Original Research

Characteristics of Local Chicken Birds from Southern Rajasthan Region

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Abstract

A survey was conducted on 300 poultry rearers of 60 villages in 12 tehsils of 6 districts in Southern Rajasthan. The flock size was larger in Chittorgarh and Dungarpur district, the most common flock size was less than 10 birds followed by 10 to 20 birds. Farmers maintained non-descript native birds with mixed plumage colour, yellow coloured skin and shank, red ear lobe, black eye with single comb and reared in backyard/free range system. The average age at first egg lay was 6.78±0.05 months and annual egg production was 43.16±0.39 eggs. The average egg weight was 40.50±0.34 while length and width was 4.75±0.02 and 3.47±0.01 cm respectively. The average adult weights of male and female were 1.9 ± 0.02 and 1.25±0.04 kg respectively. The major constraints as reported by the respondents were attack of predators, high incidence of disease, sale of poultry product and lack of improved germplasm.

Key words: Backyard Chicken, Body Weight, Egg and Physical Characters

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Introduction

Poultry is one of the fastest growing segments of the agricultural sector in India with around eight percent growth rate per annum (Chatterjee and Rajkumar, 2015). India ranks 3rd in egg production and 7th in chicken meat production in the world (Watt Executive Guide, 2015). About 3.4 million tons (74 billion) of eggs are produced from 260 million layers and 3.8 million tons of poultry meat is produced from 3000 million broilers per annum in India. Free range and small scale semi commercial back-yard poultry production can be advantageously promoted in rural areas and it can be used as a powerful tool for alleviation of rural poverty, eradication of malnutrition and creation of gainful employment in vast rural areas (Sharma and Chatterjee, 2009; Raj Kumar *et al.*, 2010).

Rajasthan ranks 18th in poultry population (80.24 lakh, Livestock Census, 2012) which is less than 2 % of India's poultry population. The per capita availability of egg per year in Rajasthan is very low (11 eggs) as compared to national average of 45 and much lower than eggs recommended by Nutritional Advisory Committee of ICMR (180 eggs per capita per year) which suggests great scope of improvement in poultry production in Rajasthan. The poultry population under backyard in Rajasthan is 30.33 lakh which is about 38 % of total population. The majority poultry production in Southern Rajasthan is under free range / backyard i.e. 94% of total poultry population in Southern Rajasthan (Livestock Census, 2012). Therefore enhancement of poultry production in Southern Rajasthan must focus on improving backyard poultry production.

In the present study a survey was conducted in six districts of Southern Rajasthan to find out poultry production under backyard conditions. The main objective of the study was to find out growth and production characteristics of backyard chicken in Southern Rajasthan. The observation recorded on different aspects of village poultry would help in making efforts in improving livelihood and nutritional status of Southern Rajasthan which inhabits majority of tribal population of Rajasthan.

Materials and Methods

An attempt was made to know the existing status of rural poultry farming along with constraints perceived by poultry owners in Rajasthan. The study was conducted in six districts of southern Rajasthan namely Udaipur, Rajsamand, Chittorgarh, Dungarpur, Banswara and Bhilwara. From each district two tehsils were selected randomly. From each tehsil five villages were chosen and from each village five poultry farmers were selected at random with the condition that the farmer must have poultry. Thus, a total of 12 tehsils, 60 villages and 300 poultry rearers were interviewed in the survey. The process of data collection essentially involved the ways and means of approaching and gaining access to different sections of information in order to fulfil the purpose of the study i.e. status of backyard / free range poultry farming. The process also involved rapport building with local people who enable them to express themselves and generate information reliably and in relaxed atmosphere. Keeping in view of the objective of study a structured interview questionnaire was developed for the purpose of data collection. The schedule was initially pre tested in the actual field situation at the place other than the locale of the present study. On the basis of experience gained through pre testing suitable modifications were made in the construction and sequence of questions. In order to arrive at logical interpretation, the data were compiled, tabulated and analyzed as per Snedecor and Cochran (1994).

