

Status of Avifauna in Barak Valley, Assam, with special reference to Ardidae Family

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Abstract

The Birds occupy a very significant position in the human society. They provide us food, medicine, fertilizers, beautiful decorative feathers, enchanting songs and bring about pollination. In addition they form various sources of amusements and exercise biological control over injurious crop pests. Birds have attracted human attention since time immemorial because of their beauty, their ability to fly and their importance as a source of food and feathers. Ecologically the birds play an important group because of their life style , high sensitivity to environmental changes , their position in the food chains and their wide spread distribution . However, several factors like rapid urbanization, technological development, agricultural practices with insecticides and fertilizers, and wanton destruction of tree and vegetation and thereby the destruction of the nesting sites of birds poses serious threats to this interesting group of organisms. Keeping this in mind a survey was undertaken in Barak Valley , Assam , North Eastern Region with special reference to Ardidae family , with an objective to make an inventory of bird species found in Barak Valley , and to evaluate various environmental problems confronting the birds , specially the Ardidae family and to recommend habitat conservation and restoration of habitats .

Introduction

Avian community studies are effective tools for monitoring different ecosystems. Birds are now being assigned high ecological value because of vital links they provide in the food chains and the key role they play in nutrient cycling in wetlands and marine ecosystems. They are also important as general indicators of the state of environment in which they occur .However , before any detailed ecological investigation of the birds of a given area can be undertaken , it is essential that a checklist of an inventory of taxa be prepared and updated from time to time . No comprehensive bird survey in the three districts of Barak Valley of Assam, Cachar, Karimganj and Hailakandi has been attempted . Hence considering the lack of detailed checklist of birds in Barak Valley, the present survey was conducted to record the avifaunal diversity in different habitats of Cachar, Karimganj and Hailakandi districts of Assam. General description of Study Area:

Geography	<p>The Barak Valley districts of Cachar, Hailakandi and Karimganj in Southern Assam is situated between 24° 8' N- 25° 8'N latitudes and 92° 15'E-93° 15'E longitudes. The valley is bounded by the North Cachar Hills District of Assam and the Jaintia Hill District of Meghalaya in the North, the states of Mizoram and Manipur in the South and East, and by the state of Tripura and the Sylhet District of Bangladesh in the West. The valley is girdled by the Barail range of hills in the North, the Bhuban Hills in the East and the hills of Mizoram in the South, which in turn extends as Arakan Yoma in Myanmar. The region abounds in wetlands of various sizes, found in the flood plains river Barak and its tributaries with low hills strewn in between. The valley has a large number of seasonal streams and rivers. The major river is the Barak, which after originating in Nagaland flows southwards through Manipur until it takes a northward turn at Tipaimukh. Then it flows northwards till it reaches Jirimukh. Just above Jirimukh it turns west and enters Assam through Jirighat of Cachar District. The Barak River flows from east to west and divides into two branches at Haritkar, near the Indo-Bangladesh border, namely the Surma River; almost immediately entering into Bangladesh and the Kushiara River passing through the Karimganj district of India to finally flow into Bangladesh. The main south flowing tributaries of Barak from North Cachar Hills are Jatinga, Chiri, Jiri and Harang, while the main north flowing tributaries from Lushai Hills are Sonai, Rukni, Dhaleswari and Katakhal. Longai and Singla are the important tributaries of Kushiara while Ghumra is the most important tributary of Surma. All these rivers, especially the Barak which adopts a meandering course through the alluvial plains, frequently shift their courses to form ox-bow lakes.</p>
Geology	<p>The geology of Barak Valley mostly comprises tertiary formations. The oldest rocks found within the valley are the sandstones of the Borail series, which are concentrated in a small area. Otherwise, rocks of Surma, Tipam and Dihing series along with older alluvium are predominant. While the Surma and Tipam series mostly comprise sandstones, sandy and clay shales and ferruginous clay, the Dihing series is largely made up of pebble beds. The lowest beds of the tertiaries contain a large number of malvine fossils, but the greater portion of the tertiary strata is almost barren.</p>
Soil	<p>The soil of the plains is of alluvial origin and consists of a mixture of clay and sand in varying proportions. In low-lying areas it is generally clayey loam but at the foot of the hills, there is a preponderance of clay and silt. Pure clay beds are also observed in some places. The low isolated hills projecting in many places above the level of the alluvium are formed of layers of sand and gravel, often underlain with bands of clay.</p>
Climate	<p>The Barak Valley has a sub-tropical climate with high rainfall spread over a long period and high temperature without much variation. The geographical configuration also contributes to the climate of the Valley, which includes Cachar, Hailakandi and Karimganj districts. The moisture laden monsoon clouds entering the Valley from the west buffeting against the high hill ranges like Borail Hill range and Lushai Hills along the adjoining boundaries cause heavy rainfall. The Barak Valley has three principal seasons - summer, monsoon and winter. Climatically these seasons in Barak Valley are well defined with a comparatively dry winter from November to February, hot dry summer from March to May and a rainy season from late May to late October. Sometimes rains start immediately after winter washing out the summer. The months of March and April often witness severe storms with strong winds, thunder and hail. Temperature and relative humidity are high and vary over a rather narrow range. Rainfall however, varies considerably being the lowest in January and February.</p>

Barak Valley consists of two Forest Divisions, viz. Cachar Forest Division and Karimganj Forest Division. The Cachar Forest Division consists of seven Reserve Forests and Karimganj Forest Division consists of six Reserve Forests. The Katakhal and Dhaleswari Reserve Forests are geographically within the area of the Hailakandi District, but are under the control of Cachar Forest Division, the total area under the Forest reserves in Barak Valley amounts to about 2916.05 sq. km. or about 42% of the total geographical area of the three valley districts (Gupta, 2001).

