

Overview

Birds have always been a feature of attraction because of their fabulous colors, melodious calls and easily identifying characters, which had evolved 150 million years ago. Our foremost need to have all types of birds around us is because of their intrinsic values be it aesthetic or ethical. A more realistic rationale is that birds, through their sheer diversity, abundance, mobility and functional roles as predators, prey and dispersers of pollen and plant seed, are necessary for the survival of natural ecosystem and for the services that they provide. They are known to be a good ecological indicator of the natural environment as they may flee from a forest being felled as swiftly as they may colonize one that is regenerating. Conserving this rich heritage of bird diversity on earth is becoming one of the major challenges of the day. Today 10,027 species of birds occur all over the world and majority of them are found in the tropics.

Of these, India which has a predominant tropical climate, is bestowed with diverse habitats resulting in assorted vertebrate faunal assemblage and alone has 1,306 species of bird, which forms more than 13% of the world's bird assemblage. This includes 130 or 10 % of globally threatened (IUCN) species and 57 or 4.4% endemic species.

Majority are found in the north-eastern region, as 953 species have been recorded in this region, which is 73% of the total birds reported from India. Of these, 53 or 5.6% are globally threatened and 19 species are endemic to this region.

Jeypore forest harbours about 281 birds species. However two subspecies of Long-tailed Shrike and White Wagtail were recorded, they are considered as only one separate species of each, while reporting the total bird species for Jeypore forest. These 281 bird species forms 29.5% of the birds recorded in NE and 21.5% of the birds of India.

Species of Conservation Significance

In total 23 species belonging to 22 genera and nine families, which forms 8.2% of the total birds present in Jeypore are of conservation significance. This includes the globally threatened species, species listed in the Schedule I of the Wildlife Protection Act 1972 (1994) and the endemic bird of Northeast.

Globally Threatened Birds

There are 13 globally threatened species in the forests of Jeypore, which is 24.5% of the threatened species recorded in the NE and 10% of the threatened species in India. This includes one species (Slender-billed Vulture - (*Gyps tenuirostris*) of critically endangered (CE) status, two (White-winged Duck- *Cairina scutulata* & Greater Adjutant - *Leptoptilos dubius*) endangered (E), five (Greater Spotted Eagle - *Aquila clanga*, Lesser Adjutant - *Leptoptilos javanicus*, Beautiful Nuthatch - *Sitta Formosa*, Marsh Babbler - *Pellorneum palustre*, Tawny-breasted Wren Babbler - *Spelaornis longicaudatus*) vulnerable (V) and five (White-cheeked Hill Partridge - *Arborophila atrogularis* , Great Hornbill - *Buceros bicornis* , Brown Hornbill - *Anorrhinus tickelli*, Oriental Darter - *Anhinga melanogaster*, Painted Stork - *Mycteria leucocephala*) near threatened (NT) status.

Status of Schedule-I bird species of Wildlife Protection Act 1972 (1994)

Ten bird species listed in Schedule-I of Wildlife Protection Act 1972 (1994) are present, of which five were residents, two altitudinal migrants, one winter migrant and two summer migrants. This includes White-winged Duck (*Cairina scutulata*), a aquatic bird, seen in the puddles and pools along the rivers and streams and on tree in the lower strata; Kalij Pheasant (*Lophura leucomelanos hamiltonii*) and Grey Peacock Pheasant (*Polyplectron bicalcaratum*) both pheasants, seen in the undergrowth using the ground layer in the dense evergreen forest and feeds on grains and fruits on the forest floor. This also includes four birds of prey: Besra (sparrowhawk) *Accipiter virgatus* and Black Baza (*Aviceda leupholes*), both found in the trees of top and middle layer of dense evergreen forest, Slender-billed Vulture (*G. tenuirostris*), a scavenger and summer visitor, seen on the large trees in the top and middle layer along evergreen forest edge and Osprey (*Pandion haliaetus*), a winter visitor and fish eater, observed mainly along the rivers and in tall and large trees bordering the rivers and streams.

