

MORPHOLOGICAL DESCRIPTION OF DESI CHICKEN IN MINICOY, LAKSHADWEEP ISLANDS

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ABSTRACT

A morphological characterization study was conducted on desi chicken at Minicoy in Lakshadweep Islands. The phenotypic characters such as colour and pattern of plumage, comb type and colour of skin, earlobe and shank were documented in both male and female adult chickens as per the guidelines of National Bureau of Animal Genetic Resources (NBAGR). The desi chicken from Minicoy Islands are smaller in size with a short beak, and exhibit a striking multicolour plumage intricately speckled across its body feathers, tail and neck. Significant sexual dimorphism was noted for the phenotypic characters. A total of 3 cocks and 7 hens were reported with different combination of plumage colours and patterns. The study indicated that these desi birds have distinct morphological characters that is worth for further investigation.

Keywords: Desi chicken, Lakshadweep Islands, morphological descriptors, plumage pattern

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INTRODUCTION

The animal biodiversity in India is very wide and rich with various livestock species. Livestock sector contributes to Indian economy to a greater extent of 4.66 per cent of the total Gross Value Added

(GVA) (Economic Survey 2023-24) and 30.38 per cent in the total GVA in agriculture and allied sectors. It has significantly boosted the availability of egg, meat and milk. Among the livestock components, desi chickens meat is the all-time favourite meat by both ethnic and modern people because of its lower drug residue levels, nutritional quality and palatability (Kumaresan *et al.*, 2008). India has a significant proportion of 37.2% native chicken out of 851.8 total million chickens (BAHS, 2022). The livelihood and nutritional security of resource poor farmers depend on indigenous chicken production that plays a vital role in meeting out protein requirement of poor rural inhabitants (McCain, 2005; Emuron *et al.*,

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2010). In addition to these socioeconomic roles, desi chickens are integral part of religious, cultural and social life of farmers (Mapiye *et al.*, 2008). Native breeds are gold mines of genomes consisting of genes for improvement of high yielding exotic germplasm for tropical adaptability and disease resistance which is a prerequisite for building up organic food chain. The indigenous chickens are warehouse of a number of alleles with biotic and abiotic stress tolerance. Therefore, the desi chickens are highly suitable for backyard poultry production under various climatic environments (Ajayi, 2010). However, rural poultry suffer from main threats of random crossbreeding, replacement with hybrids and environmental pressures (Cabarles *et al.*, 2012; Egahi *et al.*, 2010).

The major lacunae in the genetic improvement programmes of indigenous chicken is the lack of knowledge on variation in quantitative and qualitative traits of indigenous chicken and their effects on the performance of the birds. Documentation of this information can be of tremendous help for their breeding strategies. Mission towards Zero Non-descript Animal Genetic Resources (AnGR) of India lead by ICAR- National Bureau of Animal Genetic Resources (NBAGR) has enriched chicken genetic resources with twenty indigenous breeds. Unfortunately, genetic identity of most of the native poultry breeds particularly of non-descript desi birds are decreasing which is of greater concern from conservation point of view. However, genetic identity of the indigenous / non-descript desi birds is maintained in isolated

environment especially in Island ecosystem due to geographical barrier (Shardul *et al.*, 2021).

The desi chickens are the major chunk of chicken breeds in Minicoy of Lakshadweep Islands. They are one of the most important and ubiquitous poultry species, contributing significantly to food security and thus have become an exceptional source of animal protein in Minicoy Island, Lakshadweep. Therefore, conservation of these highly priced non-descript rural poultry is extremely crucial. Morphological characterization of this germplasm was attempted in this study, which may lay foundation stone for further studies and its registration in the future.

METHODOLOGY

The data on morphological traits were collected during October to November, 2024. The data were collected from desi birds that are reared by tribal farming community belonging to villages of South Bhandaram, Newboduthri, Rammodu, Bada, Hudihi and Sedivalu of Minicoy Island in Lakshadweep Islands. The Island is situated at a distance of 398 kms (215 nautical miles) from Kochi, Kerala.

The phenotypic characters were documented in both male and female adult chickens as per guidelines directed by the National Bureau of Animal Genetic Resources (NBAGR), Karnal, India. This study was purely on collection of primary data and involved observations of plumage colour and pattern of desi birds.

RESULTS AND DISCUSSION

A total of 101 male and 106 female birds were randomly selected to document their morphological characters such as morphology and distribution of feathers, colour and pattern of plumage, comb type, and colour of skin, ear lobe, eye and shank.

