

Poultry Genetic Resources of India and its Role in Rural Poultry Production

AK Mishra

ICAR-National Bureau of Animal Genetic Resources, Karnal-132001, Haryana, India

Poultry is one of the fastest growing segments of Indian agriculture. Scientific, technological advancements and introduction of high yielding germplasm have led to great expansion of poultry industry in last few decades. However, now a day's indigenous breeds are gaining importance due to increasing demand for their quality products. The peoples are ready to pay higher cost to egg and meat of indigenous breeds due to their quality and taste. Native breeds are acceptable by the local people since it suits their socio-cultural way of life. The traditional system of poultry production is still prevalent in the rural areas and is the backbone of rural poultry production. Presently the poultry farming have two distinct facets- the commercial – high input intensive production and extensive low-input rural/backyard poultry production. Each one is equally important, but has widely diverse input needs, especially the type of germplasm. Chicken and ducks are two major avian species in India used for production of eggs and meat both under un-organized and organized sector. The wide variation of agro-climatic conditions has facilitated the evolution and development of many poultry breeds out of which 19 chickens, 2 duck and 1 of geese have been registered.

Introduction

Traditional poultry farming is as old as its civilization and it occupies a pivotal position in India due to its huge potential to bring about rapid economic growth with low investment. Presently poultry sector is recognized as an organized and science based industry with tremendous potential to fight poverty, unemployment and malnutrition. The indigenous breeds are well known for their adaptability to local climatic geographical conditions and resistance to tropical diseases and considered as the gold mines of genomes and major genes but popularity of native breeds is decreasing day by day for being low egg producers, slow growers and smaller egg size etc. They are, however, good brooders and efficient foragers. The purity of native breeds has facing the problems of extinction due to large scale introduction of exotic breeds and exotic inheritance based rural poultry varieties and strains under various rural development programmes. However, rearing of indigenous breeds in backyard poultry production system is a conventional activity of a large number of the landless and small farmers. India and the neighboring countries are considered to be the original home of the well-known Red Jungle Fowl (*Gallus gallus*) from which the present day domestic birds have descended.

Chicken Genetic Resources

There are 19 registered breeds of chicken distributed in different parts of the country. The indigenous birds

have certain characteristics in common such as small compact body and body weight of about 1-1.5 kg. They vary greatly in their plumage pattern, comb type and body confirmation. The breast bone is low and well covered with feathers which lie close to the body. They generally lay brown shelled small eggs. The hens are broody. The birds are reared in free range backyard system. Scavenging with supplementation of kitchen waste is the most common feeding system. List of registered breeds and their details are given in Table 1. The indigenous breeds contribute to only 6.5% of total fowl population (807.85 m) of the country. As Breed Survey Report of 2019, the total populations of different breeds varied from 26615 (Nicobari) to Aseel (33680583). However, population of Miri, Daothigir, Kadaknath, Punjab Brown, Ankaleswar, Chittagong and Busra breeds was also above 10 lakhs. Three breeds namely Hansli, Kalasthi and Nicobari had population size less than 1 lakh.

Duck Genetic Resources

In India Duck farming is mainly concentrated in eastern and southern states. Coastal areas of Andhra Pradesh, Tamil Nadu, Kerala, West Bengal, Orissa, and certain parts of Assam and Jharkhand constitute the main habitat of ducks. Traditional duck rearing is mostly in the hands of poor farmers. Ducklings at the age of 6 weeks are allowed to forage in harvested paddy fields, wet land, back waters and irrigation channels. In south, some of

*Author for Correspondence: Email-anil.mishra2@icar.gov.in; anilmishra65@gmail.com

