

Andman and Nicobar Island Poultry Biodiversity: Indian Perspective

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Introduction

The word 'biodiversity' is a contraction of biological diversity. This term is commonly used to describe the variability in numbers, varieties and characteristics of living organisms.

Biodiversity is the totality of genes, species, and ecosystems in a region. It can be divided into three hierarchical categories - genes, species, and ecosystems (Global Biodiversity Strategy, 1992 prepared by World Resources Institute, World Conservation Union and United Nations Environment Programme).

Convention on Biological Diversity (CBD) definition of biological diversity

"Biological diversity" means the variability among living organisms from all sources including inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

Genetic diversity refers to the variation in the nucleotide sequences in various genes within a species. **Species diversity** refers to the variety of species within a geographical region. **Ecosystem diversity** is harder to measure than species or genetic diversity because the "boundaries" of communities, associations of species and ecosystems are elusive.

This paper discusses various aspects of poultry biodiversity in India with particular emphasis on Island Poultry Biodiversity.

Both fauna and flora exhibit huge biodiversity. Fauna includes all animal species including livestock and poultry. They include those species which are either domesticated or are companion animals. The history of domestication of poultry is as old as the human civilization.

Reasons for occurrence of biodiversity

The biological diversity results due to evolution. The organisms have been undergoing evolution since the life originated.

1. The life has evolved on the earth in two phases viz., chemical evolution and biological evolution. **Chemical evolution (took one billion years)** wherein the organic molecules, proteins, polymers, and chemical reactions took place to form first "protocells" in the sea. **Biological evolution (took 3.7 billion years)**, wherein the development was from single celled prokaryotic bacteria to eukaryotic creatures to eukaryotic multicellular organisms (diversification of species) first in the sea and then on the land.
2. Evolution leads to the change in a population's genetic architecture over time. Those populations which have selective advantages *i.e.*, adaptations, survive and reproduce. All species are descended from earlier ancestor species. Evolution can be categorized in to '**microevolution**' which is caused by small genetic changes like mutation or change in frequency of a single allele due to selection and '**macroevolution**' wherein the evolutionary changes are long term and large scale through which new species are formed and others are lost through extinction.
3. **Natural selection, mutation, gene flow / migration** and **genetic drift** are the major driving forces of evolution. Only adapted ones would be able to reproduce and survive.
4. All species are in a continuous state of change, as per the unifying principle of evolution. The survival and development of an organism is under the combined influences of physical and biological limiting factors viz., disease, competition, predation, environmental change, etc.

Poultry at Andaman and Nicobar Islands



Nicobari Fowl

- ❖ Three varieties: Brown, White and Black.
- ❖ Smaller in size, Short-legged, Compact in appearance, Stout neck, Wattles and ear lobe have pinkish hue colour, Toes are straight and well spread and Shank is short.



Chicken



Ducks

Chicken

- ❖ Vanaraja chicken being reared at A & N Island Farms (Source : <http://ahvs.and.nic.in/Photo/Glary.php>)

Ducks

- ❖ Duck rearing at A & N Island Farms (Source: <http://ahvs.and.nic.in/Photo/Glary.php>).



Turkey

- ❖ Turkey Rearing in A&N Islands (Source: <http://ahvs.and.nic.in/Schemes/Poultrydev.php>)



Guinea Fowl

- ❖ Guinea Fowl rearing in A&N Islands (Source: <http://ahvs.and.nic.in/Photo/Glary.php>)

5. One of the important reasons of speciation is reproductive isolation.

Agricultural biodiversity includes ecosystems, animals, plants and microorganisms related to food and agriculture. It's the foundation of agriculture. Most species of diversified poultry species existing today are the result of thousands of years of both **natural selection** and **human interventions** such as **selective breeding** and **varied husbandry** and management practices.

India ranks **5th in Chicken & Duck Population**, **3rd in egg production** and **5th in poultry meat production** in the world (FAO, 2009). Poultry is one of the fastest growing segments of the agricultural sector in India. India's contribution to world's egg and chicken meat production is nearly 4.6 and 2.9%, respectively. Poultry sector contributes about 1% to national GDP and 10% of total livestock GDP in India (FAO, 2009).

