

Ecology and behaviour of avian diversity in Nallamala forest region, Kurnool district, Andhra Pradesh

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ABSTRACT : Biodiversity is the variety among the living organisms, biological systems and biological processes found on earth. India contains about 8 per cent of the world's biodiversity on 2 per cent of the Earth's surface, making it one of the 12 mega diversity countries in the world. Acquiring knowledge of flora and fauna is of immense scientific and commercial importance. Nallamala Hills stretching across five districts across portions of Kurnool, Prakasam, Nalgonda, Guntur and Kadapa of the state of Andhra Pradesh is renowned for being rich in biodiversity. Nallamala (15°20'-16°31' N and 78°30'-80°10' E) is a group of low hill ranges in the central part of Eastern Ghats. The vegetation is typically of southern tropical dry deciduous and southern tropical moist deciduous forest types intermingled with shrub. The climate is generally hot and dry with temperatures rising upto 43°C to 45°C during May and dips down to 8°C in December. Average rainfall in this region is between 900 and 1000mm. Though several research activities and surveys were made or undergoing in the area of study / project *i.e.* Nallamala forest (Kurnool region), Andhra Pradesh regarding the characterization, quantification of the species diversity, very little is known to public and which are confined to research area people only. Ecology and behaviour of the species diversity especially in relation to aves gives the impressive knowledge on the species diversity for the public / students even from the College / University level.

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Biodiversity refers to the totality of species, populations, communities and ecosystems both wild and domesticated that constitute the life of any one area or of the entire planet. It is a hereditarily based variation at all levels of organization from the genes within a single local population to the species composing all or part of a local community and finally to the communities themselves that compose the living parts of multifarious ecosystems of the world. Most of the biodiversity of the Earth

is located around Equator due to its high temperature and rainfall. Rainforests of Central and South America, Equatorial Africa and South East Asia house may diverse arrays of plants and animals. India has a rich and varied heritage of biodiversity, encompassing a wide spectrum of habitats from tropical rainforests to alpine vegetation and from temperate forests to coastal wetlands. India contains about 8 per cent of the world's biodiversity on 2 per cent of the Earth's surface, making it one of the 12 mega diversity

countries in the world. This is based on the species richness and levels of endemism recorded in a wide range of taxa of both plants and animals.

Obtaining knowledge of flora and fauna is of immense scientific and commercial importance. Region-wise consolidated fauna survey help us in understanding the biological wealth of the country and their distribution and status. Nallamala Hills stretching across five districts across portions of Kurnool, Prakasam, Nalgonda, Guntur and Kadapa of the state of Andhra Pradesh is renowned for being rich in biodiversity (Rao, 1998). Nallamala (15°20'-16°31' N and 78°30'-80°10' E) is a group of low hill ranges in the central part of Eastern Ghats. From the Palnad basin in the north to the Tirupati basin in the south, the Nallamala runs a distance of 430 km with an average width of 30 km (Anonymous, 1965). The altitude ranges from 200 to 950 m. An unbroken chain of rugged hills with precipitous cliffs encompassing an area of about 7640 km² forms the range. There are three types of soil: red, mixed varieties and black. The red and mixed varieties occur along the bases of Nallamala. The humus content is almost negligible as the black soil occurs in plains where cultivation is practiced (Krishnan, 1956). The vegetation is typically of southern tropical dry deciduous and southern tropical moist deciduous forest types intermingled with shrub (Champion and Seth, 1968). The climate is generally hot and dry with temperatures rising upto 43^oC to 45^oC during May and dips down to 8^oC in December. Average rainfall in this region is between 900 and 1000 mm.

It is important to review and modify relevant environmental policies and in parallel develop strict regulatory frameworks to ensure that environmental and social impacts are minimized and mitigated (Webb *et al.*, 2012). Concomitantly, the results of the protected area gap analysis should be integrated with national land use plans to limit conflicting land uses and maximize connectivity across conservation corridors. With the economic opportunities presented by increasing number of development projects in the country there is a need to include valuation of environmental services and biodiversity in development planning.

Ecosystem services have emerged as an integrated framework for managing ecosystems in an increasingly human dominated world (Harris *et al.*, 2006; Lele *et al.*, 2013). Defined as the benefits natural systems provide to humans, this 'nature for people' paradigm has been

increasingly adopted by governments and nonprofit organizations to frame, plan and allocate resources (Posner *et al.*, 2016). There is a notable division between those that see ecosystem function as something that can be quantified in monetary terms versus those that explicitly reject one dimensional valuation schema as being both impossible and undesirable (Pascual *et al.*, 2017).