The remaining three species are Great Hornbill (*Buceros bicornis*) and Wreathed Hornbill (*Aceros undulatus*), which are frugivores and altitudinal migrant in the Jeypore forest, usually found on large trees in the top and middle layers of the dense evergreen forest, and Common Hill Myna (*Gracula religiosa*), an omnivore and resident, mainly seen on tree in the top and middle layers of both the dense and semi open evergreen forest.

Endemic Birds found in Jeypore

There are five endemic species in this forest, which forms 26.3% of the endemics reported from the north eastern region and all belong to the family Sylviidae. All these species are found in the lower and shrub layer or undergrowth in the evergreen forest and feed on insects.

Yellow-vented Warbler (*Phylloscopus cantator*), a leaf warbler, often found in mixed itinerant flocks in non breeding season and forages actively on the lower branches of large trees in the lower layer or strata and in the bamboo clumps and large shrubs or bushes. It is a winter visitor coming from the higher reaches of the Northeast and found only in dense evergreen forest.

Broad-billed Warbler (*Tickellia hodgsoni*), a resident foliage and twig gleaner, seen in the shrub layer and bamboo rich patches of the semi open evergreen forest.

The Marsh Babbler, is usually found in the dense undergrowth along the rivers and stream in the forest and feeds on the insects on the leaves of dense undergrowth and in the leaf litter on the forest floor.

Twany-breasted Wren Babbler, in Jeypore is found in dense undergrowth – shrub layer of dense evergreen forest and actively searches for insects by creeping up the branches and hopping on the forest floor.

White-naped Yuhina (*Yuhina bakeri*), a insectivores altitudinal migrant, usual seen inside the canopy of trees in the middle and lower strata or layer of the semi open evergreen forest. It is often seen with other small babbler and warblers.

Jeypore Bird Diversity

In Jeypore forest 281 bird species belonging to 174 genera and 51 families are present of which 179 or 63.7% were residents that included nine globally threatened species.

Among the rest, 65 or 23.1% species were winter visitors, seven or 2.5% summer visitors and 30 or 10.7% were altitudinal migrants, with majority of them coming from the higher reaches of western, central and eastern Himalayas.

Bird Diversity in Different Habitat

Jeypore forest, which is predominantly evergreen, is delineated based on some specific microhabitats such as dense evergreen forest, rivers & streams, evergreen forest edge, swamps, semi open evergreen forest that includes the logged areas, where openings are present, agriculture (cultivations, fallows and tea gardens) along the edge and inside and habitations on evergreen forest edge. This local classification is done based on the use by birds.

All the species mentioned below are specialist as being found only in single microhabitat. Rest of the 62 bird species were found to use two or three of the micro habitats, with maximum of 25 species found in both dense and semi open evergreen forest followed by nine species in both evergreen forest edge and agriculture and seven species present in both dense evergreen forest and its edge.

i. Dense Evergreen Forest:

Dense evergreen forest harboured the maximum of 111 or 39.5% species of the total 281 birds species recorded in Jeypore. This included two endemic (Yellow-vented warbler & Tawny-breasted Wren Babbler) species and five (two vulnerable and three near threatened) globally threatened species. Birds belong to all the foraging guilds except aquatic guild, was present, and insectivores are the most dominant guild with 79 species. Among these specialist, 57 were residents, 21 altitudinal migrants, 27 winter visitors and five summer visitors.

ii. Rivers and Stream- Forest along the banks:

Forty four species of birds were found in Rivers & Streams and the forest along the banks, in the evergreen forest, of which one species (Marsh Babbler) was endemic and five (one endangered, two vulnerable, & two near threatened) were globally threatened species. Birds of five foraging guilds, aquatic, piscivores, insectivores, carnivores and nectarivore used this habitat, with aquatic birds dominating this habitat.

iii. Evergreen Forest Edge:

The evergreen forest edge was used by 37 species; basically these species prefer to stay only along the edge of the forest and harboured the only critically endangered species (Slender-billed Vulture). These birds belong to six foraging guilds: insectivores, frugivores,

carnivores, Omnivores, nectarivore and granivores. Of these microhabitat specialists, 29 species were residents, one altitudinal migrant, six winter visitors and one summer visitor.

iv. Semi-open Evergreen Forest:

Twenty-three species of three foraging guilds (insectivores, carnivores & omnivores) were found in the semi-open patches of the evergreen forest, includes also the logged forest. Among these majority were insectivores (17 species), with omnivores (four species) and carnivores (two species) being the other guilds. The migrant status of these specialists reveals that 13 species were residents, five altitudinal migrants and five winter visitors. This microhabitat is home for two endemic species, the Broad-billed Warbler and White-naped Yuhina.

v. Other-Micro-habitats:

Four species were found only around the habitations close to the forest and two aquatic bird species seen only in the swamps along the forest edge.