Poultry includes all the domesticated avian species, viz., chicken, duck, turkey, quail, guinea fowl, emu, etc., that are used for production of meat, egg and other by-products. Chicken being the major contributor among all the poultry species commonly become synonymous to poultry. As per **18th Livestock census** (2007), the total poultry population in India is **648.88 million** which includes 617.73 million chickens, 27.64 million duck and 3.45 million turkeys & other poultry. Central Government has started diversification of species as a thrust area under which other species such as Duck (Southern and Eastern region), Japanese quail (Western and Northern region), Turkey (Southern and Western region) and Guinea fowl (Eastern region) have been introduced to boost the poultry industry. Emu farming was started at CPDO (Southern region) as a pilot project for popularizing this bird in India. Approximately, 70% of Poultry production comes from organized sector and 30% from un-organized sector and almost 70% poultry population is in backyard or semi-intensive system of rearing and 30% in intensive system.

The wild **Red Jungle Fowl** (*Gallus gallus*), widely considered as the ancestors of today's modern domestic chicken (*Gallus gallus domesticus*), was first introduced in India in about 3000 BC. The divergence between the Red Jungle Fowl and the domestic fowl is suggesting that the later has originated some 8000 year back (Romanov and Weigend 2001). Chicken genome has undergone tremendous changes due to intensive selection over

these 8000 years. Chicken received maximum attention and resulted in development of vast varieties of chicken ranging from fancy breeds to high yielding commercial germplasm. They contain unique genes or gene combinations to thrive well under harsh and unfavorable environment. Poultry biodiversity can be seen in the Island as well as the main land of India. The major Islands in India are Andaman Islands, Nicobar Islands and Other Islands including Islands of Mumbai Harbour, Wheeler Island (India), Chorao (Goa), St. Mary's Islands, Netrani Island, Diu, Divar (Goa), Lakshadweep, Majuli fluvial island, Minicoy Island, Munroe Island, Kollam, (Kerala), Sagar Island (West Bengal), Sriharikota, Vashee (Goa), Vypin, Kochi (Kerala), Willington Island, Kochi (Kerala), Vallarpadam, Kochi (Kerala), Kavvayi, The Island (Chennai), Srirangam Island, Quibble Island and Gulf of Mannar Marine National Park.

Poultry biodiversity in Andaman and Nicobar Islands

The 18th livestock census (2007) reveals a total of 984267 poultry in the Andaman and Nicobar Island only, which includes 358375 in North & Middle Andaman, 569407 in South Andaman and 56485 Nicobar districts. The total livestock population including poultry is 175222.

The egg production in Andaman and Nicobar Islands has been reported as 580.965, 145.784 and 52.978 lakh from Desi fowl, improved fowl and Ducks (Source: http://ahvs.and.nic.in/Documents/Annual_ISSS_Milk_Egg_Meat.pdf).

Avifauna of Andaman and Nicobar Islands

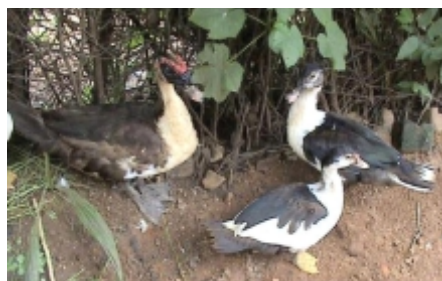
The avifauna of these Islands are unique and poultry germplasm are mostly non-descript except of some indigenous birds like **Nicobari fowl**, **Frizzle fowl**, **Naked Neck**, **Barred Desi** and **Red jungle fowl** (Chatterjee *et al.*, 2003). The indigenous birds specially Nicobari fowl is well adapted and survive well under free range condition. Nicobari fowl is locally known as '**Takniet hyum**' (in Nicobari language) means shored legged chicken. Turkey, Ducks and Guinea fowl are also being reared in the Island.

Population status of Nicobari fowl

Nicobari fowl was originated/ developed and conserved by the Nicobari tribes under natural

Diversified Poultry Germplasm at CARI, Izatnagar, India

Some of the several diversified poultry germplasm developed at CARI, Izatnagar, India (<http://www.icar.org.in/cari/index.html>) is presented below. The germplasm has been supplied to several stakeholders in private and Govt. sectors, across the country including Islands.



Moti native Duck

Characteristics: Body weight at 6th week: 1300 g; Mature body weight: Male 3300 g; Female 2100 g, Age at sexual maturity: 30-35 weeks; Egg production: 50-60 eggs/year; Egg weight: 60-70 g and FCR at 6 weeks : 2.75



Cari Sunheri Quail (Brown Feather White Breasted)

Characteristics : ASM: 43 days; 5th Week body weight: 182 g; Feed conversion ratio (5th week): 2.8; Av. egg weight: 11 g; Livability (0-5 weeks): 95% and Hatchability on TES: 68%



Cari Virat Turkey

Characteristics: Body weights at 6, 12, 24, 32 weeks are 1054, 2778, 5270 and 7100 g, respectively. The corresponding FCR are 1.85, 2.80, 3.78 and 4.15. Fertility : 94%; Hatchability: 86%

Special Features: Low fat & cholesterol, Choicest white meat.