Table 1. Registered chicken breeds of India and their population

Breed / population	Place of origin and important characteristics
Aseel 33680583	Home tract is Khammam district of Andhra Pradesh, Koraput & Malkangiri of Odisha and Bastar and Dantiwara of Chattishgarh. It is game bird, known for its high stamina, majestic gait and dogged fighting qualities and large Body size. It is biggest in size among native breeds. The plumage colour are mostly Red (or Brown) and black. It has various (9) varieties having different plumage colours. The most popular varieties of Aseel are Peela, Yakub (black & red), Nurie, Kagar, Chitta, Jawa, Sabja, Teekar and Reza. The Aseel means "ASLI". Annual egg production ranges from 65 to 70 with average egg Weight of 41 g. The adult body weight ranges from 2.59 to 4.0 Kg.
Kadakhnath 2037475	Place of origin is Dhar and Jabua of MP, known as Kalamasi and characterized by presence of black pigments on external and internal surfaces. The black colour of muscles and tissues is due to deposition of melanin pigment which causes increase in protein and decrease of fat and muscle fibre. The skin, beak, shanks, toes and soles of feet are slate-like in colour. There are 3 varieties of Kadakhnath; Jet Black (black in colour), Pencilled (black with white feathers in neck) and Golden (basically black with golden feathers on head & neck). Egg production ranges from 85–90 per annum with average egg weight of 40 g.
Chittagong 1241000	The home tract is Meghalaya and Tripura. Presently available in parts of Bangladesh and also known as Malay. Large, heavy bird, strong hardly and quarrelsome temperament.
Ankaleshwar 1322006	Distributed in Bharuch and Narmada districts of Gujarat. The breed might have been named after the name of Ankleshwar in Bharuch district. Plumage colour ranges widely; a combination of white and light grey to brown. The golden colour are most prevalent. Annual egg production is approx. 80.
Ghagus 760964	Found in Kolar and adjoining parts of Bangalore (Karnataka) and Chittoor and Anantpur districts of AP. The birds might have derived its name by a peculiar sound. The predominant plumage colour is brown followed by black cocks have shining bluish black feathers on breast, tail and thighs. Neck is covered with golden feathers. Egg production ranges from 45–60 per annum with average egg weight of 42.25 g.
Busra 1218724	Reared by tribal people living all along on either side of boundary line of Maharashtra and Gujarat. Busra nomenclature might have come from Busrawal – a village in Sakri taluk of Dhule district or from name of a tree "Busrawal (Marathi)/ Bahawa (Advasi dialect). Birds are small in size and have wide variation in body colour. Plumage is mostly white mixed with black feathers on neck, back, tail and reddish brown feathers on shoulders and wings. Annual egg production is ranges from 40 to 55.
Daothigir 3696257	Found in Bodoland region of Assam. It derives its name from the name of plant "Thigir"(Dillenia indica). This plant bears flowers of different colours similar to the plumage colour of these birds. In Bodo language "Dao" means bird and hence birds are known as Daothigir. Birds are small sized, compact but heavy and have long legs. Plumage is mostly black interspersed with white feathers. Egg production ranges from 60 to 70 per annum with average egg weight of 44 g.
Danki 168332	Distributed in Vizianagaram and adjoining parts of Srikakulam and Visakhapatanam districts of AP. Birds are mainly used for game (fighting) purpose during Sankrati. The predominant plumage colour is brown followed by black. Local people call these birds by different names on the basis of plumage colour: Khaki or sanwala (Black); dega (red); parla (brick color), Satua (white) and pingle (spotted). This is fairly heavy breed, glossy and lustrous plumage, single comb, long necks and legs. Egg production ranges from 25-35 per annum with average egg weight of 46 g.
Kalasthi 49736	Distributed in Chittoor and adjoining parts of Nellore and Cuddapah districts of Andhra Pradesh. Breed might have been named after the name of the area i.e. Sri Kalasthi in Chittoor district. The predominant plumage colour is bluish black followed by brown. Egg production ranges from 30–40 2 per annum with average egg weight of 43 g.
Harringhata Black 455760	Distributed in Nadia and North 24 Pargana districts of West Bengal. Plumage colour is Black; some cocks have brown feathers on neck and wings. Egg production ranges from 25-90 per annum with average egg weight of 36.53 g.
Kashmir Favorolla 597626	Locally known as "Kashir kukkar. Available in Anantnag, Baramullah, Budgam, Kupwada, Srinagar and Pulwama districts of J&K. The birds with plumage of all shades varying from Jet black, dark brown and golden to pure white are available. Egg production ranges from 2060-85 per annum with average egg weight of 45.76 g.
Miri 5411093	Home tract is Dhimaaji, North Lakhimpur, Sibsagar and adjoin districts of Dibrugarh and Majhauri island in upper Assam. The name is derived after the name of tribe rearing them (Miri or Misisng). The local name is "Porog". The birds have no standard plumage colour and majority of the birds are white followed by brown and black. Egg production ranges from 50-65 per annum with average egg weight of 42.06 g.
Punjab Brown 1365800	Native tract is almost all districts of Punjab and Haryana. Plumage colour is mostly brown. Males usually have black spots/ stripes on neck, wings and tail. Egg production ranges from 60 -80 per annum.
Tellichery 148705	The breed derives its name from the name of a place "Tellichery "in Kannur district of Kerala. The birds are distributed in Calicut district and surrounding areas in Kannur and Malappuram districts of Kerala and Mahe of Pandicherry. These birds are fast movers and are not easy prey for the predators. Birds are also thought to have some medicinal value. Plumage colour is black with shining bluish tinge on hackle, back and tail feathers. Few have golden mixed with bluish feathers on neck. Typical birds have blackish red comb. Egg production ranges from 60-80 per annum with average egg weight of 46 g.