Results and Discussion

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Flock Size

In all the six districts surveyed, none of the poultry rearers had egg, meat or dual type improved birds. All the respondents reared coloured non–descript "desi" birds. The flock size depends on the season, the survey was conducted in the month of December, 2009 and January, 2010, the average unsexed young stock were 4.05±0.40 per household (Table 1), while adult males were 2.38±0.10 and adult females were 8.72±0.36.

Table 1: Average poultry birds per household under backyard poultry

District	Non–descript		
	Chick	Adult Male	Adult Female
Banswara	6.62±1.23	1.68±0.17	5.30±0.24
Bhilwara	0.62±0.26	1.46±0.10	6.60±0.48
Chittorgarh	6.74±1.07	3.84±0.33	13.42±1.02
Dungarpur	6.88±0.59	3.84±0.22	12.82±0.61
Rajasamand	4.78±1.35	1.86±0.15	8.46±1.07
Udaipur	1.10±0.50	1.58±0.10	5.72±0.78
Overall	**4.05±0.40**	**2.38±0.10**	**8.72±0.36**

The flock size was considerably higher in Chittorgarh and Dungarpur districts as compared to other districts surveyed. The most common flock size in the household surveyed was less than 10 birds followed by a size between 10 to 20 birds (Table 2).

Table 2: Flock size in the household surveyed

Flock Size	N	%
< 10	121	40.33
10–20	106	35.33
21–25	20	6.67
26–30	23	7.67
31–35	11	3.67
36–40	9	3
41–45	5	1.66
>45	5	1.67

A flock size of more than 50 birds was rare. Rath *et al.* (2015) has also reported that a flock size of 5 to 50 birds is commonly found under backyard conditions. The availability of resources and market were the main factors to decide the size of flock. The average flock size was considerably higher than flock size of 4.69 birds in Bareilly district of Uttar Pradesh as reported by Mandal *et al.* (2006). However, the flock size in present study is similar to the flock size (13) as reported by Dhaka *et al.* (2017) in Bundi district of Rajasthan. Dumrya *et al.* (2015) has conducted a survey in West Bengal and found that majority of respondents had a flock size of less than 25 birds. The present study was conducted in Southern Rajasthan

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where the commercial poultry production is very rare and majority of poultry is reared under backyard which justifies higher flock size.

Physical Characteristics

A total of 3338 native birds kept by poultry rearers in six districts were observed for their physical characteristics. As far as plumage colour is concerned (Table 3), majority of birds (53.89%) birds had mix plumage colour, followed by brown (23.43), white (8.90%), black (8.36%) and golden colour (5.42%). The birds were classified according to pattern of colour (Table 3), 47.21% birds had dull colour, whereas 16.75% solid colour. The birds with stripped was 17.91%, followed by patchy (11.47%), spotted (6.26%), other (0.27%) and barred (0.12%).

Table 3: Physical characteristics –plumage colour and pattern, skin and shank colour

Plumage Colour	Percent	Pattern	Percent	Skin Colour	Percent	Shank Colour	Percent
White	8.9 (297)	Solid	16.75 (559)	Pink	37.39 (1248)	Pink	21.27 (710)
Black	8.36 (297)	Dull	47.21 (1576)	Yellow	61.29 (2046)	Yellow	77.47 (2586)
Mix	53.89 (1799)	Stripped	17.91 (598)	Black	1.32 (44)	Black	1.26 (42)
Brown	23.43 (782)	Patchy	11.47 (383)	–		Other	0
Golden	5.42 (181)	Spotted	6.26 (209)				
	–	Barred	0.12 (4)				
	–	Other	0.27 (9)				
Total	100 (3338)	Total	100 (3338)	**Total**	100 (3338)	Total	100 (3338)

Figures in parenthesis indicate number of observations

Maximum birds (61.29%) had yellow skin colour, followed by pink (37.39%) and black (1.32%). As far as shank colour is concerned, 77.47% birds had yellow shank colour, 21.27% pink shank color, while only 1.26% were of black shank (Table 3). Majority (68.27%) of birds had red ear lobe while 31.73% had white ear lobe. Similarly, the red comb colour was found in 99.70%, while black comb colour was found only in 0.30% (Table 4).

