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Characterization of Domestic Duck Production System in Eastern Region of India

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Abstract

A study was conducted in Eastern plateau region of India (Jharkhand, Odisha and Chhattisgarh) to evaluate the smallholder duck production systems in the region. A total of 251 duck farmers were selected for this study. The information was collected by using an interview schedule. Majority of farmers rears the duck more than 20 years. The average flock size is more in Chhattisgarh (11.76±0.60) compared to Jharkhand (9.51 ±0.67) and Odisha (9.47± 0.52). Ducks were mostly depend on scavenging for their nutritional needs in the study area. Very little percentage of duck used to hatch their eggs in Jharkhand (27.78) and Odisha (24.44) as compared to Chhattisgarh (56.34). The ducks are raised both for meat and egg purpose. The average annual egg production per duck in Jharkhand, Odisha and Chhattisgarh was ranged to be 50-70, 60-80 and 52-111 eggs per annum respectively.

Keywords: Duck Production System, Desi Duck, Eastern Plateau Region, Production Performance, Reproduction Performance

Introduction

Indigenous ducks of our country constitute more than 90% of the total duck population (BAHS, 2016). Total duck population of Eastern region (27.78 million) constitutes more than 85.00% of the total duck population of India (32.50 million). The contribution of the ducks can be assessed by the fact that almost every rural household have a couple of them and duck eggs fetch higher price compared with those from the hens. The other reason why the native ducks are preferred over the exotic duck breeds is due to their attractive plumage colour (Padhi, 2014; Jalil, Begum and Nahar, 1993 and Rehman *et al*., 2009). Indigenous ducks play a vital role in sustainable livelihood of the resource poor duck farmers. The leading states in duck population are West Bengal, Assam, Kerala, Andhra Pradesh, Tamil Nadu, Bihar and Orissa.

Duck rearing is still in the hands of poor rural farmers, who are landless labourers. Mostly Muslims and backward people in Eastern region of India have special affinity for duck meat preferably desi ducks and hence, the breeds need conservation, development and promotion through farming community. Since duck farming has not undergone any process of industrialization, its husbandry practices are traditional, nomadic and sometimes primitive (Gajendran and Karthickeyan, 2011). Therefore, the traditional practices of duck rearing evolved since ancient days from time to time by the farmers, still exist and are proved to be efficient and economical for sustainability. Eastern Plateau regions are the native of many indigenous duck germplasm reared by the farmers with traditional/domestic production system which have not been characterized so far. Hence, the present study was undertaken to study the duck production System in Eastern plateau region of India.

Materials and Methods

The study was conducted in seven districts of Jharkhand (Palamu, Garhwa, Lohardaga, Latehar, Simdega, Khuti and Ranchi), five districts of Odisha (Cuttack, Baleswar, Puri, Mayurbhanj and Bhubaneswar) and three districts of (Surguja, Balrampur and Raipur) Chhatisgarh where the duck flocks were concentrated. The information regarding indigenous technical know-how practices in duck farming had been elicited by using interview schedule. The data were collected from face-to-face interviews using the survey questionnaire. The management aspects and the performance of ducks were collected during the visits made to the individual duck units in the study area. In the study, a total of 251 duck farmers *viz.* 90 from Jharkhand & Odisha and 71 from Chhattisgarh were included.

Live weight (g) was measured by digital electronic spring balance up to the nearest gram. Annual egg production (no.) and age at first egg (AFE) data were collected from field based on farmer's responses. The age at first egg (AFE) was recorded as the age in days from the date duckling is hatched out to the day when she lays her first egg and average was taken into consideration. After collection of data, all information was recorded in master table sheets. Before analysis, tabulated data were carefully checked and reviewed to detect any unusual or extreme values recorded and summarized in the sheet. Data were analyzed using standard statistical method to calculate descriptive statistics such as mean, range, frequency and percentage.

Results and Discussion

Duck Production System

Duck Rearing Period

Majority of the respondents in Jharkhand, Odisha and Chhattisgarh rear the duck for the last 20 years.

Duck Flock Sizes

There is little variation in the size of duck flocks in different states of study area. Flock size ranged from 2 to 20 in Chhattisgarh, 2 to 52 in Jharkhand while it ranged from 7 to 44 in Odisha. Small duck flock sizes in present study supports the finding of Halder *et al*. (2007) in west Bengal whereas dissimilar to the findings of Islam *et al*. (2002) and Gajendran and Karthickeyan (2009) in Tamil Nadu, Nind and Tu (1998) in South Vietnam and Mahanta *et al*. (2001) in Lakhimpur and Dhemaji districts of Assam, Zaman *et al*. (2005) in Nageswari duck of Bangladesh. Semi-intensive and free-range scavenging systems were also observed in Bangladesh (Rahman *et al*., 2009), West Bengal (Halder *et al*., 2007), Tripura (Das and Rahman, 2018) and Tamil Nadu (Gajendran and Karthickeyan, 2009).