Species Richness in Different Foraging Guild and their Ecological Role

Foraging guilds are derived based on what the birds feed predominantly and exhibits their significant role in ecosystem. Overall birds recorded in Jeypore belong to eight foraging guilds of which insectivores was the most dominant guild or group with 154 species of 86 genera and 26 families. This includes all the five endemic species and three vulnerable species. Further, 80 species in this guild were residents, followed by 50 winter visitors, 21 altitudinal migrants and five summer visitors. This group uses all the forest layers (top, middle, lower, shrub and ground) and substrates like leaves, twigs, branches, main trunk and leaf litter on the forest floor. Species in this guild are good insect pest controller in the forest ecosystem.

Insectivores, Carnivores (17 species) and most of the Omnivores (28 species) aid in controlling the insect and rodent pest in the forest as well as in the agricultural ecosystem adjoining the forest.

Frugivores, that include hornbills, barbets, pigeons, parakeets and koel, represented by 21 species, along with some of the Omnivores (crows, mynas, starlings) that feed on fruits serve as seed dispersers. Parakeets, which are frugivores, are partial seed dispersers as they also feed on the seeds of certain fruits, in the process destroying them.

Nectarivores (eight species) and some of the insectivores (drongo), and Omnivores (mynas, starlings) that feed on nectar help in plant pollination.

The fish eating terrestrial birds, Piscivores (Kingfishers, Brown Fish Owl and Osprey) are represented by eight species, while the water dependent or aquatic bird species, described here as Aquatic guild are represented by 31 species. These birds depend on the rivers and streams inside the forest and the agricultural fields along the forest edge.

Overall Status of Bird Families in Jeypore Forest

Among the 51 families of birds recorded, three families Sylviidae, Corvidae and Muscicapidae were very dominant with each contributing 52 or 18.5% species, 29 or 10.3% and 27 or 9.6% species respectively to the total bird species of Jeypore. Among the remaining families, 16 (Anhingidae, Centropodidae, Certhiidae, Cerylidae, Cinclidae, Coraciidae, Dendrocygnidae, Fringillidae, Glareolidae, Hemiprocidae, Hirundinidae, Laridae, Pittidae, Trogonidae, Upupadea and Zosteropidae) were represented by only one species.

Dominant Bird Families in Jeypore

Family Sylviidae

This was the most dominant family with 52 species of which 17 species were residents, 20 winter visitors and 15 altitudinal migrants. The birds in this family fall under only two foraging guilds and insectivores form 94.2% (49 species), while omnivores were only three. All five endemic species belongs to this family in addition to including two species that are vulnerable. The microhabitat use of the birds in this family revealed that 35 species were found only in dense evergreen forest, 10 species specialist of semi open evergreen forest, two specialist of the rivers & streams and one specialist of the evergreen forest edge. The birds in this group used all the possible niches in the forest, as they were found on trees in the top, middle and lower strata or layers, shrub layer or undergrowth and also ground, with most of them gleaning the leaves, twigs and ground litter for insects. In this group though majority of the species are small, they are very active and seen moving in mixed foraging flocks exploiting food from their respective niches.

Family Corvidae

Corvidae, another dominant bird family in Jeypore, is represented by 29 species. These include 14 microhabitat specialists of which 12 were only in the dense evergreen forest and two species recorded only along the edges of the evergreen. The remaining 15 species are found in two or three microhabitats, with maximum of 12 species seen in both dense and semi open evergreen forest. Of the 29 species, 21 were insectivores and include Cuckooshrikes, Minivets, Flycatcher Shrikes, Wood Shrike, Drongos, Iora, Fantails, Monarch and Paradise Flycatchers. Rest of the eight species that comprised of Magpies, Treepies and Orioles, were omnivores, i.e., they eat both plant parts and animals. The birds of this family use all the above ground layers of the forest with majority of them seen in the canopy and very rarely coming to the ground.

