



Characterization of some indigenous breeds of chicken in Kalahandi and Nuapada Districts of Odisha

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ABSTRACT

The present study was aimed to identify and characterize 3 different domestic breeds of chicken in 2 tribal dominant districts of Odisha. According to the colour pattern and local name these 3 breeds are named as Kabri, Chitri and Khairi which are found different from avian chicken breeds described so far in their phenotypic characters as well as in the performance traits. All these avian species studied in this investigation are raised in smallholder production system. The phenotypic traits like comb type, plumage colour, plumage pattern and information on body length, body girth, shank length, breast angle, keel length measurements etc. were studied. Attempt was also made to evaluate its performance traits like growth rate, body weight, egg production in these 3 breeds.

Key words: Chicken, Characterization, Breeds, Performance, Odisha

Animal genetic resources play an important role for the economic development of developing country like India. Indigenous breeds of livestock and poultry have shown exceptional attributes like high survivability and high fertility, good maternal ability, disease resistance and perform in low plain of nutrition with sub-optimal management. Over the years, indigenous breeds of livestock and poultry have been selected by different stakeholders for traits like disease resistance, poor roughage based feed efficiency, ability to withstand starvation and provide draught as well as for diverse other reasons, such as fighting and racing ability and physical characteristics. Locally adopted breeds may produce less compared to highly specialized breeds but they are definitely more efficient in use of natural resources unfit for human consumption and more suitable for exploitation of higher production medium or low input production systems. Highly productive breeds developed under high input intensive production system fail to produce to the desired extent in the highly stressful environment encountered with rural poor and tribal. Conservation of domestic animal diversity therefore, must encompass identification, characterization and monitoring of genetic resources, which should be done to ensure their best short-term use as well as, which long-term availability. Although standards are still not in place in perfection for

poultry, yet 22 breeds have so far been identified along with their breed characterization in the country (Dev 1977, Mohapatra and Panda 1981, Mohapatra 1990, 2002, Panda and Praharaj 2004, Mishra 2003). Recently 3 more breeds were described which are found in Odisha (Das 1999, Mishra 2003). Kalahandi and Nuapada districts are among the KBK districts and backward districts of Odisha. These districts have a major percentage of scheduled tribe (35%) population (Economic Survey 2005) for whom poultry has been a major source of livelihood besides crops. No studies have been undertaken in this district as well as in the state to identify the poultry genetic resources and to evaluate their potential.

MATERIALS AND METHODS

The primary objective of this investigation was to identify the domestic poultry genetic resources available in the above districts and to characterize them for their phenotypic and performance traits. To achieve this, a questionnaire was prepared slightly modifying the performa suggested by FAO (2003) for characterization of avian genetic resources and the performa devised by National Bureau of Animal Genetic Resource, ICAR. The data were collected for various traits from 50 birds of each sex from 3 breeds of chicken, viz. *Kabri*, *Khairi*, and *Chitri*. The information collected from each breed includes the following heads.

General information: Country, State, species, sex, local name, distribution of the breed/variety, native environment, temperature, humidity, rainfall, feeding status, housing, system of management, drinking water, terrain features, type for which used.

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Population data: Origin of population, population size and structure, number of breedable males and females, male to female ratio in the flock.

Management: System of housing, type of management, feeding status, drinking water, mortality pattern and cause, disease prevalence

Breed description: Plumage colour, plumage pattern, skin colour, shank and foot colour, ear lobe colour, comb and wattle colour, eye colour, type of comb and wattle, spur, other visible traits, performance traits like, body weight, age at first egg, annual egg no., no. of clutches, clutch size, egg size, broodiness.

Other body measurements: Beak, head, breast angle, shank length, shank width, body girth, body length, height of bird etc.

The preforma adopted for this purpose although was prepared in form of a questionnaire, the investigators collected data personally. All information required were collected from the poultry owners of Kalahandi and Nuapada district by personal interaction and by taking measurements on the breeds or by closely observing them as necessary.

RESULTS AND DISCUSSION

None of the indigenous fowl have any name in this part of the state. They are usually named based on their colours like *Chitri* (Multi-coloured), *Kabri* (Black), *Khairi* (Catechu) etc. All other domestic fowls found in these districts were considered indigenous and not suitable for description under any breed. They not only varied in their performance but also in their plumage colour, plumage pattern, body shape and size etc. and considered to be more suitable to be described as mongrels or mixed.

