

**Research paper****Characterization of indigenous ducks in different agroclimatic region of West Bengal**Subhamoy Pal<sup>#</sup>, Aruna Pal<sup>\*1</sup>, JK Chatterjee<sup>#</sup>, PN Chatterjee<sup>1</sup><sup>1</sup>West Bengal University of Animal and Fishery Sciences, 37, K.B. Sarani, Kolkata-37 (West Bengal) India<sup>#</sup>Vishwa Bharati University, Bolpur (West Bengal) India**ABSTRACT**

Ducks form one of the most important poultry species next to chicken. In the present study, we have characterized the indigenous ducks of West Bengal phenotypically through quantitative and qualitative traits in three different agro-climatic region of West Bengal, comprising of four districts. Body colour ranges from white to deep brown, either intact or patchy. Males were observed to have better morphometry compared to that of female in all agro-climatic regions. Ducks from Purba Bardhaman district were reported to have better neck length, girth of breast and body length, whereas Ducks from Malda were reported to have less neck length and body length. Characterization of these duck population reveals high homogeneity and important for breed description.

**Keywords:** Phenotypic characteristics, ducks, poultry.**\*Corresponding author:** : arunachatterjee@gmail.com.**INTRODUCTION**

Ducks are the second most important species next to chicken and contribute approximately Rs. 4 crores to total GDP of India. They are reared for table egg and meat production in India and. India has a population of 23.54 million ducks (19<sup>th</sup> Livestock census, 2012) out of which 90-95% constitute indigenous or non-descript types. Free range nomadic duck keeping or the extensive system of management is the most popular rearing system among farming communities at village level. Duck farming practices in the country are mostly concentrated in eastern, north eastern and southern regions where extensive inland watershed areas are present, which form an excellent natural habitat for the waterfowls. The leading states in terms of duck population are- Assam (7.21 million), West Bengal (6.08 million), Kerala (0.92 million), Tripura (0.71 million), Manipur (0.38 million) and Odissa (0.30 million).

The commercial meat consumption is growing at a faster annual rate (3.4%/year) globally than the chicken meat industry, particularly in Asia, which accounts for 83.5% of world production. China is the largest consumer of Asian duck meat (2 kg) on contrary to World per capita consumption of 600g/year. China produces 79% of Asian duck meat. Worldwide, duck production is intensifying not only, as in China, to reduce the risks of bird flu – but also in order to reduce pollution and to realize the benefits from improved genetics. Extensive system of duck rearing in Asia is essentially based on the use of natural resources in the form of grassland and ponds. Free range or extensive rearing of ducks plays a vital role in rural areas in Asian countries for utilization of cheap natural feed

resources, like insects, worms, snails and snakes on which they survive mostly by scavenging. Hardy nature with average egg production makes the indigenous ducks highly suitable for extensive system of rearing. They do not require elaborate housing, medical and feeding Care and management compared to chicken. Ducks are versatile, live happily under wide range of climatic conditions and they are free from common poultry diseases such as leucosis, Marek's disease, infectious bronchitis and other respiratory troubles.

Duck has varied eco-genetic potentials which could undoubtedly bring the up-liftment of rural livelihoods in the country. Duck eggs and meat are accepted by all sections of the society. About 96.47% of ducks are reared in rural areas while the remaining 3.53% are reared in urban areas. Since majority of ducks are desi or non-descript type having low production potential, therefore, there is an ample scope of duck improvement in the region. Added to this, there is a drastic decline in population over years from 27.6 million in 2007 to 23.5 million in 2012 may be due to massive culling after bird flu outbreak. There is an urgent need to augment the duck production through innovative breeding, feeding and disease management strategies. Very limited research and scientific intervention has been made for their genetic and phenotypic characterization and variability of duck resources in the country. Hence, any attempt to improve the duck farming will have direct impact on the economically backward families. Ducks, especially the indigenous types, are resistant to many diseases despite their frequent exposure to marshy and grazing areas; where the incidence of potential pathogens is relatively.

