2015)<sup>[26]</sup> in Bishoflu (44.20±9.6) and Mishra *et al.* (2019)<sup>[13]</sup> in Southern Rajasthan (43.16±0.39).

The average egg weight observed in the present study was 40.03±0.84 grams. Similar egg weight was recorded by Mishra *et al.* (2019)<sup>[13]</sup> in local birds in Rajasthan (40.50±0.34), Sudhir *et al.* (2021)<sup>[20]</sup> in indigenous birds of Karnataka (38.83±1.37) and Thangadurai and Shanmugam (2019)<sup>[22]</sup> in Tamil Nadu (45.12). However, higher weights compared to our study have been recorded in indigenous chicken by several researchers in India. The variation may be attributed to the managemental factors as well as genetic makeup of the indigenous birds.

In the present survey it was observed that majority of the eggs from indigenous chicken were brown in colour (46.34%) followed by light brown (38.61%) and creamy colour (15.05%). This observation was in line with the reports of Vij *et al.* (2007)<sup>[24]</sup> in Tellicherry chicken, Kalitha *et al.* (2011)<sup>[9]</sup> in indigenous chicken of Assam and Sudhir *et al.* (2021)<sup>[20]</sup> in indigenous chicken of Karnataka.

### Conclusion

The results of the present study provides a clear understanding of the various managemental practices being adapted by the farmers in rearing of indigenous/ native chicken in four districts of Bengaluru division of Karnataka. It was evident that farmers had a flock size of less than 20 birds and that the birds were maintained under backyard conditions with low input in terms of housing and supplemental feeding. In addition, the study has indicated variations in practices adapted by the farmers among the districts studied indicating the role of cultural and environmental factors in adaptation of indigenous chicken rearing by the farming community.

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