



Evaluation of Tripura black native germplasm of poultry at the organised farm conditions

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Poultry rearing is traditionally popular in Tripura, since time immemorial, for egg and meat production. Most of the farmers of Tripura maintain 5–15 native birds in their backyard to support their livelihood throughout the year. Although these native birds have some undesirable characteristics viz. poor egg production, lower growth and body size but still preferred by rural people due to broodiness (self propagating ability) and lower feed requirement (which could be fulfilled by utilizing waste materials viz. kitchen waste, fallen grains, green grass, Insects and earthworms) so that people maintain these birds nearly on zero input from generation to generation. Therefore, considering importance of Tripura black native germplasm among the tribals and as no information about their characteristics and performance were available at the organised farm conditions, an attempt was made to study the production performance of Tripura black native germplasm of poultry of Tripura at the organised farm conditions.

Tripura black, the native germplasm of poultry, was established at ICAR Research Complex for NEH Region, Tripura Centre, Lembucherra by purchasing birds from local farmers. The morphological characteristics of the germplasm were studied. A flock of black colour having uniformity in colour and other phenotypic traits were generated and used for evaluation. A total of 461 fertile eggs of this local germplasm were set for hatching and 364 chicks were taken out from the hatchery on 22nd day after hatching. The chicks were wing banded and provided vitamin supplement in clean drinking water. The chicks were brooded up to 6 weeks of age in deep litter system using dry rice husk as litter material mixed with lime powder at the Institute farm. Observations on body weight, feed consumption, egg production and other economic traits were taken for the study.

Egg quality traits viz. egg width, egg length, shape index, thick albumin weight, total albumin weight, per cent albumin

ratio, albumin index, yolk weight, per cent yolk ratio, yolk index and Haugh unit were studied at 40 weeks of age using standard procedure. The data were analyzed using statistical procedures as described by Snedecor and Cochran (1994).

The findings of different traits are as follows:

Morphological characteristics of Tripura native germplasm: In Tripura, mainly four types of native germplasm are distributed throughout the state namely Dark black colour (medium size), Brown colour (small size), Barred fowl (medium size) and mixed birds of all the three types. Few birds of Chittagong breed were also found in some border areas of Bangladesh in South Tripura Dist. Naked neck and Frizzle birds were observed in all the four types of germplasm. The birds of black colour are very popular in rural areas of Tripura so the present study was performed on this germplasm. The majority of birds have dark black shining plumage colour but some red plumage was also found on the neck, mostly in males. The shank was light yellow and blackish grey in colour. The comb was mostly single and skin was whitish pink in colour. The details of morphological characteristics have been presented in Table 1.

Table 1. Morphological characteristics of Tripura black native germplasm

Trait	Description
Plumage colour	Pure black (65%) and black with red on neck (35%)
Eye colour	Black (97%) and light black (3%)
Comb type	Single (83%), Rose (12%) and others (5%)
Comb colour	Bright red (91%) and dull red (9%)
Earlobe colour	Red (100%)
Shank colour	Light yellow (53%) and blackish grey (47%)
Skin colour	Whitish pink (100%)
Egg shell colour	Light brown (22%), cream (65%) and white (13%)
Egg size	Medium (70%) and small (30%)

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Fig. 1. Female and male birds of Tripura black native germplasm.

Per cent fertility and hatchability: The average per cent fertility was 84.43%. The per cent hatchability on total egg set and fertile egg set were 78.96 and 93.35%, respectively (Table 2). Lower values for fertility and hatchability on TES and FES than the present study were reported by Mohan *et al.* (2008a) in native breed Aseel peela, Mohan *et al.* (2008b) in kadaknath deshi fowl and Doley *et al.* (2009) in indigenous chicken of N.E. region.

Growth and production traits: The mean of body weights and other economic traits at different ages of Tripura black have been presented in Table 2. The mean body weights at 20 weeks of age were: 1186.09 ± 25.46 g., 1003.64 ± 13.99 g. and 1061.59 ± 13.55 g., respectively for male, female and overall mean. Higher mean body weight at 20 weeks of age than the present study was reported by Niranjana *et al.* (2008a) in Aseel breed, Mohan *et al.* (2008a) in native breed Aseel peela and Mohan *et al.* (2008b) in kadaknath deshi fowl. However, Niranjana *et al.* (2008a) observed lower body weight in Kadaknath breed under the organised farm conditions. The difference in body weights at different ages may be due to differences in genetic potential of different breeds, agro-climatic conditions, nutrition and managerial practices.