The West Bengal is the second largest duck producing state of the country. Indigenous duck egg and meat is very nutritious and popular and it fetches better price. So far indigenous ducks have not been systematically characterized in West Bengal, except a preliminary study by Vij et al., 2010, which was restricted to only one agroclimatic region. There exists huge biodiversity due to six agroclimatic region in West Bengal. Morphological characterization have already been undertaken in different states of India (gaur et al., 2010) in duck populations of Tamilnadu (Gajendran and Karthickeyan, 2009; Murugan et al., 2009), Kerala (Patki and Lucy, 2012), Assam (Zaman et al., 2007; Sharma et al., 2003; Phookan et al., 2018) and Orissa (Kamal et al., 2019; Mishra et al., 2009; Panda et al., 2008; Padhi et al., 2011; Padhi et al., 2014). Hence there is an urgent need to characterize the indigenous ducks of West Bengal, so that indigenous stock may be saved through conservation strategy for future use.

#### MATERIALS AND METHODS

The present study has been designed for characterization of duck (n=184) from different agroclimatic zones of West Bengal. Indigenous duck of WB were studied at four different districts belonging to three different agroclimatic region, namely, Purba Barddhaman and Hooghly (both belonging to Gangetic alluvial region), Birbhum (undulating red and laterite region); and Malda (Vindhyan Alluvial Zone).

The descriptions of external morphological variants considered in this study were assessed according to the guidelines of FAO as suggested by Cuesta (2008) and NBAGR guideline. For the characterization of female duck, biomorphometric traits studied are bill length, bill width, shank length, neck length and width of breast, girth of breast, pelvic girth and body length. Girth of breast is measured at sternum region. The production parameters studied for duck includes egg traits. Biomorphometric characteristics were measured by measuring tape. Other

qualitative characters have been measured based on visual appraisal. Reproduction or production traits were estimated based on personal survey. Data collected from the farmers on several attributes were subjected to descriptive statistics and one-way analysis of variance using SYSTAT 12.0 package.

#### RESULTS AND DISCUSSION

##### *Qualitative characteristics:*

The indigenous ducks of West Bengal have multiple plumage patterns ranging from white to deep brown, either intact or patchy. Shank colour is usually orange, rarely brownish orange colour is also visible. Skin colour is white. Bill colour varies from orange yellow, orange, grey and sometimes slate colour. Ducks are medium to well-built and body carriage is horizontal. Bill shape is horizontal. Distinctive green coloured, however sometime observed in the neck region and wing of Drake. Earlier preliminary studies revealed similar qualitative trait, but biomorphometry were not studied (Banerjee et al., 2013). Earlier, we had undergone some morphological studies for indigenous ducks in Nadia, North 24 paraganas and Birbhum districts of West Bengal, which is in agreement to present study (Pal et al., 2016).

##### *Quantitative characteristics*

Biomorphometric characters were studied in different agroclimatic regions in both male and female ducks. Both male and female were characterized in all districts. Apparently, they seem to be similar in different districts under study for most of the traits. However, significant differences has been observed in different districts for neck length, width of breast, girth of breast, body length, egg weight. Neck length was observed to be less in Malda district and highest in Purba Barddhaman. Similarly, the width and girth of breast was observed to be least in Hooghly. Pelvic girth and body length was observed least in Malda (Table 1). For most of the traits, drake (male duck) was observed to have higher value in comparison to



Figure 1: Indigenous duck of West Bengal



female duck. Similar findings were also observed by other workers (Vij et al., 2010; Phookan et al., 2018), It seems that the duck from Purba Bardhaman district were of better body size and Malda the least.

Vij et al. (2010) have studied indigenous duck population restricted to only Gangetic alluvial region, with similar results. However they had only studied Nadia, North 24 Parganas and Hoogly districts, surrounding Kolkata . But in the current study, we had studied Purba Bardhaman also located distantly from Kolkata, which had never been studied earlier. In addition, we studied two additional agroclimatic regions as red and Laterite region, Vindya Alluvial region. Likewise the data were presented district wise for a better study.

Indigenous duck population was also studied in Assam. The mean length (cm) for shank and bill were recorded as 5.675 and 5.444 in Pati duck, the recently registered only duck breed from Assam. Shank length was observed to be less in Pati ducks in all agroclimatic region of West Bengal. The bill length of pati duck is comparable to overall population of West Bengal. However the ducks from Purba Bardhaman were reported to have bill length in comparison to others. However, Nageswari duck of Assam recorded a better shank length and bill length (Phookan et al, 2018). Nageswari duck from Bangladesh recorded a lower value of biomorphometric traits (Morduzzaman et al., 2015). Both Sanyasi and Keeri varieties of duck from

Tamilnadu recorded more bill length than indigenous ducks of West Bengal. Shank length for both Sanyasi and Keeri varieties were similar to that of overall duck population. However duck population from Gangetic alluvial region (Purba Bardhaman and Hoogly) recorded a longer shank length. Neck length for Sanyasi and Keeri was recorded to have similar to duck from Gangetic alluvial region. However the body length from both Sanyasi and Keeri was less than duck of West Bengal (Gajendran et al., 2009).