This research work is carried out to characterize the species of aves regarding their ecology and behaviour found in the above said region, their habits, habitat etc., Though several research activities and surveys were made or undergoing in the area of study / project *i.e.* Nallamala forest (Kurnool region), Andhra Pradesh regarding the characterization, quantification of the species diversity, very little is known to public because they are confined to research area people only. Ecology and behaviour of the species diversity of aves gives the impressive knowledge on the species diversity for the public / students even from the College / University level. Hence this work is selected which will have mass acceptance and appreciation.

EXPERIMENTAL METHODOLOGY

Direct method involving sampling area *i.e.* as mentioned above (Nallamala forest, Kurnool region, Andhra Pradesh) and also based on secondary data.

EXPERIMENTAL FINDINGS AND DISCUSSION

We made our study based on the method said above on avian diversity of the Nallamala Hills, especially along the tracts encompassed by Nagarjunasagar Srisailem Tiger Reserve (3568 km²) and Gundla Brahmeshwaram Wildlife Sanctuary (1198 km²). Except a few faunal surveys carried out by Zoological Survey of India (Murthy, 1968, 1986; Sharma, 1971; Agarwal and Bhattacharya, 1976) and by the Forest Department, no scientific documentation of mammalian fauna was done until recently. Ecology and behaviour of 20 species of aves, habits, habitats etc., is collected and made available in this research study.

Here are the findings of our study on the ecology and behaviour, habits, habitats of the said 20 species of aves:

Purple sun bird :

Phylum: Chordata

Class: Aves
 Order: Passeriformes
 Family: Nectarinidae
 Genus: *Nectarinia*
 Species: *Asiatica*

They are seen in pairs or small groups and aggregations may be found in gardens with suitable flowers. Groups of as many as 42-50 individuals have sometimes been noted. The purple sun bird is a common and familiar species, all over its range it affects gardens, grooves cultivated and shrub country as well as light deciduous forest. They feed on flower nectar insects, spiders etc. They have a fast and direct flight and can take nectar by perch at the base of flowers. Purple sun birds are cute noisy the call of purple sun bird is chewit – chewit - chewit and some time sharp wick-wick. Eggs are incubated by female and hatch after 14 to 18 days only the female birds incubates but the male assisting in tending the young of purple sun bird.

White browed wagtail :

Phylum: Chordata
 Class: Aves
 Order: Passeriformes
 Family: Motacillidae
 Genus: *Motacilia*
 Species: *Maderaspatensis*

Banks of rivers, pools and lakes. The white browed wagtail is a resident breeder in India and is endemic to the Indian subcontinent. In most of India it is found below 1000 m but in southern India it goes up in to hills up to 2200 m. It is very rare in the Indus valley area. It is found in one of the few habitats and is often found perched on over head water storages in residential buildings. It is a rare winter visitor to Sri Lanka and has possibly extended their range in recent times.

Black drongo :

Phylum: Chordata
 Class: Aves
 Order: Passeriformes
 Family: Dicuridae
 Genus: *Dicrurus*
 Species: *Macrocercus*

Researchers have considered the possibility that these drongos possess theory of mind, not fully shown in many animals other than humans but doubt this capability.

Generally found in open areas, savannas. It lives in open forests, habitation form lands and slightly wooded habitats near water. It may be found from sea level to 1900m of elevation. They are aggressive and fearless in nature. Birds are often seen singly or in groups of 2 or 3 individuals. Males and females sing in the morning during the breeding season. They will attack much larger species that enter their nesting tertiary. This behavior led to their former name of king crow. They are capable of fast moving that enable them to capture flying insects with short legs. They may also perch on grazing animals. They are capable of producing wide range of calls but a common call is a two note tee hee call.

Rock pigeon :

Phylum: Chordata
 Class: Aves
 Order: Columbiformes
 Family: Columbidae
 Genus: *Columbia*
 Species: *Livia*

The pigeons are the typical representative of flying birds and are known both as wild and domesticated forms. They exhibit most of the characteristics of birds and are available in large numbers. Blue rock pigeons live Sri Lanka and Myanmar in Asia and also found in Europe and North Africa. In wild state the blue rock rock pigeons lives in rocky hills and cliffs in semi domesticated condition they are seen to live as a commensal of man. The seminiferous stock is seen to most railway stations, forts, old unused buildings, grain ware houses, temples etc. The female rock pigeon lays eggs in a nest lined with sticks, stems, roots and debris in the wild nest in cities and towns the nest placed in window ledges and roofs under bridges. Pigeons especially harming or carrier breeds, are well known for their ability to find their way home from long distances. Despite these demonstrated abilities wild rock doves are sedentary and rarely leave their local areas.