Rearing System

Intensive management system of rearing was not practiced in the study area. Semi-intensive and free-range scavenging systems were followed. Ducks were reared under scavenging condition with only natural feed resources like village pond, near small water bodies. Above 80 percent of the farmers followed scavenging system in Jharkhand (86.67%), Odisha (83.33%) and Chhattisgarh (83.33%) followed by semi intensive method in Jharkhand (13.33 %), Odisha (16.67%) and Chhattisgarh (84.51%)

Housing

In Jharkhand, Odisha and Chhattisgarh 5-13% of farmers did not provide shed to their birds at day time and did not take special care for ducklings due to lack of knowledge and training, but all farmers provided housing at night. Of the remaining households, 87-91 percent provide shed. None of the farmers who did not provide housing gave economic reasons for this; but they all perceived that housing is not necessary. The materials used for shed construction also differed, with about 66.66 % of Jharkhand, 73.34 % of Odisha and 72.34% of Chhattisgarh used simple materials (soil /Bamboo/ straw) and rest of them simply purchased raw materials for shed construction. These figures show that (Table 1) farmers prefer low-cost housing with few inputs, as a measure to help make farming cost-effective.

Halder *et al*., 2007 also observed that the ducks were mostly kept at night in a small constructed shelter (80.33%) in West Bengal. Similarly, in some places of Tamil Nadu, ten coconut leaves were woven together to provide guards for as many as 80 dozen ducklings. Instead of coconut leaf guards, the palm leaf woven *thatties* (thatched material) called *Sambu* used as guards. These enclosures are stronger and durable than the coconut leaf enclosure (Gajendran and Karthickeyan 2011). Rahman *et al*. (2009) also observed that more than 60 % of duck houses are made of tin and wood. Similarly, Halder *et al*. (2007) reported that 18.22% farmers did not possess any permanent shelter and kept their ducks under some bamboo basket and only 1.44% farmers provided organized shelter to their ducks.

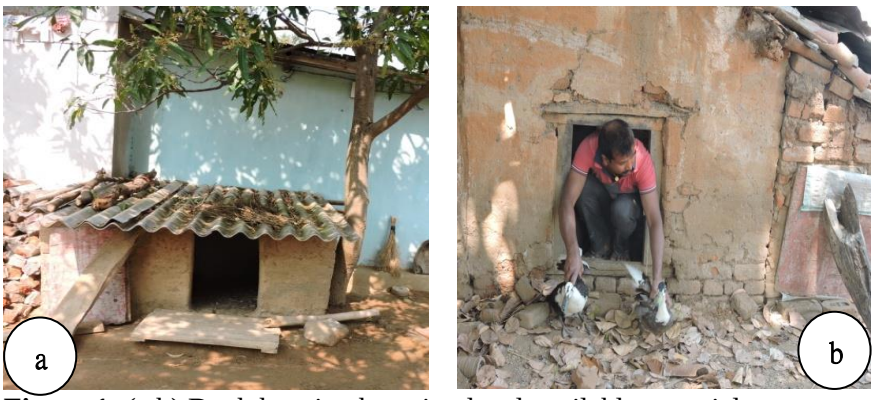

Figure 1: (a,b) Duck housing by using local available materials

Feeding and Supplementation of Feed

Among farmers 17.78% in Jharkhand 27.78% in Odisha and 19.72% in Chhattisgarh did not supply any additional feed to their ducks. Ducks were reared under scavenging condition (with only natural feed resources), whereas, more than 80 % farmers of Jharkhand and Chhattisgarh, 72.22% farmers of Odisha gave supplemental feeding @50g/bird/day, apart from scavenging. Farmers mainly used ponds as the scavenging venue for duck. Additional feed includes kitchen waste, paddy and mixed feed stuffs. The most common mixed feedstuffs are paddy, maize, broken rice and broken wheat produced on respondents' own farmland.

Feed and feeding method of duck in present study was in agreement with the observations of Ravindran (1983), Kamal *et al*., (2019), Reddy (1987), Halder *et al*. (2007) in west Bengal and Rahman *et al*. (2009) in Bangladesh and Tamilvanan *et al.* (2019) in North and Middle Andaman. Zaman *et al*. (2005) reported that adult Nageswari ducks, acquired most of their feed (paddy grains, snails, small fishes, earth worms and insects) by foraging in the paddy fields, ponds, rivers and other water bodies. Contrary to this, duck farmers of Kerala, Andhra Pradesh and Tamil Nadu fed their adult ducks with the mixture of locally available feed ingredients like coconut gratings, palm

core and small fishes. Rahman *et al.* (2009) reported that 38.50 per cent farmers did not supply additional feed to their ducks whereas 62% farmers gave supplemental feeding to their ducks. The main components of supplemental feeds were rice polish, a mixture of rice polish and broken rice and a mixture of rice polish and wheat bran. Pervin *et al.* (2013) studied duck production strategy and profile of duck farmers in two coastal districts (Noakhali and Lakshmipur) of Bangladesh, where they observed that 95.5% of the farmers supplied mixed feed (wet mash) to feed their ducks and most of the farmers used rice polish, broken *rice* and boiled rice as supplemental feeds either alone or in combination.