Kabri

Kabri breed of fowls are widely distributed throughout the districts. They account for 10–15% of the total domestic fowl found in these 2 districts. Number of breeding females are fairly large for *Kabri* breed and may exceed 5,000 in

each district. The respondents informed that they are raising this stock since long and were inherited from their parents. In spite of several development programmes undertaken in these 2 districts for welfare of the people particularly ethnic tribals, no mixing of exotic and indigenous population has taken place, since exotic stocks could not survive in the rural and tribal areas where the indigenous variety flourish. The average body measurement traits of the breeds are presented in the Table 1.

It is a small to medium size bird used both for production of egg, meat and very rarely for fighting. The birds of both the sexes are very active, alert with well-balanced body. Head is small to medium in size, deep, flat on the top and of charcoal colour. Average width of head was 30.2 ± 0.24 mm in males and 29.3 ± 0.28 mm in females. Beak is medium in size, wider at the base and pointed at the tip and horn like in colour. Average beak length was 20.37 ± 0.28 mm in males and 18.2 ± 0.32 mm in females, whereas average width of beak was 11.25 ± 0.2 mm in males and 9.0 ± 0.32 mm in females. This bird has single comb of medium size with 4 to 6 serration and points, which is most common. The anterior most points are smaller than the rest. Wattles are proportionate to the comb, small to medium in size, well rounded at the bottoms and correspond to the texture of the comb. Both combs and wattles are larger in males compared to females and reddish in colour. Eyes are round, large, prominent and dark or brown in colour. Earlobes are small, elongated and white. Neck is longer and slender in males whereas smaller and thicker in females. Neck is covered with hackle feathers, which extend little beyond base of the neck. The body is small, compact and round in appearance both in males and in females and the average weight of cock is 1.5 ± 0.48 kg and hen is 1.0 ± 0.25 kg. The girth, height and length of the bird in both sexes is presented in Table 1. Back is small in length, relatively broad across shoulders and saddles and slopes down from the base of neck to the base of tail. Saddle feathers are medium in length and abundant. Breast is round and extends well forward. The keel bone is small about 8.94 ± 0.32 cm in length in males and 7.3 ± 0.42 cm in females. Breast angle was $50.4 \pm 0.54^\circ$ in males

Table 1. Average body weight and body measurement traits of *Kabri*, *Khairi* and *Chitri* breeds of chicken

Character	<i>Kabri</i>		<i>Khairi</i>		<i>Chitri</i>	
	Male	Female	Male	Female	Male	Female
Body weight (kg)	1.5 ± 0.48	1.0 ± 0.25	1.42 ± 0.25	0.95 ± 0.13	1.56 ± 0.31	1.1 ± 0.21
Head width (mm)	30.2 ± 0.24	29.3 ± 0.28	33.5 ± 0.20	30.3 ± 0.19	30.4 ± 0.31	26.65 ± 0.28
Beak length (mm)	20.37 ± 0.28	18.2 ± 0.32	20.14 ± 0.45	17.2 ± 0.16	19.72 ± 0.19	17.5 ± 0.21
Beak width (mm)	11.25 ± 0.2	9.0 ± 0.32	11.78 ± 0.70	10.28 ± 0.13	10.4 ± 0.15	9.2 ± 0.16
Height of bird (cm)	77.9 ± 0.34	62.6 ± 0.35	65.95 ± 0.18	64.28 ± 0.20	63.7 ± 0.23	44.25 ± 0.33
Body girth (cm)	47.5 ± 0.36	30.5 ± 0.25	38.9 ± 0.25	36.7 ± 0.19	33.2 ± 0.26	29.2 ± 0.18
Body length (cm)	70.9 ± 0.52	57.6 ± 0.32	68.5 ± 0.29	54.94 ± 0.24	52.93 ± 0.48	47.25 ± 0.52
Keel length (cm)	8.94 ± 0.32	7.3 ± 0.42	9.3 ± 0.17	8.6 ± 0.21	9.1 ± 0.46	8.2 ± 0.36
Breast angle (deg.)	50.4 ± 0.54	43.16 ± 0.39	57.3 ± 0.5	51.0 ± 0.56	55.4 ± 0.38	48.4 ± 0.58
Shank length (cm)	11.14 ± 0.13	9.6 ± 0.13	7.8 ± 0.18	7.25 ± 0.12	10.3 ± 0.42	7.8 ± 0.53
Shank width (mm)	11.2 ± 0.25	9.2 ± 0.22	10.78 ± 0.14	9.6 ± 0.94	9.5 ± 0.28	7.2 ± 0.31
No eggs /hen	-	40–60	-	35–50	-	45–70
Age of maturity (months)	5	7–8	5	6–7	5 1/2	7–8