Black headed munia :

Phylum: Chordata
 Class: Aves
 Order: Passeriformes
 Family: Estrididae
 Genus: *Lonchura*
 Species: *Castaneothorax*

Black headed munia is a small gregarious bird which feeds mainly on grain and other seeds. It frequently visits open grass land and cultivation fields. The nest is a large domed grass structure in a bush or tall grass in to which 4 to 7 white eggs are laid.

Red headed vulture :

Phylum: Chordata
Class: Aves
Order: Accipitriformes
Family: Accipitridae
Genus: *Sarcogyps*
Species: *Calvus*

Endemic to India, old world vulture inhabit deciduous. The red headed vulture prefers open country usually away from human habitation, well-wooded hills and dry deciduous forests with rivers. Red headed vulture lives in open country or in semi desert areas. The red headed vulture is threatened by the more reduced populations of large ungulates due to hunting pressure.

Little grebe :

Phylum: Chordata
Class: Aves
Order: Podicipediformes
Family: Podicipedidae
Genus: *Tachybaptus*
Species: *Ruficilis*

Pairs are highly territorial, nesting mostly on floating plant material hidden in dense vegetation at the margin of shallow fresh water, rivers, streams, lakes and ponds. The adult is unmistakable in summer, predominately dark above with its rich, rufous colour neck, cheeks and flanks and bright yellow gape. The rufous is replaced by directly brownish grey in non breeding and juvenile birds. In winter its size, buff plumage with a darker back and cap, "powder puff" rear end enable easy identification of these species.

Common tailor bird :

Phylum: Chordata
Class: Aves
Order: Passeriformes
Family: Cisticolidae
Genus: *Orthotomus*
Species: *Sutorius*

Bushes in gardens, cultivation edges and forest.

Common tailor bird is well adapted to humans. The species is common and wide spread in its range and not threatened. The sexes are identical, except that the male has central tail feathers in the breeding season although the reliability of sexing data accompanying museum specimens used in determining this sexual dimorphism has been questioned. These are due to the dark pigmented and bare skin that are present in both sexes and sometimes give the appearance of a dark.

Grey heron :

Phylum: Chordata
Class: Aves
Order: Pelecaniformes
Family: Ardeidae
Genus: *Ardea*
Species: *Cinerea*

The grey herons although most common in the low lands they also occur in mountain turns, lakes, reservoirs, large and small rivers, marshes, ponds, ditches, flooded areas, coastal lagoons, estuaries and the sea shore. Breeding colonies are usually near feeding areas but exceptionally may be upto 8 kilometers away and birds sometimes 12 miles from the nesting site. The main call is a loud crocking "frank" but a variety of guttural and raucous noises are heard at the breeding colony. The male uses an advertisement call to encourage a female to join him at the nest and both sexes varies greeting calls after a pair bond has been established. A loud, harsh "schach" is used by the male in dividing other birds.

Cattle egret :

Phylum: Chordata
Class: Aves
Order: Pelecaniformes
Family: Ardeidae
Genus: *Bubulcus*
Species: *Ibis*

Wetlands and grasslands often associated with live stock. The cattle egrets nest in colonies which also often contain nest of other species of heron and egret. The male brings nesting material to the female and it constructs the nest. 4 to 5 eggs are usually laid and incubation by both parents care for the young. After 40 days the young are ready to fly and by about 60 days they are ready to the independent. The nesting season usually ends by mid September. The positioning of the

egret eyes allows for binocular vision during feeding and physiological studies suggest that the species may be capable of crepuscular to nocturnal activity.

Singing bush lark :

Phylum: Chordata
Class: Aves
Order: Passeriformes
Family: Alaudidae
Genus: *Mirafra*
Species: *Centillans*

The range of the singing bush lark is extensive with an estimated global extent of occurrence of 10,000,000 km². Its global population is thought to be large though it has yet to be quantified. The sings from bush does not usually perch on trees or wires. The cells are similar to that of jerdons bush lark but are lower and have longer rotting males often falling in pitch.