Family Muscicapidae

Muscicapidae that includes Whistling Thrush, Ground Thrushes, Shortwing, Flycatchers, Niltava, Robins, Shama, Redstarts, Forktails and Stonechats, is another dominant bird family in Jeypore forest. It is represented by 27 species with all birds being insectivores, of which nine were residents, 16 were winter visitors and two altitudinal migrants. Further this family included 13 dense evergreen forest specialists, five rivers & streams habitat specialists, and one specialist each in evergreen forest edge and semi open evergreen forest. Among the

remaining seven species, which were found to use two microhabitats, four were in both dense and semi open evergreen forest. Birds in this family exploit the spaces between and inside the canopy of trees in the top, middle and lower strata in addition to feeding in the shrub and ground layers.

Important Bird Groups in Jeypore Forest

Woodpeckers: as a service provider

Woodpeckers and Piculets are good indicators of a healthy forest and also presence of mature forests with both young and old trees, trees of various species and sizes including very large trees, and lots of dead wood. This environment provides them with food, shelter, and nesting sites. They have evolved a strong, conical, chisel like bill for excavating and a very long sticky tongue for extracting their prey from deep crevices and bore-holes in the wood. The tail is specially adapted with stiff central feathers used as a support during climbing trees.

They play a very crucial ecological role in the form of:

a. Woodpecker as a Nesting site provider: Holes excavated by woodpeckers and then abandoned after use, provide homes for other cavity nesting birds, reptiles, mammals etc.

b. Woodpecker as a food material provider: When woodpeckers tear apart rotting wood, they expose invertebrates—insects and their larvae, spiders, worms etc.—that other animals feed on.

c. Woodpecker in other Services: Woodpeckers play an important role in the disintegration and decay of dead wood. Because they forage and build nests in dead trees, woodpeckers may be important in the dispersal of fungi that break down wood.

In Jeypore 12 species of woodpeckers and two species of piculets (small woodpeckers) of different size are found. These birds of the family Picidae, occupy different habitat, forest layers and use different strata or niche on the trees in the forest.

Small Woodpeckers

The two species of piculets use the top and middle layers of the evergreen forest and bamboos, feeding by mainly gleaning the twigs on the trees for ants, their pupae and eggs. The Grey-capped Pigmy Woodpecker, another tiny bird, feeds by probing, prying, tapping and hammering the smaller branches in the canopy of trees of the lower layer in the semi open and edges of evergreen forest.

Medium Sized Woodpeckers

Fulvous-breasted Woodpecker (*Dendrocopos macei*), a medium sized bird, forages mainly on tree trunks and larger high branches in the middle and lower layer along the forest edges and semi open patches evergreen forest. Rufous Woodpecker (*Celeus brachyurus*), is usually found in semi open evergreen forest with bamboo. This species forages in trees at all heights mainly in the middle and low layer, often digging into tree-ant nests, which it relishes. This species also feed on the ground on fallen rotten logs and termite nests. Lesser Yellownappe (*Picus chlorolophus*), a green woodpecker, is often seen feeding mainly on the main trunk,

primary and secondary branches on trees in the middle and lower layers in the dense evergreen as well as along the forest edge. Streak-throated Woodpecker (*P. xanthopygaeus*) another medium sized green woodpecker is found usually in the evergreen forest edge, using trees in the middle and lower layer. They feed mainly on the main trunks of smaller sized trees and primary and secondary branches of the medium and small sized trees, but occasionally seen on the forest floor also.

Grey-headed Woodpecker (*P. canus*), a greenish woodpecker found in the semi open evergreen forest, usually using the small to medium sized trees in the middle and lower layers. They often forage and feed on the ground as well as on the primary and secondary braches. Himalayan Flameback (*Dinopium shorii*), is found only in the dense evergreen forest, where they use the trees in the top and the middle layer, mainly foraging on the primary and secondary branches but occasionally seen using the entire tree. Common Flameback (*D. javanense*), another medium sized woodpecker, usually seen in the semi open evergreen forest in Jeypore, occupy the trees in the middle and top layer and hunts at all levels in the trees, but usually low down on main trunk and primary branches. Black-rumped Flameback (*D. benghalense*), is seen usually along the edges of the evergreen forest mainly on the trees in the middle and lower layer. They are found to forage at all levels in the tree except the smaller twigs and also often on the forest floor leaf litter and fallen logs.