Breed / population	Place of origin and important characteristics
Nicobari 26615	Originated in Nicobar group of Islands. They are small size birds with short legs, compact and round body. It is a brownish matty coloured hardy bird. It produces highest number of eggs under free-range condition with supplementary feeding among all the indigenous breeds of India. The average annual egg production varies from 110 to 235 with average egg weight of 49.06 g.
Mewari 114624	Distributed in Ajmer, Sirohi, Jaipur, Udaipur, Bhilwara, Dungarpur, Banswara, Rajsamand, Chittorgarh and Pratapgarh districts of Rajasthan. The plumage colour in females - Varied from light to dark brown and grey with pencil lining and in males- Bright gold and bronze feathers forming a "Shawl" or Cape over the back of the bird from neck to lower back. Egg production ranges from 37-52 per annum with average egg weight of 52.86 g.
Kaunayen 114828	Breeding tract consists of Thoubal, Imphal West, Imphal East and Bishnupur districts in the valley region. The predominant plumage color is black followed by brown (or red) with or without patches. Neck, breast and thighs are generally bare, hard and rose red colored in fighting cocks. Used for cock fighting. Egg production ranges from 25-40 per annum.
Hansli 91385	Reared in Mayurbhanj and Keonjhar districts of Odisha for game and meat purpose. Plumage is predominantly black. Males have golden yellow or red hackle and saddle feathers. Egg production ranges from 39 - 96 per annum with average egg weight of 46.5 g.
Uttara Not included in survey	Distributed in Kumaon region of Uttarakhand. Its plumage is black in colour. These birds have feathered shank which is not present in any other native breeds. About 18% of birds have bunch of feathers on head (crest/crown). The birds are more noisy and flighty. Annual egg production ranges from 125 to 160 with average egg weight of 51.33 g.

the duck farmers move with their flocks to different places in search of food for ducks depending upon the availability of harvested field. This system of rearing in the rural areas is mostly extensive. India has only two registered breed of duck namely Pati and Maithili.

Pati duck: Pati ducks are reared in backyard production system in rural areas of Assam. Plumage is dark brown in drakes with grayish black head; tail with black and white feathers. Ducks are solid brown. A white ring may or may not be present at neck in both sexes. The bill, shank and feet are predominantly yellow. Pati ducks are used for meat, egg and ritual sacrifices. The average body weight is 1.58 kg. The estimated population of Pati duck is 18.21 lakhs.

Maithili duck: Maithili ducks are distributed in Motihari, Sitamarhi, Madhubani, Araria, Kishanganj and Katihar districts of Bihar. These ducks have uniform light/dark brown feathers throughout the body. Circular spots on the feathers (Mosaic pattern) in ducks and dark brown to ash colour in drakes. Head is bright black to greenish black in drakes and brown in ducks. Body carriage is slightly upright and bill shape is horizontal. Average age at first egg is 191.12 days (range 159-223). Average annual egg production is 54.6 (range 33-71). Average egg weight is 49.53g. Body weight at 6 month of age is 1.18kg (range 1.12-1.24). Population size is approximately 46,000.

Geese Genetic Resources

Kashmir Anz is the only breed of geese being registered by the National Bureau of Animal Genetic Resources, Karnal. These cinnamon or white colored birds are reared

for meat, eggs, feathers, or as a hobby in areas located around the water bodies (lakes and wet lands) across the Jammu and Kashmir valley but are more abundant in districts of Srinagar, Bandipora, Ganderbal, Budgam and Baramulla. These geese are mostly found in and around the water bodies (Lakes and Wetlands) across the Valley but are more abundant in districts of Srinagar, Bandipora, Ganderbal, Budgam and Baramulla. Name Kashmir Anz is derived from two words- Kashmir representing the breeding tract of the breed and Anz meaning Geese in local language. Kashmir Anz geese are hardy, disease resistant and good foragers, requiring minimum inputs for rearing and management.