Asian koel :

Phylum: Chordata
Class: Aves
Order: Cuculiformes
Family: Cuculidae
Genus: *Eudynamys*
Species: *Scalopaceus*

The asian koel is a bird of light woodland and cultivation. They prefer staying in a dense thick forest with trees and bamboos, light woodland and cultivation areas also found in shrubby areas which have tall trees, woods, villages, towns and gardens and mangrove forest. Asian koel is a shy bird, they can be seen alone or in pair. They have straight and swift flight with rapid wing beats. Asian koel is a very vocal. Often heard before seen, song of the male is a repeated koo-ooo-koo-ooo the female makes a shrill kik-kik-kik-call. The asian koel is a cuckoo and like many cuckoos it is a broad parasite. The female keel lays her egg in the nest of one or more species of hosts allowing the latter to incubate her eggs and feed her chicks until they are fledged and for some time after.

Eurasian eagle owl :

Phylum: Chordata
Class: Aves
Order: Strigiformes
Family: Strigidae

Genus: *Bubo*

Species: *Bubo*

The *bubo* evolved in to existence in Africa although early radiations seem to branch from Southern Asia. Eurasian eagle owls were larger than those which were deemed to date to the late Pleistocene about a dozen sub species are recognized today. Eagle owls are distributed somewhat sparsely but can potentially inhabit a wide range of habitats with a partiality for irregular topography. They have been found in habitats are diverse as northern coniferous forests to the edge of vast deserts. In the Italian alps, it was found that almost no pristine habitat remained and locally eagle owls nested in the vicinity of towns villages and sky resets.

Baya weaver :

Phylum: Chordata
Class: Aves
Order: Passeriformes
Family: Ploceidae
Genus: *Ploceus*
Species: *Philippinus*

The baya weaver inhabits grassland shrub with scattered trees, mangroves and cultivated areas. The baya weaver is a weaver bird found across the Indian sub continent and South East Asia. Flocks of this birds are found in grasslands, cultivated areas, scrubs and secondary growth and they are best known for their hanging report shaped nests and weaver from leaves. Among the population three sub species are recognized the nominate race *Philippinus* is found through much of maintained India into South East Asia.

Comb duck :

Phylum: Chordata
Class: Aves
Order: Anseriformes
Family: Anatidae
Genus: *Sarkidiornis*
Species: *Melanotes*

Pools in well – wooded country. The species is threatened by hunting, deforestation and indiscriminate use of poison in rice fields. The species declined in the Senegal delta following the doming of the Senegal River which has resulted in habitat degradation and loss from vegetation over growth, desertification. This species is also susceptible to avian influenza so is virus.

Paddy field pipit :

Phylum: Chordata
Class: Aves
Order: Passeriformes
Family: Motocillidae
Genus: *Anthus*
Species: *Rufulus*

Short grassland and cultivation; Savannah – dry grassland. A widespread species found in open habitats, especially short grassland and cultivation with open bare ground. It runs rapidly on the ground and when flushed does not. The paddy field pipit breeds throughout the year but mainly in the dry season.

Forest owlet :

Phylum: Chordata
Class: Aves
Order: Strigiformes
Family: Strigidae
Genus: *Glaucidium*
Species: *Radiatum*

Crepuscular and nocturnal, but apparently little inconvenienced by sunlight and frequently on the move in daytime. The forest owlet is small and stocky; it is a typical owlet with a rather unspotted crown and heavily banded wings and tail. They have a relatively large skull and beak.

Indian pond heron :

Phylum: Chordata
Class: Aves
Order: Pelecaniformes
Family: Ardeidae
Genus: *Ardeala*
Species: *Grayii*

Inhabit wetlands. They appear stocky with a short neck, short thick bill and buff brown back. In summer, adults have long neck feathers. Its appearance is transformed from their dull colours when they take flight when the white of the wings makes them very prominent. It is very similar to the squaco heron but is darker backed to the chinese pond heron. They are usually silent but may give a harsh croak when flushed or near their nests.

Zitting cisticola :

Phylum: Chordata
Class: Aves

Order: Passeriformes

Family: Cisticolidae

Genus: *Cisticola*

Species: *Juncidis*

Inhabits fields and grasslands. The adult males have less crown streaking and more back marking than the females, but there is no great difference between the sexes are the eighteen geographical races. The absence of a nuchal collar in the non- breeding season they tend to skulk within the grass and can be hard to spot.

Brown headed gull :

Phylum: Chordata
Class: Aves
Order: Charadriiformes
Family: Laridae
Genus: *Choroicocephalus*
Species: *Brunnicethalus*

Especially found in lakes and rivers. The black headed gull is a bold and opportunistic feeder. It eats insects or invertebrates in ploughed fields with equal relish. It is a noisy species especially in colonies. Its scientific name means laughing gull. This species takes two years to reach maturity. First year birds have a black terminal tail band, more dark areas in the wings and in summer, a less fully developed dark hood.

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