The Bay Woodpecker (*Blythipicus pyrrhotis*), another rufous coloured medium sized woodpecker, is found in the semi open evergreen forest with dense undergrowth and bamboo. They are found to forage mainly low down on the trees in the lower layer and large shrubs, though they also use other parts of the tree. They feed predominantly on moss cover tree trunks, dead stumps, and fallen logs, occasionally also on the ground among the roots. This species usually tend to keep close to or on the trunk.

Large Woodpeckers

Greater Yellownappe (*P. flavinucha*), a large sized green woodpecker, is usually seen in the dense evergreen forest, mainly on large trees in the middle and top layer. This species forages at all levels on the main trunk, primary and highest larger secondary branches. Greater Flameback (*Chrysocolaptes festivus*), another large woodpecker in Jeypore forest seen usually in the dense evergreen forest and uses trees in the top, middle and the lower layer. However, they forage at all levels, they prefer to feed on the main trunk and primary and large secondary branches, especially on dead wood.

All these woodpeckers are residents and usually found moving with the mixed foraging flocks of insectivorous birds.

Richness in Birds of Prey

This group is considered very important as they play a crucial ecological role mainly in maintaining the population of the prey species such as small mammals (rodents) game & small birds, reptiles, amphibians, fishes and insects. They also serve in cleaning up the environment through scavenging on dead animals. These birds form a very important link in

the food chain of the any forested and agriculture ecosystems. In Jeypore forest two families represented this group, Accipitridae with 12 species and Falconidae with two species.

Family Accipitridae included the critically endangered (CE) Slender-bill Vulture (*Gyps tenuirostris*), a scavenger, seen on the trees of the top layer on the evergreen forest edge, Ospery (*Pandion haliaetus*), a fish eating large eagle, usually found along the rivers and large streams, Crested Serpent Eagle (*Spilornis cheela*), that feeds predominantly on snakes, was generally seen on trees in the top and middle layers of the dense evergreen forest, Oriental Honey Buzzard (*Pernis ptilorhynchus*) that specializes on feeding on honey comb, is seen along the evergreen forest edge on the trees in the lower and middle forest layer, Greater Spotted Eagle (*Aquila clanga*), another large eagle and a vulnerable species was found on tall and medium sized trees along the rivers and Changeable Hawk Eagle (*Spizaetus cirrhatus*), was usually found among the trees in the top and middle layers of semi open evergreen forest and along the edge of the forest. This bird feeds on gamebirds, small mammals and lizards.

In addition, Common Buzzard and Crested Goshawk (medium sized birds), Shikra and Besra (small hawks) are also found in this forest. Black Baza, another medium sized bird, can be seen in small flocks on the trees in the top and middle layers of dense evergreen forest.

Family Falconidae included the medium sized falcon, the Eurasian Hobby (*Falco subbuteo*), usually seen on the trees in the top and middle layers of the semi open evergreen forest. The smallest, bird of prey in India, the Pied Falconet (*Microhierax melanoleucos*), one of the very rare species of the northeast is found mainly on the trees in the top layer of the semi open evergreen forest. This falconet feeds on small birds, lizards, frogs and insects.

The diversity of this group shows the conservation significance of this evergreen forest as all depend on large sized trees in the top and middle layers.

Nocturnal Birds

This group, which are also known as birds of prey include eight species of seven genera and two families, represented by owls and nightjars. Among these four were carnivores feeding mainly on rodents, three were insectivores and one feed on fish. They occupy different habitats and layers, with Brown Fish Owl found along the riverine forest, using the trees in the middle and lower layer along the rivers, Collared Scops Owl and Spotted Owlet in forest edge and clearings mainly in the lower layer, Brown Hawk Owl, specifically evergreen forest edge, and Asian Barred Owl (mainly active during the day), mainly in both dense and edge of evergreen forest, occupying the trees in the middle layer. Brown Wood Owl stays on the trees on top layer in the dense evergreen forest, while the nightjars use the forest floor in semi open and edges of evergreen forest capturing insects in the air and space inside the canopy. These are considered as successful nocturnal birds of prey that are found worldwide, as they are perfectly adapted to nocturnal hunting. In addition, to sight and hearing, they have physiological adaptations to make it nearly silent when they fly. They are very significant due to their important ecological role in controlling the population of the rodents (rats) and the insects, majority of which are nocturnal. These birds hide by day in densely foliaged small to large trees, often close to the main trunk or in dark tree hallows.