and $43.16 \pm 0.39^\circ$ in females. Males had longer keels and wider breasts compared to females. Wings are small in size, compact and placed very close to the body. Primary and secondary feathers are relatively narrow and overlap in natural order in the wing. Tail is fairly large compared to body size and full. Main tail feathers are relatively broad, overlap and carried backward making an obtuse angle to the back of the body at the rear end. The sickles are short and curved in males. Skin colour varies from white to pinkish in different specimens studied. Legs are medium in length, longer in males than females, placed well apart from each other and look straight when seen from anterior side. Shanks are medium in size, clean, light black/slatish in colour and free from feathers. Shanks are longer in males than in females. The shank length was about 11.14 ± 0.13 cm in males and 9.6 ± 0.13 cm in females. Width of shank was 11.2 ± 0.25 mm in males and 9.2 ± 0.22 mm in females. The colour of plumage in both the sexes is black with lustrous greenish sheen in tail and wing feathers. In some of the males few hackle feathers were of light golden colour.

Khairi

The population may be as high as 10% of all domestic fowls found in both the districts belong to *Khairi* breed. Number of breedable females is fairly high and as per our estimate may exceed 5,000 in each district. It was informed by the farmers that they are raising this stock since their known memory and as far as possible no migration has taken place. It is a medium size bird used by the farmers both for production of eggs and meat. The birds of both the sexes present an alert and active appearance. Head is medium in size, slightly convex on the top and light red in colour. The average width of head was 33.5 ± 0.20 mm in males and 30.3 ± 0.19 mm in females. Beak is small, wider at the base and of light ivory colour. Beak width was around 11.78 ± 0.70 mm and beak length was 20.14 ± 0.45 mm in males. Beak length was 17.2 ± 0.16 mm and beak width was 10.28 ± 0.13 mm in females. Comb is single comb, with 5 serrations and extends backward. Wattles are large, and round at the bottom. Both combs and wattles are red in colour and larger in males compared to females. In some of the females comb and wattles were very small. Eyes are round, small and dark brown in colour. Earlobes are small, elongated and white in colour. In some of the specimens earlobe colour was a mixture of red and white. Neck is medium in size both in male and female. In males, neck is well covered with hackle feathers, which extends to anterior portion of the back. The body is small and round and average weight of cock is 1.42 ± 0.25 kg and hen is 0.95 ± 0.13 kg. Back is flat and broad across the shoulder. The height, girth, body length, Keel bone, Breast angle are presented in the Table 1. Wings are medium in size extending horizontally and backward and placed close to the body. Front of the wings are well covered with hackle feathers. Both primary and secondary feathers are broad and overlap in natural order in the folded wing. Tail is prominent and large. It contains a lot of soft feathers below the main tail feathers and gives a bulky appearance

in males. Main tail feathers are broad and overlap each other loosely in the males and more closely in females. Skin is pink in colour. Legs are fairly long, strong and placed well apart when seen from the front. The toes are also long and there are 4 toes in each leg. Spur is small in size and present in some of the males. The shank colour is yellow in males and slightly dark or slaty in colour in females. Shank length was about 7.8 ± 0.18 cm in males and 7.25 ± 0.12 cm in females where as shank width was 10.78 ± 0.14 mm in males and 9.6 ± 0.94 mm in females.

The plumage colour varies from light to dark brown throughout the body. It is covered with golden yellow hackle feathers, which extend from base of the head to almost half way above the back on the dorsal surface in males. The tail feathers are lustrous black with greenish sheen and more striking in males compared to females.

Chitri

Birds of the *Chitri* breed are mostly found in Nuapada especially Komna blocks of Nuapada district. Although population size is very big and may not exceed 2,000 which includes adult males, females as well as growing stocks. No of breedable female may be around 500. The local population where the breed was seen could not provide any information about origin of the population. However, it was informed that this evolved in the village flocks some years ago, which may be due to introduction of some birds containing the gene, but nobody noticed this till we interrogated them since the birds were coloured.