Indigenous Poultry and Rural Empowerment

Backyard production system has over the years contributed to a great extent to the agrarian economy of the country. For rural poultry production Indigenous breeds are well suited as these are well known for their tropical adaptability and disease resistance. In India two types of production system of poultry production exists:

- Rural/Backyard poultry production system
- Commercial poultry production

Eggs and chicken meat are produced under this system at low cost by scavenging birds in the backyard and without feed supplementation with commercial rations. It provides livelihood security to the underprivileged family in addition to securing the availability of protein rich food at cheaper cost. It is an old age practice in rural India and available in three forms (Singh, 2007).

- (a) Traditional scavenging system
- (b) Semi-scavenging system
- (c) Small-scale intensive system

The choice of system is largely determined by the availability of resources and inputs, which depends on the keeper's socio-economic circumstances. Requirements of the different systems are quite different from each other including the type of germplasm to be used (Singh, 2007).

Traditional backyard production system: This is one of the most sustainable production systems with hardly any dependence on external sources (including chicks). This system is cost effective and satisfies consumer preferences for eggs and meat of indigenous/local birds and cultural linkages. Traditional backyard system exists in two forms:

- **Un-improved backyard system:** Includes use of native birds, scavenging, no regular water or feed, little or poor night shelter, no vaccination and medication.
- **Improved backyard system:** Includes use of improved germplasm, scavenging, regular water, supplementary feeding, improved shelter, care of chicks in the early age, vaccination against prevalent diseases and deworming.

The birds utilized in the system are although poor in egg and meat production but are hardy, adaptable to tropical climate, have better disease resistance, scavenging for their own feed, can run and fly to escape predators and are capable of reproducing to supply replacement stock for the household flock. Number of birds to be reared in this system usually should not be more than 25.

Semi-scavenging system: This system is used for small flocks under partially controlled management and where the scavenged feed account for a substantial part of the total feed consumed. Birds are kept most of the times under confinement with supplemented diet. They are allowed to scavenge in a day partly and are managed for predator's protection. Number of birds to be reared under this system varies from 50–200.

Small-scale intensive system: This system consists of small to medium sized flocks kept by a family as a means of acquiring assets to defeat poverty. They represent quite a large proportion of the assets and income of

their owners, and are often financed from loans, but it is highly risky and dependent on good marketing facilities.

Suitability of Indigenous Chicken for Rural Poultry

The native breeds are good foragers, efficient mothers, require less cost and special care to grow and thus have characteristics essential for raising poultry under village conditions. Indigenous breeds enjoy the advantage of superiority over exotic breeds/strains due to following characteristics:

- Preference for coloured bird by the peoples.
- Capability of self-defence from predators due to its alertness, light body weight, longer shank length and aggressiveness.
- Thrive well under adverse environments like poor housing, management and feeding.
- Comparatively disease resistant to protozoon & ecto-parasites and have better immunocompetence.
- Possesses characteristics essential of scavenging chicken.
- Have better adaptability to extreme climatic conditions prevailing in the country.
- Comparatively hardier and require less health care than exotic birds.
- Having broodiness or self propagation.

Large scale introduction of exotic breeds/strains of poultry under various rural development programmes resulted in extinction of some of breeds and few are facing the danger of extinction. Hence, conservation of native breeds is of prime importance. High yielding germplasm have contributed significantly in the progress of commercial poultry production but most of the high yielding exotic breeds have temperate origin. India being a tropical country having vast hot and humid area around coastal regions is not suitable for full expression of its production potential. In the peak summer and humid months, high yielding stocks suffer from tropical stress manifested as low egg production and reduction in the feed efficiency.

Future Perspectives

- Besides, the huge growth, the Indian poultry sector has been chicken dominated which in turns ignoring the potentials of others diversified poultry species. Hence, policies for improving the other poultry

species viz. duck, geese, guinea fowl, quails etc. needs intensification.

- Conservation is a very costly affair, which needs proper planning, source of regular financing and follow-up the action plan. National institution, state Governments, State Agricultural Universities and commercial entrepreneurs should be included in the conservation work.
- Avian Genetic Resource Task Force should be established to plan the conservation strategies and its follow-up for recognised native breeds. Improvement and utilization of the native breeds are the only tools for its sustainability in the traditional production system.
- A net work programme having a research centre in each state would be a good proposition as the particular breed has acquired adaptability for the particular environment. These centers would conserve, evaluate, and improve the productivity of indigenous breed and provide improved native parent stocks to poultry farmers, Government poultry unit / private hatchery etc. and thus will help the sustainability of the breed in their ecologies.
- All the States are requested to consider having a breeding policy for indigenous poultry and evolve measures to conserve native breeds.

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