Indigenous ducks from Odisha were recorded to have a longer body length, bill length, bill width compared to ducks of West Bengal. Shank length from alluvial and red laterite region of West Bengal was recorded to be more than ducks of Odisha. However ducks from Vindya Alluvial region (Malda district) were recorded to have less Shank length. Neck length was observed to be less in duck of Odisha in comparison to that of West Bengal (Kamal et al., 2019). Studies on Muscovy ducks at two different agroclimatic regions of Nigeria revealed a complete different picture. Body length and neck length was observed to be more than that of ducks from WB, whereas bill length was observed to be less in Muscovy ducks (Yakubu et al., 2011).

#### Reproductive traits

Reproductive traits studied were age at first egg, no. of eggs and weight of eggs (Table 2). Significant differences were observed in weight of egg in different agro-climatic regions. There was a very interesting observation was that

**Table 1:** Biomorphometric characteristics (in cm) for indigenous duck of West Bengal in different regions pertaining to different agro-climatic region

Agroclimatic region	District	Sex	Bill length	Bill width	Shank length	Neck length	Width of Breast	Girth of Breast	Pelvic girth	Body length
Gangetic alluvial region	Purba Barddhaman (n=36)	Female	5.683±	2.767±	6.067±	13.677±	11.833±	22.412±	25.75±	25.667±
		Male	6.450±	3.100±	6.750±	13.250±	13.500±	23.000±	26.000±	30.500±
	Hooghly (n=42)	Female	5.462±	2.688±	6.250±	12.250±	10.937±	17.375±	22.625±	25.625±
		Male	5.650±	2.650±	6.780±	12.850±	11.750±	17.250±	23.00±	25.980±
Red and laterite region	Birbhum (n=36)	Female	5.483±	2.683±	5.8±	12.167±	12.667±	20.667±	24.333±	24.5±
		Male	6±0	2.9±0	6.7±	16.5±	13.5±	21.5±	26.5±	31.5±
			0.0	0.0	0.96	0.34	0.56	0.97	0.53	0.183
Vindhyan Alluvial region	Malda (n=70)	Female	5.327±	2.713±	5.753±	11.233±	11.387±	20.733±	22.107±	24.100±
		Male	6.034±	3.667±	6.067±	13.167±	11.833±	21.333±	23.833±	29.50±
			0.044	0.033	0.025	0.227	0.167	0.333	0.351	0.50
	P- value		0.0	0.001	0.00	0.426*	0.364*	0.983*	0.005	0.082*

**Table 2:** Egg quality traits for indigenous duck of West Bengal

District	No. of females	Age at 1st egg (months)	No. of eggs	Weight of egg (gm)
Purba barddhaman	24	6.167±0.078	201.905±10.682	53.33±0.07
Hooghly	32	6.250±0.078	102.833±2.809	58.142± 0.023
Birbhum	24	6.333±0.098	156±3.475	57.833±0.223
Malda	60	6.467±0.065	146.00±3.866	58.400±0.234
<b>P- VALUE</b>		0.00	0.005	0.353*

better egg weight for ducks from Malda was recorded and least in Purba Bardhaman. Egg weight for Pati ducks was comparable throughout duck population. However, ducks from Gangetic alluvial region recorded less egg weight. The present study is in agreement to that of Vij et al., 2010. However the egg weight from West Bengal was reported to be less than that of other states, Odisha, Kerala, Andhra Pradesh. Similar observations were also recorded for ducks from other states. Vij et al (2010) had compared ducks from different states. Similar type of data was also reported for Nageswari Duck's from Bangladesh.

In conclusion, indigenous ducks of three different agro-climatic regions in West Bengal were characterized and found to have quite homogeneity within the regions. Physical characteristics were nearly similar in all three populations. Morphometric characteristics also revealed high homogeneity within the population of a region. Study found the duck population of West Bengal as unique and homogenous.

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