Phenotypic characters

The phenotypic characters (%) of the desi chicken reported at Minicoy Islands are described in the Table. The dorsal view (male and female) of plumage pattern is presented in Fig. 1.

Fig 1 : Dorsal views of multi-coloured plumage



The desi chicken from Minicoy Islands are smaller in size with an average body weight of 985.25 ± 20.85 gms with a short beak (5.76 ± 0.17 inches) and exhibits a striking multicolour plumage intricately speckled across its body feathers, tail and neck. The phenotypic characters showed significant sexual dimorphism. Different varieties of cock and hens were identified with combinations of plumage colours and patterns (Fig. 2 to 11) and summarised in Table 1.

Varieties of Cock



Fig. 2 : Cock 1

This cock exhibits a plumage characterized by a vibrant mosaic pattern of rich brown, red and white colours intricately speckled across its body feathers. The tail feathers were predominantly of white and black in colour. The comb and wattle colours were red; while its legs and feet were pinkish-tan in colour with darker markings. The beak was pale reddish-pink and toe was yellowish and eyes were reddish-brown in colour.



Fig. 3: Cock 2



Fig. 4 : Cock 3

The cock possessed mixed plumage colour predominated by black and creamy white stripes. The neck and head were creamy white in colour. The general body colours were yellowish cream, brown, black, white with black stripes and admixture of brown and black, light brown and blue, light brown and white, black and brown. The shank and toes were light yellow and orange with black spots; while, tail feathers were attractive greenish black in colour. Comb type was single and wattle is present.

Varieties of hen



Fig. 5: Hen 1

The plumage all over the body had a mix of light brown / tan and dark brown / black feathers. Neck feathers had a mix of light brown and yellow colours with black tips. Wings had mix of light chocolate with black coloured feathers. Tail had dominant greenish black plumage mixed with light brown at anterior end. This plumage pattern is more commonly observed in Minicoy. Shank and toes were light yellow coloured.



Fig. 6 : Hen 2

The general plumage colour can be described as blackish brown with spots uniformly spreading on back, tail and wings giving homogeneous and smooth appearance. The head was predominantly speckled with yellow. The neck was usually mixed of black, brown and yellow plumage. In general, its plumage is a dark, mottled and vibrant brown, with variations in shade creating a textured appearance. The beak was blackish yellow with black spots. The feet were orange in colour with black spots. The hen's comb and wattle were red in colour. This was also a more commonly spotted plumage pattern in the Islands.



Fig. 7: Hen 3

This variety had brown, black and speckled feathers with yellow tinges on the breast and neck region. Plumage on tail is prominently black coloured with brown tinges. Shank and toes are yellow. The comb type was single and the wattle was red in colour.



Fig. 8 : Hen 4

This variety has brown dominant plumage with black and white patches feathers with yellow tinges on the breast and neck region. Plumage on tail was prominently black coloured with white tinges. Shank and toes were yellow.



Fig. 9: Hen 5

This variety had brown dominant plumage with black speckled feathers with reddish brown feathers on the neck region. Plumage on tail was prominently black with brown tinges. The shank and toes were yellow. The comb type was single and wattle was red in colour.



Fig. 10: Hen 6

This variety has grey dominant plumage with admixture of black and white speckles with brown tinges on the breast and white speckles on the neck region. Plumage on tail is prominently black coloured. The shank and toes were grey. The comb type was single and wattle was red in colour.



Fig. 11: Hen 7

The hen has plumage colour pattern of gold colour and dark brown on the neck. The plumage on the body is a mix of brown and gold / tan. Shank and toes are greyish black in colour.

The desi birds irrespective of sex were observed with normal feather morphology. The reports on morphology traits of desi birds from other states by Tadelle *et al.* (2003), Sudhir *et al.* (2021),

Gopinath (2013) and Thirunavukkarasu *et al.* (2024) accorded to these findings.

