

Phenotypic and genetic characteristics of Tellicherry breed of chicken

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Backyard poultry rearing consisting mainly of local/*desi* birds has been the backbone of the poultry development programme in Kerala. The state has one indigenous breed of chicken i.e. Tellicherry. It is found in the Malabar region of the state. Very little information is available on this breed in literature except that plumage colour is reported to vary from black to grey, and eggs tinted and small to medium in size (Mahapatra and Panda 1981, Acharya and Bhat 1984 and Singh and Johari 2000). Hence the present investigation was taken up to characterize and evaluate Tellicherry breed of chicken in its native tract.

Survey was conducted in the year 2006 in Kozhikode (Calicut), Kannur and Wayanad districts of Kerala covering 18 villages, 38 flocks and 209 birds. Information was recorded on flock composition, management practices, and morphological and performance parameters. Eggs were collected for studying quality parameters. Blood samples were collected from 32 unrelated birds from the breeding tract. DNA was isolated using standard laboratory protocol (Sambrook *et al.* 1989). The 25 microsatellite primers were selected based on their location, size and polymorphic information content. The primers were tagged with Hex and Fam dyes. The genotyping was performed using automated DNA sequencer and gene mapper software ver. 3.0. The statistical analysis was performed using Popgene software (Yeh *et al.* 2004). The mutation drift equilibrium test was applied using all the three models of microsatellite evolution using Bottleneck software ver 1.2.02 (Cornuet and Luikart 1999).

The breed derives its name from the name of a place 'Tellicherry also known as Thalassery' in Kannur district of Kerala. Presently, these birds are found mainly in Calicut district. Few are available in surrounding areas in Kannur and Malappuram districts of Kerala, and Mahe of Pondicherry. These are available mostly in the not so well developed interior areas. Flock size ranged from 2 to 16 with

an average of about 5.5 birds per household. On an average a flock comprises 27, 61 and 12% chicks, hens and cocks respectively. These birds are fast movers and are not easy prey for the predators. Tellicherry birds are reared mainly for meat. As per prevailing indigenous technical knowledge Tellicherry birds are used in preparation of ayurvedic medicines for treatment of asthma, anaemia and worm infestation.

Birds are kept in the free range system. Birds roam freely and eat whatever is available in the form of grains, seeds, vegetation, insects, etc. Commercial poultry feed is not fed. Shelter is provided in wooden houses raised 2–3' above the ground. Brooding is a usual practice. Mortality is very low almost nil. Birds are not vaccinated against any disease.

Body conformation is similar to Red Jungle fowl but it is slightly bulkier. Plumage colour is black with shining bluish tinge on hackle, back and tail feathers. Few birds have golden mixed with bluish feathers on neck. Pattern is solid. Skin is greyish in colour. Comb is red, single and large in size. It is erect in cocks and drooping on the rear side in hens. Typical birds have blackish red comb. Wattles are red and medium in size. Ear lobe is mostly red with white markings in some

Table 1. Performance characteristics

Parameter		Average/range
Body weight (kg)	Cock	1.62±0.16 (19)
	Hen	1.24±0.10 (57)
Age at first egg (mo)		5–8 (31)
Annual egg production		60–80 (31)
Weight (g)	Albumen	20.34±0.77 (18)
	Yolk	15.00±0.47 (18)
	Shell	4.68±0.14 (18)
	Egg	40.02±0.94 (18)
Shell thickness (μ)		29.22±0.98 (18)
Albumen index		0.061±0.007 (18)
Yolk index		0.32±0.017 (18)
Haugh units		69.07±3.48 (18)

() No of observations.

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Table 2. Genetic diversity in Tellicherry breed