Figure 2 (a): Ducks in Scavenging system

Figure 2 (b): Duckling in Scavenging system

Broodiness

Artificial incubation was not at all practised. Very little percentage of ducks used to hatch their eggs in Jharkhand (27.78) and Odisha (24.44) and Broody hens were found to be widely used for hatching duck eggs. Whereas, in Chhattisgarh 56.34% have broodiness character. Therefore, mud pots and bamboo baskets were used for hatching purpose with paddy straws and saw dust as bedding material. The duck eggs were placed in the pots over the bedding material and the broody hen and duck were made to sit on eggs. About 36.67%, 34.44% and 21.13% farmers of Jharkhand, Odisha and Chhattisgarh did not try to observe the broodiness characters of duck. The duck eggs were placed in the pots and the broody hen or duck having broodiness character was made sit on eggs. Absence of brooding nature in most of the desi ducks in present study supported by Morduzzaman *et al*. (2015) who also reported absence of brooding nature in native Nageswari duck.

Health and Mortality

Majority of the farmers (86.67 % in Jharkhand, 91.11% in Odisha and 97.18% in Chhattisgarh) did not use vaccines against the diseases of ducks due to its non-availability. Mortality data were divided into two periods: period 1 from first day to two months of age; period 2 from two months to adult; More than 10% respondent of Jharkhand, Odisha and Chhattisgarh replied that percentage of mortality was 80-85 % in the age of day old to 2 months. In all the three districts and in all the two periods of life, duck plaque was the main cause of mortality, followed by predators and unknown reasons. Otherwise incidence of disease was very less.

Non-availability of vaccine for ducks in the present study is in agreement with the findings of Rithamber *et al*. (1986), Tu (1995) and Seri Masrah (1996). Zaman *et al*. (2005) stated that farmers of Nageswari ducks did not adopt vaccination, de-worming or other healthcare practices. Mahanta *et al*. (2001) reported duck plague, duck cholera, hepatitis and botulism as major causes of death in local ducks of Assam. In other studies, Islam *et al*. (2002) and Sharma *et al*. (2003) recorded much lower percentage of mortality (below 10%) in adult Nageswari ducks in Assam. Islam *et al.* (2002) also reported occasional vaccination against duck plague and regular treatment with common antibiotics, potash solution and black pepper. Bhuiyan *et al.* (2005) showed that mortality percentage of Pekin, Muscovy and Desi White under farmer's condition at Sylhet of Bangladesh were 4.0, 4.0 and 2.0% respectively up to 9 weeks of age. In other studies, Islam *et al*. (2012) reported mortality percentage of Khaki Campbell, Jinding and Desi in Barisal and Bhola districts to be 19.79, 17.77 and 30.20% respectively. Rahman *et al*. (2009) reported that duck plague and duck cholera were the common diseases of Desi ducks at southern coastal regions of Bangladesh.

Table 1: Traditional management system in duck rearing

Parameters	Jharkhand		Odisha		Chhattisgarh	
Duck rearing period	**n**	**Farmers (%)**	**n**	**Farmers (%)**	**n**	**Farmers (%)**
<10 years	9	10	8	8.89	5	7.04
11-20 years	21	23.33	32	35.55	28	39.44
>20 years	60	66.66	50	55.55	38	53.52
Total	90	100	90	100	71	100
Flock size	90	9.51±0.67	90	9.47±0.52	71	11.76±0.60
Duck rearing method						
Intensive	0	0	0	0	0	0
Semi-intensive	12	13.33	15	16.67	11	15.49
Scavenging method	78	86.67	75	83.33	60	84.51
Total	90	100	90	100	71	100
Housing						
Soil made	38	42.22	7	7.78	52	72.34
Brick with plastic shed	20	22.22	12	13.33	15	21.13
Bamboo/straw made	22	24.44	59	65.56	0	0
no shed	10	11.11	12	13.33	4	5.63
Total	90	100	90	100	71	100
Feeding system						
Scavenging	16	17.78	25	27.78	14	19.72
Scavenging with supplementation	74	82.22	65	72.22	57	80.28
Total	90	100	90	100	71	100
Supplementation of feed						
Paddy	28	37.84	22	33.85	15	21.13
Mixed	46	62.16	43	66.15	56	78.87
Total	74	100	65	100	71	100
Broodiness						
Yes	25	27.78	22	24.44	40	56.34
No (with Desi hen)	32	35.56	37	41.11	16	22.54
Not tried	33	36.67	31	34.44	15	21.13
Total	90	100	90	100	71	100
Health						
Vaccination						
Yes	12	13.33	8	8.89	2	2.82
No	78	86.67	82	91.11	69	97.18
Total	90	100	90	100	71	100
Mortality						
Day old to 2 months						
>10%	77	85.56	72	80	58	81.69
<10%	13	14.44	18	20	13	18.31
Total	90	100	90	100	71	100
2 months to adult						
>10%	19	21.11	13	14.44	10	14.08
<10%	71	78.89	77	85.56	61	85.92
Total	90	100	90	100	71	100
Disease						
More	31	34.44	33	36.67	26	36.62
Less	59	65.56	57	63.33	45	63.38
Total	90	100	90	100	71	100