KADAMBARI Guinea Fowl

Characteristics: Body weight at 8 weeks: 500-550 g, Body weight at 12 weeks: 950- 1000 g, Age at first egg: 230-250 day, Egg weight: 38-40 g, Egg production (March to September): 100-120 eggs, Fertility: 70-73 %, Hatchability on fertile eggs set: 70-78 %, Livability: Excellent



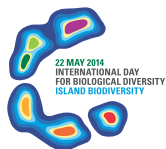
Emu

Characteristics: Weight: 50-60 Kg at 24 months; Height: 5-6 feet; Life span: 30-40 years; Egg size/ weight: 5.3"x3.5"/700-900 g; Reared for Meat, egg, oil, leather, feathers etc.; Marketable age (meat): 12-18 months, low cholesterol, rich in Fe, Mg, K & Vit C.



Desi type Birds

CARI-Nirbheek; CARI-Rainbro and several other varieties/ strains of Ducks, quails, turkey, guinea fowl and layer and broiler chickens have also been developed.



condition (Chatterjee et al., 2005), mainly distributed in Nicobar particularly in Katchal, Teressa, Camorta, Chowra, car Nicobar, Pilomilo and different parts of South and Middle Andaman. Poultry farming with Nicobari fowl along with the other indigenous fowl is an important source of income for 18.9% of the population (Chatterjee and Yadav, 2008). Nicobari fowl is distributed throughout the Andaman and Nicobar Islands and the estimated population of Nicobari fowl is 7524 of which 2509 were male and 5015 were female. It's an endangered breed.

Economically important traits

There are three varieties of Nicobari fowl, Brown, White and Black. It is comparatively smaller in size, short-legged, hardy, compact in appearance with stout neck, with wattles and ear lobe have pinkish hue colour. Toes are straight and well spread. Shank is short. The adult body weight of male is around 1.4 kg and female 913 g at 12 week of age. The egg weight is approx. 42-50 g and annual egg production is approx. 150 eggs, which is quite high amongst indigenous breeds of chicken. The age at sexual maturity is approx. 184 days and the FCR (kg feed/dozen eggs) is 2.6. The average mortality between 0-8 weeks is 2 % and overall mortality from 0-72 weeks is 6.4%. The mortality of Nicobari fowl is lower than other birds under field condition. Nicobari fowl is comparatively resistance towards ND, Mareck's disease, infectious bursal disease (IBD), salmonella, E. coli and coccidiosis (Rai and Ahlawat, 1995).

Poultry development in Andaman and Nicobar Islands

There are 11 Govt. Hatcheries and Ten Govt. Poultry Training-cum-Demonstration farm, eight Govt. Duckery -Cum- Demonstration farms in this territory. Promotion of improved chicken varieties like *Vanaraja* has been successful in popularizing Backyard Poultry in this territory. *Vanaraja* chicken, Turkey, Guinea fowl and Ducks are being reared/ promoted and chicks/ keets/ ducklings etc. are supplied to farmers.

Diversified poultry germplasm in main land

The Central Avian Research Institute (CARI),

Izatnagar has contributed a lot towards development of elite germplasm for commercial poultry farming and backyard poultry germplasm for in intensive, semi-intensive or free-range systems. Some of the diversified poultry species/ germplasm have been presented in figures at the end.

Latest developments in identification of biodiversity at genetic and phenotypic levels

Characterization of genetic diversity from other breeds and within breed, by employing molecular tools is a prerequisite in developing strategies for conservation and utilization of poultry genetic resources. Recent advances in molecular biology have opened new horizons in assessment of genetic variability at the DNA level. It is one of the most useful tools to the geneticists and breeders to evaluate the existing germplasm.

Need and programmes for conservation of poultry biodiversity

Conservation of these breeds will act as source of variation for future poultry improvement as it is well understood that all breeds would not perform equally well in all climatic conditions. In nutshell the current genetic reservoir is the basis for the future economics, scientific and socio-cultural opportunities (FAO, 2007).

Society for Conservation of Domestic Animal Biodiversity (SOCDAB)

The Society for Conservation of Domestic Animal Biodiversity (SOCDAB) with its headquarters at National Bureau of Animal Genetic Resources and chief motto as "Let's not take our future food needs for granted. Let's bank on our native farm animal genetic resources" was established in June, 1998 to acknowledge, discuss and resolve the issues on conservation of farm animal genetic resources by a group of concerned professionals and enthusiastic conservationists.



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