It is a medium size bird with a well-balanced body. The birds of both the sexes are active and alert. Head is medium in size and flat on the top, colour of the head being same as colour of the body plumage. The head width was about 30.4 ± 0.31 mm in males and 26.65 ± 0.28 mm in females. Beak is medium in length, wider at the base and pointed at the tip. The colour of beak is ivory in some and horny in others. Beak length was about 19.72 ± 0.19 mm in males and 17.5 ± 0.21 mm in females. The average beak width was 10.4 ± 0.15 mm in males and 9.2 ± 0.16 mm in females. Comb is single comb with 4–5 serrations and extends well backward. Wattle is round at the bottom, moderately large in males and very small in females and free from folds and wrinkles. Both comb and wattles are red and well developed in males compared to females. Eyes are round, prominent, fairly large and black in colour. Eye lids are pink. Earlobes are elongated, either white or gray in colour in females and pink in males. Neck is thick, small and this remained consistent in both the sexes. Neck is well covered with hackle feathers in case of male. Body is medium in size, round and flat at the back, broad across the shoulders and slopes down slightly from base of the neck to base of the tail. Keel bone is strong and measures 9.1 ± 0.46 cm in males 8.2 ± 0.36 cm in females. Breast is broad and extends forward. Breast angle was $55.4 \pm 0.38^\circ$ in males and $48.4 \pm 0.58^\circ$ in females. Males have longer keels and wider breast than females. The height of the males was 63.7 ± 0.23 cm and females were 44.25 ± 0.33 cm. The body girth was

about 33.2 ± 0.26 cm in males and 29.2 ± 0.18 cm in females. The body length was 52.93 ± 0.48 cm in males and 47.25 ± 0.52 cm in females.

Wings are medium to large in size, placed close to the body and extend backward and horizontally. Primary feathers are bigger and wider than secondary feathers and overlap in natural order. In males hackle feathers cover the front of the wing. Tail is medium in length and well developed in both the sexes. It makes an obtuse angle with the body. The sickles are smaller in size than main tail feathers. Main tail feathers are broad and overlap in natural manner. Predominantly, in brown variety, tail feathers are black where as in typical barred variety tail feathers are grey crossed with white bars. The skin colour is yellow. Legs are medium in size, strong placed well apart when seen from front. Toes are also well developed and 4 in number in each leg. Toes placed well apart from each other. Shank colour is yellow in males and white or light yellow in females. Shanks and toes are clean and free from feathers. Body feather extended well to the leg and covers thigh and hock joints. Shank length was 10.3 ± 0.42 cm in males and 7.8 ± 0.53 cm in females whereas shank width was 9.5 ± 0.28 mm in males and 7.2 ± 0.31 mm in females. Plumage colour in the females is either grey or light green with white bars crossing perpendicularly and presenting a typical barred appearance. In males, the plumage is light brown or light green. The colour of hackle feathers is same as that of body colour. Tail feathers are either black or barred conforming to the body plumage colour of the bird.

Management and disease condition

All the 3 breeds of the chicken are raised in the backyard under small-holder production system and there is not much difference among the breed management. They meet their feed requirement from scavenging and rarely fed at home. The flock size varies from 5–30 birds/ family. This includes adult hens, growing birds and chicks. Water is provided at home as and when required. There is no other source from which birds can drink while scavenging. Birds are not usually provided any supplemental feed at home. Only the sick birds, chicks and broody hens are fed to some extent. The supplemental feed includes local grown cereals, pulses and their by products including kitchen waste. The birds roam around the village for scavenging and provided shelter only during night. Locally prepared bamboo basket serves as shelter material in most of the houses. Only well to do families have separate arrangement for housing the birds during night. In few cases no separate provision is there and the birds share the same space along with the owners.

Male to female ratio is highly variable. None of the families maintain more than 1–2 males for reproduction purpose. Extra males are usually sold for table purpose or given as gifts. Predation is a problem. The predators includes

dogs and cats both wild and domestic, mongoose, snakes, eagles, other large birds, jackals and wild animals in the forest or nearby forest areas.

Mortality and morbidity vary considerably among the flocks and during epidemics some of the flocks are completely wiped out. Ranikhet disease and fowl pox are the most important diseases of the indigenous chicken encountered in the area. They also suffer from ecto- and endo- parasites. Veterinary aid was not known and scarce in the past. Recently, vaccination against Newcastle disease and fowl pox is under taken in those villages where the people are conscious and request for such help. Deworming is also practised but very occasionally. As reported, these birds are highly adopted to this environment and relatively resistant to worm infection.

Das Kornel (1999) and Mishra (2003) reported some chicken breeds of Kalahandi district. In their study they made no difference in the various fowls found in the district based on their plumage colour and other phenotypic characters. During, the present study 3 distinct groups of domestic fowls, which not only varied in their plumage colour but also for several other phenotypic characteristics like comb pattern, body length, height and skin colour etc. were available, for which it was considered appropriate to describe them as a three different breeds rather than putting them together as one breed.

Three different breeds *Kabri*, *Khairi* and *Chitri* of chicken were identified in the 2 districts of Odisha which are found different from the various chicken breeds described so far, in their phenotypic characters as well as in performance traits. Further research including molecular studies is required to determine their distance/difference of any from other recognized breeds of poultry and to improve these breeds that can be well adapted to the situation.

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