Locus	No. of alleles	Effective No. of alleles	Observed heterozygosity	Expected heterozygosity	PIC
Huj002	8	4.57	0.53	0.79	0.78
MCW262	7	4.85	0.56	0.81	0.79
MCW317	11	3.17	0.59	0.70	0.68
MCW328	7	3.04	0.56	0.68	0.67
LEI155	9	4.14	0.72	0.77	0.76
LEI180	12	3.06	0.78	0.68	0.67
MCW213	11	4.84	0.78	0.81	0.79
MCW266	5	2.33	0.44	0.58	0.57
MCW217	11	3.74	0.63	0.74	0.73
MCW250	9	5.38	0.66	0.83	0.81
MCW84	6	3.73	0.78	0.74	0.73
LEI147	15	7.29	0.81	0.88	0.86
LEI74	7	3.34	0.75	0.71	0.70
LEI90	7	2.83	0.66	0.66	0.65
LEI122	7	4.63	0.59	0.80	0.78
LEI82	13	7.64	0.66	0.88	0.87
LEI98	5	2.89	0.53	0.66	0.65
MCW228	13	8.57	0.53	0.90	0.88
LEI 64	10	4.06	0.41	0.77	0.75
MCW305	10	3.70	0.41	0.74	0.73
LEI166	9	5.01	0.66	0.81	0.80
MCW261	12	7.24	0.75	0.88	0.86
LEI120	15	8.53	0.66	0.90	0.88
LEI174	9	6.94	0.78	0.87	0.86
HUJ003	17	9.85	0.94	0.91	0.90
Mean±SE	9.8±0.40	5.02±0.26	0.65±0.02	0.78±0.01	0.77±0.01

birds. Sometimes it is creamy white. Eye ring is blackish red. Beak is blackish in appearance. Shank is featherless and blackish grey in colour.

Average weight of cock was 1.62 ± 0.16 kg and that of hen was 1.24 ± 0.10 kg (Table 1). Age at first egg ranged from 5–8 months with an average of about 6 months. A hen lays about 4–6 eggs continuously and then there is a gap of 1–2 days after which it again starts laying. Hen makes lot of sound after laying egg. After laying eggs for about 30 days, the hen goes broody and incubates eggs for about 21 days. Brooding period is about 2–2.3 months. One laying cycle takes about 3.7 to 4 months. Egg production per cycle and per annum ranged from 20 to 25 and 60 to 80 respectively. Hatchability on total egg basis ranged from 70 to 80%.

Eggs are tinted in appearance. Egg weight ranged from 34 to 45 g with an average of 40.02 ± 0.94 g. On an average an egg was composed of 51% albumen, 37% yolk and 12 percent shell and shell membranes. Shell colour was mostly light brown (45%), followed by brown (33%) and creamish white (22%). Egg shell was mostly brittle (78%) and thin with average thickness of $29.22 \pm 0.98 \mu$. Albumen was thick in 78 and thin in 22% of eggs. Yolk colour was deep yellow in 67 and yellow in 33% of eggs. Albumen index, yolk index and haugh units were 0.061 ± 0.007 , 0.32 ± 0.017 and 69.07 ± 3.48

respectively. Blood and meat spots were absent.

Genetic characterization

Highly polymorphic ubiquitously distributed 25 microsatellites were genotyped to generate allele data (Table 2). A total of 245 alleles were observed. All the loci were dinucleotide repeats and were suitable for diversity analysis and detecting the population structure. LEI 98, MCW 266 exhibited only 5 alleles while HUJ 003 generated 17 alleles. The mean number of alleles was 9.8 ± 0.40 . The value of effective number of alleles (5.02 ± 0.26) was significantly less and can be attributed to the fact that a large number of alleles were at very low frequencies. The observed heterozygosity was quite high (0.65 ± 0.16) and ranged from 0.41 (LEI 64, MCW 305) to 0.94 (HUJ 003). The mean observed heterozygosity was however less than the expected heterozygosity (0.78 ± 0.01), pointing towards the existence of population structure in Tellicherry breed. Polymorphic information content (PIC) estimated on the basis of allele frequency was 0.77 and gene diversity was 0.73. The population structure was present as the F_{IS} was significantly different from Zero (0.174). There was no severe reduction in population size of Tellicherry breed in recent past as indicated by normal L-shaped curve.

SUMMARY

Tellicherry breed of chicken is found in Calicut district of Kerala. Survey was conducted in the breeding tract covering 18 villages, 38 flocks and 209 birds. Information was recorded on flock composition, management practices, and morphological and performance parameters. Tellicherry birds are reared mainly for meat and are also considered to have some medicinal value. Birds are kept in free range system. Plumage colour is black mixed with shining bluish feathers. Comb was of single type. Average weight of cock was 1.62 ± 0.16 kg and that of hen was 1.24 ± 0.10 kg. Average annual egg production ranged from 60 to 80. Albumen index, yolk index and haugh units were 0.061 ± 0.007 , 0.32 ± 0.017 and 69.07 ± 3.48 respectively. Total 25 loci were utilized for data generation from 32 birds of Tellicherry breed from the breeding tract. The mean value of F_{IS} was found to be 0.174 which indicates existence of population structure in this breed.

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