Plumage colour

The cocks were having predominant plumage colour of creamy white and black (60.12%) followed by white brown (23.23%) and brown red black (16.65%). The brown red black cock was similar to red jungle fowl. Hens were found in various colour combinations of brown black (58.34%), black (26.13%), brown red black (13.32%) and grey white (2.21%). Other colours like dark brownish golden was also found at small proportions. The findings are in accordance with the observations on native chicken by Thirunavukkarasu *et al.* (2024), Sudhir *et al.* (2021), Veeranna Gowda *et al.* (2020), Gopinath (2013) and Daikwo *et al.* (2011) whose studies reported that the plumage colour of desi birds was predominantly multicolour, brown, black followed by red, greyish black and brownish black, black, brown with spotted. Black, black with spotted white. The present findings of various colour combinations in plumage give attractive appearance to desi birds of Minicoy Island in Lakshadweep Islands that are contrary to findings of Gopinath (2013) who has reported self-white, self-black, self-blue, self-red, barred, lasing and mottled in indigenous chicken of Karnataka.

Plumage pattern

The predominant plumage pattern in cock was multicoloured (29.36%) and Black breasted Red (25.47%), followed by stripped (13.62%) and spotted (13.45%), Wheaten (9.24%), solid (5.18%), Red pyle (2.56%) and speckled (1.12%). The prime plumage

pattern was solid (20.88%) followed by wheaten (17.42%), multi-colour (15.62%), Black breasted red (13.71%), spotted (12.34%), striped (11.25%) and speckled (5.72%) in hens. These reports are opined by observations of Thirunavukkarasu *et al.* (2024), Sudhir *et al.* (2021), Veeranna Gowda *et al.* (2020), Gopinath (2013) and Vij *et al.* (2016) who observed seven primary plumage patterns such as solid, dull, stripped, patchy, spotted, barred and mottled. This diversity in plumage colour and pattern of desi and indigenous chicken is a feature for camouflaging, adaptability and survival.

Comb type

The single comb was the only comb type (100%) recorded in both the sexes. The observations of Rotimi *et al.* (2016), Rajakumar (2013) and Gopinath (2013) also confirmed the present report of desi birds.

Skin colour

Both cock and hen had yellow skin colour that is in concurrence with the findings of Thirunavukkarasu *et al.*, (2024), Sudhir *et al.* (2021), Veeranna Gowda *et al.* (2020), Assefa and Melesse (2018) and Gopinath (2013). However, white skin colour has also been reported by Agarwal *et al.* (2020), Rajkumar *et al.* (2017) and Vij *et al.* (2016).

Eye and earlobe colours

The eye colour in both sexes was black. The colour of the earlobe was red in both sexes. The observations of Thirunavukkarasu *et al.* (2024), Sudhir *et al.* (2021), Veeranna Gowda *et al.* (2020),

Agarwal *et al.* (2020), Qureshi *et al.* (2018), Rajkumar *et al.* (2017) and Vij *et al.* (2016) are also align with the present reports.

Shank colour

Both the sexes had predominant yellow shank (more than 90%) and the rest of the birds had black colour shank. Thirunavukkarasu *et al.* (2024), Sudhir *et al.* (2021), Veeranna Gowda *et al.* (2020), Agarwal *et al.* (2020), Qureshi *et al.* (2018), Rajkumar *et al.* (2017), Vij *et al.* (2016) and Gopinath (2013) also found yellow shank as a predominant colour in desi birds. As observed in the present study, Rotimi *et al.* (2016), Gopinath (2013) and Egahi *et al.* (2010) also reported black shank in native chickens with varying proportions in addition to white and green shanks.

CONCLUSION

The phenotypic variability in plumage colour and pattern of the present study indicates wide variability in this population. However, further morphometric analysis, evaluation production performance and molecular characterization and genome studies can throw more light on the chicken germ plasm present in this Island ecosystem and future need for its conservation.

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Table 1. Morphological traits (%) of the desi chicken

Trait	Male (n=101) (49%)	Female (n=106) (51%)	Pooled (n=207) (100%)
<i>Plumage colour</i>			
<i>Female</i>			
Brown black	-	58.34	-
Black	-	26.13	-
Black Grey white	-	2.21	-
White brown	23.23	-	-
Creamy white and black	60.12	-	-
Brown Red black	16.65	13.32	14.985
	100	100	
<i>Plumage pattern</i>			
Solid	5.18	36.58	20.88
Red pyle	2.56	3.52	3.04
wheaten	9.24	25.6	17.42
Spotted	13.45	11.23	12.34
Stripped	13.62	8.89	11.255
Black breasted Red	25.47	1.96	13.715
Multi-colour	29.36	1.89	15.625
Speckled	1.12	10.33	5.72
<i>Shank colour</i>			
Yellow	96.67	91.58	94.12
Black	3.33	8.42	5.875
<i>Eye colour</i>			
Black	100	100	100

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