Productive Performance

Average age at first egg in native ducks of Jharkhand, Odisha and Chhattisgarh was 187 days (ranges 172-223 days), 165 days (ranges 156-181) and 156.36 days (ranges 145-185) respectively. The egg productions per bird in native duck of Jharkhand, Odisha and Chhattisgarh were reported to be between 50-70, 60-80 and 52-111 eggs per annum respectively.

Attainment of sexual maturity in Odisha native duck observed in the present study is found to be similar with the finding of Padhi *et al*. (2014), who reported the age at sexual maturity of native ducks of Odisha 167 days. Attainment of sexual maturity observed in the present study is little higher than those found by Padhi *et al*. (2009). The age at first egg for indigenous ducks of Odisha was reported to be 122 days (Padhi *et al*., 2009). Padhi (2010) reported the age at first egg of the flock of the indigenous duck as 118 ±1.15 days. The average age at first egg of desi duck of West Bengal was recorded as 196 days (Roy *et al.*, 2017). This variation might be due to better nutrition and management condition. In Nageswari ducks, Sharma *et al.* (2003) found average age at first egg to be 181.94±1.57 days. In other studies, Zaman *et al.* (2005) and lslam *et al.* (2002) reported that average age at first egg (AFE) of Nageswari duck was 188 days with a range of 174-198 days and 180-195 days respectively. Egg production in Odisha desi duck up to 40 weeks and 72 weeks of age on per day basis were reported to be 64.36 and 165.27 eggs, respectively (Padhi *et al*., 2009). In another experiment by Padhi (2010) it was found that egg production was 65.09 eggs (±2.30) up to 40 weeks and 113.66 eggs (±4.04) up to 60 weeks of age. Average egg production per annum per duck was 96.2 in native duck of West Bengal (Halder *et al*., 2007). Mahanta *et al.* (2001) and Islam *et al.* (2002) mentioned that the average egg production of Nageswari duck varied from 140-160. However relatively lower egg number was found by Sharma *et al.* (2003) the average egg number at 40, 56 and 72 weeks of age were 64.62±0.34, 85.54±0.40 and 110.68±0.75 eggs respectively. In Chara and Chemballi ducks of Kerala, Mahanta *et al.* (1998) reported the egg number up to 72 weeks of age (8 laying cycles of 28 days each) as being 116.09 and 124.95 eggs respectively. The Annual egg production per duck (Pati) is 70-95 eggs, (Kalita *et al.*, 2009). The egg production data corroborated with the findings of Islam *et al*., 2002 in Assam and also similar to the observations of Mahanta *et al*., 2009 in ducks in Kerala and Assam, respectively, while it contradicted with the findings of Ravindran *et al*., 1984 who stated an average egg production of 130-140 eggs per duck per annum in Kerala state. The culling ages for all the native ducks were maximum of two to three years. There is no distinguishable clutch size and clutch interval found in native duck of Jharkhand Odisha and Chhattisgarh. The culling ages of two to three years in present study are in agreement with Gajendran & Karthickeyan, 2009 who reported that the farmers of Tamil Nadu rearing desi indigenous ducks disposed off their adult flocks after two to three years for meat purpose.

Conclusion

Indigenous ducks are popular among farmers due to eggs which fetch higher price, meat and different attractive plumage colour. Majority of the duck owners rear the duck for the last 20 years. However, their productivity is low compared to improved varieties. The duck rearers follow traditional feeding system and they don't have any scientific knowledge for productivity improvement of scavenging desi ducks of Eastern region. Most of the farmers provided kitchen waste, paddy, maize, broken rice and broken wheat produced on respondents' own farmland as supplementary feed ingredients to ducks either singly or in combination. As these ducks are well acclimatised to local agro climatic conditions, and very little work on improvements of native ducks through selection are being carried out, still it has to be given more importance in different regions of India. Training on *package* of practices on duck farming needs to be strengthened.

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Conflict of Interests

There is no conflict of interest.

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