The cumulative feed consumption up to 6 weeks of age, the feed consumption per bird per day between 19–20 and 39–40 weeks of age is presented in Table 2. The feed consumption of Tripura native germplasm is lower than all the other stock evaluated at this centre (AICRP Annual Reports, 2002–08). The lower feed consumption of Tripura black at all the ages can be due to lower body weight of the bird. The age at first egg and age at sexual maturity was 160 days and 179.39 ± 1.18 days, respectively at the farm conditions. The lower age at sexual maturity than the present study was observed by Doley *et al.* (2009) in indigenous chicken of N.E. region under the farm conditions. Niranjana *et al.* (2008a) determined higher age at first egg in Aseel breed. The weight at first egg and at 40 weeks of age was estimated: 29.68 ± 0.16 g. and 38.18 ± 0.50 g., respectively, at the farm. The significant increase in egg weight from age at first egg to 40 weeks of age is associated with the maturity of the reproductive system of the birds. Higher value for egg weight than the present study was reported by Niranjana *et al.* (2008a) and Mohan *et al.* (2008a, b) in Aseel and Kadaknath breed under organised farm conditions. The egg production up to 40 weeks and 72 weeks of age was 36.17 ± 1.54 eggs and 124.14 eggs, respectively at the farm (Table 2). Mohan *et al.* (2008a) in Aseel Peela (160 eggs in 78 weeks) and Niranjana *et al.* (2008a) in Kadaknath breed observed higher egg production, whereas Niranjana *et al.* (2008a) in the same study reported lower egg production in case of Aseel breed. The differences in average age at first egg, egg weight and egg production can be due to differences in genetic make up of different breeds, agro-climatic conditions, nutrition and managerial practices.

Per cent mortality: The per cent mortality during brooding, growing and laying period was observed as: 4.60,

Table 2. Mean performance of Tripura black native germplasm at the institute farm

Traits	Mean performance		
	Male	Female	Overall
Fertility%	—	—	84.43
Hatchability% (i) TES (ii) FES	—	—	(i)78.96 (ii)93.35
DOC (g)	27.43 ± 0.27	26.98 ± 0.22	27.14 ± 0.17
BW04WK (g)	162.66 ± 3.07	148.56 ± 2.15	153.48 ± 1.79
BW08WK (g)	355.49 ± 8.99	296.30 ± 5.18	317.02 ± 4.86
BW12WK (g)	620.79 ± 11.12	504.83 ± 7.68	545.76 ± 7.12
BW16WK (g)	934.30 ± 17.19	760.97 ± 11.94	822.00 ± 10.97
BW20WK (g)	1186.09 ± 25.46	1003.64 ± 13.99	1061.59 ± 13.55
BW40WK (g)	1708.74 ± 39.55	1317.85 ± 24.80	1443.69 ± 24.62
Cumulative Feed Consumption up to 6 Wks of age (g./bird).	—	—	762.35
Av. feed consumption bet. 19–20 weeks of age (g/day)	91.95	84.65	88.30
Av. feed consumption bet. 39–40 weeks of age (g/day)	90.03	88.65	89.34
Age at first egg (days)	—	—	160
Age at sexual maturity (days)	—	—	179.39 ± 1.18
Wt. at first egg (g)	—	—	29.68 ± 0.16
EW40 WK (g)	—	—	38.18 ± 0.50
EP40 WK (nos)	—	—	36.17 ± 1.54
EP72 WK (nos)	—	—	124.14

Table 3. Egg quality traits of Tripura black native germplasm at 40 weeks of age

Trait	Mean $\pm$ SE	CV
Egg width (cm)	3.86 $\pm$ 0.051	10.18
Egg length (cm)	5.077 $\pm$ 0.035	5.38
Shape index	76.32 $\pm$ 1.30	13.10
Thick albumin weight (g)	16.31 $\pm$ 0.35	16.71
% Thick albumin	71.66 $\pm$ 0.73	7.83
Total albumin weight (g)	22.69 $\pm$ 0.38	12.84
% Albumin ratio	60.04 $\pm$ 0.76	9.78
Albumin index	0.049 $\pm$ 0.001	25.55
Yolk weight (g.)	14.29 $\pm$ 0.33	17.77
% Yolk ratio	37.57 $\pm$ 0.53	10.93
Yolk index	0.51 $\pm$ 0.005	8.50
Haugh unit	79.13 $\pm$ 1.16	11.34

2.20 and 7.10% at the farm. The per cent mortality was lower than all the other stocks evaluated at this centre (AICRP Annual Reports 2002–08). The higher mortality during laying period was mostly due to managerial problems. Overall Tripura black native germplasm have good resistance to most of the diseases.