Table 4: Physical characteristics – ear lobe and comb colour

Ear Lobe	Per cent	Comb Colour	Per cent	Eye colour	Per cent	Comb type	Per cent	Other specific visible traits	Per cent
White	31.72 (1059)	Black	0.3 (10)	Grey	14.47 (483)	Single	79.06 (2639)	Dwarfism	0
Red	68.27 (2279)	Red	99.7 (3328)	Black	63.75 (2128)	Pea	16.18 (540)	Feathered	0
	–	Other	0	Brown	21.78 (727)	Rose	4.76 (159)	Scaly feather	0
				–		Double	0	Necked neck	2.37 (79)
						Other	0	Multiple spur	0
								Other	97.63 (3259)
Total	100 (3338)	Total	100 (3338)	**Total**	100 (3338)	**Total**	100 (3338)	**Total**	100 (3338)

Figures in parenthesis indicate number of observations

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In all 63.75% birds had black eye colour followed by brown (21.78%) and grey (14.47%) colour. Majority of the birds (79.06%) bears single comb, while pea and rose comb was found in 16.18 and 4.76% birds respectively (Table 4). As far as other specific variable traits *viz.* dwarfism, feathered legs, naked neck, silky frizzle, multiple spur is concerned, only 2.37% birds with naked neck were found in the area (Table 4). Majority of birds maintained under free range conditions in the southern Rajasthan are desi birds the observations corroborate the findings of Dumrya *et al.* (2015) and they have also reported that majority of farmers rear desi birds under backyard conditions.

Egg Production Characteristics

The average age at first egg varied from 6.08±0.03 months (Bhilwara) to 7.52±0.15 months (Chittorgarh) with an average age of 6.78±0.05 months, the results of present study corroborates findings of Vij *et al.* (2006) where the average age at first egg ranged between 5.75 months (Gangus breed) and 7.37 months (Danki breeds). The annual egg production also varied from 37.40±0.62 (Banswara) to 52.06±1.23 (Chittorgarh) with an average egg production per hen per year was 43.16±0.39 (Table 5), which is slightly lower than birds maintained under backyard/free range system as reported by Mandal *et al.* (2006) and as reported by Roy *et al.* (2018). Similarly, Singh *et al.* (2017) have also reported higher egg production in Vanraja chicken under backyard conditions which is a dual purpose improved chicken variety.

Table 5: Performance-egg production characteristics

District	Age at first egg (month)	Annual egg production	Clutch size	Pause period	No. of times hens hatch eggs per year	Egg Weight (gm)
Banswara	7.14±0.09	37.40±0.62	12.80±0.22	110.10±1.01	2.38±0.07	40.72±0.53
Bhilwara	6.22±0.05	41.10±0.29	14.90±0.09	104.22±0.32	2.96±0.02	36.94±0.87
Chittorgarh	7.52±0.15	52.06±1.23	10.02±0.39	103.90±1.21	3.60±0.07	42.26±0.36
Dungarpur	6.90±0.31	43.02±0.83	11.08±0.21	108.80±1.73	3.02±0.04	44.78±0.48
Rajasamand	6.84±0.12	42.60±0.83	13.52±0.27	117.10±1.06	2.34±0.09	39.63±1.43
Udaipur	6.08±0.03	42.80±0.38	13.22±0.24	101.76±1.09	3.00±0.00	38.53±0.52
Overall	**6.78±0.05**	**43.16±0.39**	**12.59±0.13**	**107.05±0.52**	**2.88±0.08**	**40.50±0.34**

Buldgen *et al.* (1992) suggested that in addition to genetic effects, this low production could be improved and doubled through rational feeding. In general, the poultry keepers are interested in producing chicks rather than selling eggs in nearby market. The clutch size and pause period varied from 10.02±0.39 to 14.90±0.09 days and 101.76±1.09 to 117.10±1.06 days with overall average of 12.59±0.13 and 107.05±0.52 days respectively for broody hens. The number of times hen hatch the eggs per year varied from 2.34±0.09 to 3.60±0.07 with an average of 2.88±0.08. The average number of chick hatched out per hatch was 9.52±0.09 (Table 5).