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Migratory Status of Bird Species

Migratory Status	F	G	S	NT	V	E	CE	Endemics	WLPA S-I
Altitudinal Migrants	9	25	30	1	1	0	0	2	2
Resident	46	124	179	4	3	2	0	2	5
Summer Visitor	4	7	7	0	0	0	1	0	2
Winter Visitor	14	44	67	0	1	0	0	1	1
Total	51	174	283	5	5	2	1	5	10

F-Family, G-Genus, S-Species, NT-Near Threatened, V-Vulnerable, E-Endangered, CE-Critically Endangered, WLPA S-I – Wildlife Protection Act Schedule-I

Species Richness in Different Foraging Guilds

Guilds	F	G	S	NT	V	E	CE	Endemics	WLPA S-I
Aquatic	12	26	31	2	1	2	0	0	1
Carivore	4	15	17	0	1	0	1	0	3
Frugivore	6	12	23	2	0	0	0	0	2
Granivore	4	11	14	1	0	0	0	0	2
Insectivore	25	84	154	0	3	0	0	5	0
Nectarivore	1	3	8	0	0	0	0	0	0
Omnivore	6	17	28	0	0	0	0	0	1
Piscivore	5	6	8	0	0	0	0	0	1
Total	51	174	283	5	5	2	1	5	10

F-Family, G-Genus, S-Species, NT-Near Threatened, V-Vulnerable, E-Endangered, CE-Critically Endangered, WLPA S-I – Wildlife Protection Act Schedule-I

Status of Species of Conservation Significance (Threatened, Endemic & WLPA Schedule-I)

Status	Family	Genus	Species
Critically Endangered	1	1	1
Endangered	2	2	2
Vulnerable	4	5	5
Near Threatened	4	5	5
Endemics	1	5	5
WLPA Schedule - I	5	10	10
Total	9	22	23

Bird Species Richness in Different Micro-habitats of Jeypore Forest

Microhabitats	F	G	S	Endemics	CE	E	V	NT	Schedule-I
Dense Evergreen	21	77	111	1	0	0	2	3	6
Evergreen Edge	20	31	37	0	1	0	0	0	1
Rivers & Streams	22	37	44	1	0	1	2	2	1
Semi Open Evergreen	8	19	23	0	0	1	1	0	0
Habitation	4	4	4	0	0	0	0	0	0
Evergreen Edge Swamp	1	2	2	0	0	0	0	0	0
Dense Evergreen/Semi Open	8	17	25	0	0	0	0	0	1
Dense Evergreen/Rivers & Streams	1	1	1	0	0	0	0	0	0
Dense Evergreen/Edge	5	5	7	0	0	0	0	0	0
Dense Evergreen/Habitation	2	2	2	0	0	0	0	0	0
Evergreen Edge/Agriculture	8	8	9	0	0	0	0	0	0

Evergreen Edge/Habitation	1	1	1	0	0	0	0	0	0
Rivers & Streams/Edge	2	2	2	0	0	0	0	0	1
Rivers & Streams/Agriculture	1	1	1	0	0	0	0	0	0
Semi Open Evergreen/Edge	4	4	4	0	0	0	0	0	0
Dense Evergreen/Edge/Agriculture	1	1	1	0	0	0	0	0	0
Dense Evergreen/Edge/Habitation	2	2	2	0	0	0	0	0	0
Evergreen Edge/Agriculture/Habitation	2	2	3	0	0	0	0	0	0
Rivers & Streams/Edge/Agriculture	2	2	3	0	0	0	0	0	0
Semi open Evergreen/Edge/Agriculture	1	1	1	0	0	0	0	0	0