Egg quality traits: The means and coefficient of variation (C.V.) of different egg quality traits of Tripura black have been presented in Table 3. The mean and coefficient of variation (CV) of shape index of Tripura native germplasm was 76.32 $\pm$ 1.30 and 13.10%, respectively. The present results for shape index was in close agreement with the findings of Chatterjee *et al.* (2007) in frizzle fowl and Brown Nicobari, Kaur *et al.* (2008) in clean shank local hill fowl of Uttarakhand. However, lower estimates for the shape index was observed by Padhi *et al.* (1998) in White and Brown Nicobari, Chatterjee *et al.* (2007) in Naked neck and Barred deshi and Kaur *et al.* (2008) in feathered shank local hill fowl. Contrary to this Chatterjee *et al.* (2007) in White and Black Nicobari fowl observed higher shape index. Significant genetic variation for egg length, width and shape index in different breeds or strains was reported by Chatterjee *et al.* (2007).

The per cent albumin ratio along with their CV was: 60.04 $\pm$ 0.76 and 9.78%, respectively. Lower estimates for per cent albumin ratio was reported by Padhi *et al.* (1998) in Naked neck and Nicobari fowl and Chatterjee *et al.* (2007) in Naked Neck, Barred deshi, Frizzle and Nicobari fowl. However, Padhi *et al.* (1998) determined higher per cent albumin ratio in White Leghorn. The albumin index along with their CV is presented in Table 3. Padhi *et al.* (1998) in Naked neck and Nicobari and Kaur *et al.* (2008) in Feathered and Clean shank local hill fowl reported higher albumin indices. The albumin quality has significant breed or strain differences in genetic variation (Padhi *et al.* 1998 and Chatterjee *et al.* 2007).

The mean and C.V of yolk weight, per cent yolk ratio and yolk index were: 14.29 $\pm$ 0.33 g., 37.57 $\pm$ 0.53, 0.51 $\pm$ 0.005 and 17.77, 10.93, 8.50%, respectively. The yolk index indicated

the spherical nature of the yolk. Lower estimates for yolk indices were determined by Padhi *et al.* (1998) in Naked neck and Nicobari, Chatterjee *et al.* (2007) in Naked neck, Barred deshi, Frizzle and Nicobari fowl and Kaur *et al.* (2008) in Feathered and Clean shank local hill fowl. Contrary to this higher estimate of yolk index was observed by Sharma *et al.* (2002) in White Leghorn. The differences for yolk weight, per cent yolk ratio and yolk index in different study can be due to breed /strain effect, differences in temperature and/or season (Chatterjee *et al.* 2007, Kaur *et al.* 2008).

The Haugh unit is the measure of albumin quality. The estimated mean and C.V. of Haugh Unit was 79.13 $\pm$ 1.16 and 11.34%, respectively. The comparable result on Haugh Unit was reported by Kaur *et al.* (2008) in Feathered shank local hill fowl. Contrary to this Padhi *et al.* (1998) in Naked neck and White Nicobari and Kaur *et al.* (2008) in Clean shank local hill fowl reported lower Haugh Unit. Higher estimates for Haugh Unit were observed by Mohan *et al.* (2008a, b) in Aseel Peela and Kadaknath deshi birds. The Haugh units were significantly influenced by different genetic groups (Niranjan *et al.* 2008b).

SUMMARY

The birds of Tripura black are very popular in rural areas of Tripura. Morphologically true to type of this germplasm have dark black shining plumage colour with medium body size. The shank was light yellow and blackish grey in colour. The comb was mostly single and skin was whitish pink in colour. The mean body weights at 20 weeks of age were: 1186.09 $\pm$ 25.46 g., 1003.64 $\pm$ 13.99 g. and 1061.59 $\pm$ 13.55 g., respectively for male, female and overall mean. The feed consumption per day between 19 and 20 weeks of age was: 91.95 g., 84.65 g. and 88.30 g. per bird, in male, female and overall mean, respectively. The age at sexual maturity was: 179.39 $\pm$ 1.18 days, at farm condition. The egg production up to 40 weeks and 72 weeks of age was 36.17 $\pm$ 1.54 eggs and 124.14 eggs, respectively. The egg quality traits of Tripura black were studied at 40 weeks of age at the farm. The estimated mean of the shape index, per cent albumin ratio, albumin index, per cent yolk ratio, yolk index and Haugh unit were 76.32 $\pm$ 1.30, 60.04 $\pm$ 0.76, 0.049 $\pm$ 0.001, 37.57 $\pm$ 0.53, 0.51 $\pm$ 0.005 and 79.13 $\pm$ 1.16, respectively.

It is concluded that the production performance of Tripura black native germplasm was good at the organised farm conditions. However, no recorded information was available on this native germplasm, therefore this is an attempt to characterize this precious germplasm of Tripura for further recognition. Moreover, further research is needed for improving production profile as well as conservation of this germplasm to maintain its purity and existence for future use.

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