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Egg Characteristics

The egg characteristics like egg length, width and weight were measured on at least 5 eggs for each household during survey. The district-wise egg weight varied from 36.94±0.87 g (Bhilwara) to 44.78±0.48 g (Dungurpur) with an average weight of 40.50±0.34 g. The egg weight in the present study was slightly higher than the egg weight reported by Roy *et al.* (2018). In addition to genetic differences, the variations in feed resources as well as age of birds affect the egg weight (Table 6). The overall average egg length and egg width were 4.75 ± 0.02 and 3.47 ± 0.01 cm respectively.

Table 6: Egg characteristics

Parameters	Number of Observations	Mean ± SE
Egg length (cm)	1385	4.75±0.02
Egg width (cm)	1385	3.47±0.01
Egg weight (g)	1385	40.50±0.34

Body Weight and Measurement

The body weight varied from 1.67±0.08 kg at Chittorgarh to 2.29±0.02 kg at Banswara districts in males while 1.09±0.01 kg at Dungarpur to 1.47±0.01kg at Banswara in females with an overall average of 1.91±0.02 kg in males and 1.25±0.01 kg in females (Table 7). The adult body weight in present study was in accordance with the figures reported by Vij *et al.* (2006) for Danki, Kalasthi and Gangus breeds and for Tellicherry chicken (Vij *et al.* 2008). Roy *et al.* (2018) have reported similar pooled adult body weights in indigenous chicken maintained under backyard rearing system in West Bengal. However, Singh *et al.* (2017) have reported higher adult body weight in Vanraja chicken under backyard conditions. The district wise shank length of adult birds varied from 7.88±0.08 to 8.94±0.07 cm in males while 6.39±0.05 to 7.29±0.04 cm in females with an overall average of 8.35±0.03 cm in males and 6.73±0.02 cm in females (Table 7).

Table 7: Body weight and measurement

District	Adult weight of male (kg)	Adult weight of female (kg)	Shank length of male (cm)	Shank length of female (cm)
Banswara	2.29±0.02	1.47±0.01	8.94±0.07	7.29±0.04
Bhilwara	1.90±0.02	1.22±0.01	8.51±0.01	6.59±0.02
Chittorgarh	1.67±0.08	1.16±0.02	8.06±0.06	6.68±0.05
Dungarpur	1.68±0.02	1.09±0.01	8.23±0.02	7.03±0.03
Rajasamand	2.23±0.03	1.39±0.04	8.50±0.08	6.41±0.05
Udaipur	1.71±0.02	1.15±0.01	7.88±0.08	6.39±0.05
Overall	**1.91±0.02**	**1.25±0.01**	**8.35±0.03**	**6.73±0.02**

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Constraints

The constraints (Table 8) as perceived by the rural poultry owners were recorded in the schedule prepared for the purpose of the study. The rank position of the constraints was decided on the basis of frequency distribution against each constraint. Attack of predators was the major constraint which was reported by 87.33% farmers, followed by high incidence of disease (85.67%), market for sale of poultry product (76.00%), lack of health services (65.33%), lack of improved germplasm (58.67%) and balance feed availability (57.33%).

Table 8: Constraints in backyard poultry farming (N=300)

S. No.	Constraints	Frequency	Percentage	Rank
1	Attack of predators	262	87.33	I
2	High incidence of disease	257	85.67	II
3	Market for sale of poultry product	228	76	III
4	Lack of health services	196	65.33	IV
5	Lack of improved germ plasm	176	58.67	V
6	Balance feed availability	172	57.33	VI

Dumrya *et al.* (2015) has also reported these constraints though ranks were different than the present study. Mandal *et al.* (2006) reported similar constraints; Patra and Singh (2016) found that absence of structured market followed by availability of improved germplasm and inputs were the most critical constraints perceived by the farmers. In order to overcome the constraints there is a need for creating awareness, providing knowledge and proper planning and implementation of strategies for backyard poultry farming.

Conclusion

The majority of poultry keepers reared non-descript chicken having a most common flock size of less than 20 birds. The birds were maintained under backyard / free range conditions with low production. The attack of predator and high incidence of diseases were the major constraints perceived by the farmers. There is need for research in bringing about improvement in the production of chicken under backyard conditions.

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