List of major Tree species found in the hills, foothills and alluvial forests of Barak Valley:

1. <i>Schima khasiana</i>	15. <i>Bombax insignis</i>	29. <i>Cynometra polyandra</i>
2. <i>Gmellina arborea</i>	16. <i>Bombax ceiba</i>	30. <i>Laritiera acuminata</i>
3. <i>Artocarpus chaplasha</i>	17. <i>Endospermum chinensis</i>	31. <i>Quercus spp</i>
4. <i>Dipterocarpus turbinatus</i>	18. <i>Terminalia bellerica</i>	32. <i>Eleocarpus spp</i>
5. <i>Michaelia champaca</i>	19. <i>Terminalia chebula</i>	33. <i>Lagerstroemia flosreginae</i>
6. <i>Michaelia montana</i>	20. <i>Terminalia myriocarpa</i>	34. <i>Xanthoxylum budrunga</i>
7. <i>Talanuma sp</i>	21. <i>Garuga pinnata</i>	35. <i>Diplospora singularis</i>
8. <i>Bummarra serrata</i>	22. <i>Tetrameles nudiflora</i>	36. <i>Vatica lancefolia</i>
9. <i>Chikrassia tabularis</i>	23. <i>Anthocephalus cadamba</i>	37. <i>Saraca indica</i>
10. <i>Cedrela toona</i>	24. <i>Pterospermum sp</i>	38. <i>Baccaurea sapidar</i>
11. <i>Cinnamomum cericodaphne</i>	25. <i>Vitex spp</i>	39. <i>Careya arborea</i>
12. <i>Palaquium polyanthum</i>	26. <i>Messua ferrea</i>	40. <i>Hitsea spp.</i>
13. <i>Kayea floribunda</i>	27. <i>Dillenia indica</i>	41. <i>Podocarpus nerifolia.</i>
14. <i>Dysorylum binectiberum</i>	28. <i>Duabanga sonnerisoides</i>	42. <i>Eugenia jambolina</i>

For practical purposes the forests of Barak Valley may also be classified as Hill Forests, Foot Hill forests, Alluvial Forests, Swamp Forests, Cane brakes and Bamboo brakes (Gupta, 2001). All these forest types harbour varieties of avifauna. Zoo-geographically, all these forest types under the two forests Divisions of Barak Valley lie on the transitional zone between Indian Sub region and Indo-Chinese Sub regions of Oriental region and as a result there is an intermingling of avifauna species of both the sub- regions. From the past records of Cachar Forest Division, it is noted that previously this area was very rich in avifaunal diversity, but due to wanton destruction of habitat the diversity of avifaunal species has come down sharply.

The list of major tree species found in the forests of Barak Valley is given in Table-1.1. The marginal vegetation around the study sites located in urban as well as rural areas included taxa like - *Commelina benghalensis*, *Cyperus spp*, *Mimosa pudica*, *Lindernia crustacea*, *Eclipta prostrata*, *Monochoria hastate*, *Enhydra fluctuans*, *Justicia gendarussa*, *Adicantun spp*, *Achyranthis aspera*, *Spilanthus paniculata*, and *Selaginella spp.*

Wetlands

Besides streams and rivers, Barak Valley also abounds in other fresh water systems including flood plain wetlands locally called “beels”, tanks and ponds of varying sizes, swamps and marshes, which constitute important habitats for innumerable species of birds. These ecosystems help in storing the excess water after heavy rainfall. The floodplains are sometimes locally named as ‘Haor’. There are a number of beels or haors of varying sizes present in the Barak Valley, and amongst these the ‘Sonbeel’ of Karimganj district is the largest in the whole of Assam, occupying an area of 15 sq.k.m. (in winter). In winter, many beels are drained out by man for cultivation. During summer all such areas are filled with floodwater. In areas where flood is prolonged, tree growth is less, but in areas where it lasts for a short period, trees like *Barringtonia acutangula* grow. The beel margins are usually covered with reeds, such as *Arundo donax* and herbs such as *Alpinia allughas*.

Statistics of natural wetlands in Cachar, Hailakandi, and Karimganj districts

District	Area (in hectares)				
	Lake/ Pond	Floodplain lakes (seasonally inundated)	Ox-bow lakes	Swamps/ Marshes	Total Area
Cachar	1151.5	4869.5	592.5	564.5	7178
Hailakandi	322.5	480	37.5	0	840
Karimganj	95	4667	87.5	870	5719.5
Total	1569	10016.5	717.5	1434.5	13737.5

Most of the beels in Barak valley also face the problems of weeds, especially the exotic *Eichhornia crassipes* (water hyacinth), which is choking up many of the wetlands, thereby decreasing the foraging grounds of wetland Birds. Hunter in his Statistical Accounts of Assam gives the following account of the Wetlands of Barak Valley, “There are no artificial water courses or lakes in Barak Valley but the ‘Chatla Haor’ or flood plain wetland of Cachar District and ‘Sonbeel’ of Karimganj District, swell up into a lake like sheet of water during the three or four months of rainy season. In Chatla, it is difficult to give an estimate of the area of this piece of water, as it varies much from year to year, and it is not easy to determine where the actual beel begins and where the marsh jungle ends. Its dimensions may, however be approximately stated to be about six miles in length and two miles in breadth at the widest part.”

Besides Son beel and Chatla flood plain wetland, the other major wetlands in the Barak Valley are Jabda and Lucca Haors of Cachar district, having an area of more than 10.5 sq km., the Bokri Haor, area of 10 sq k.m., Bowalia Haor, about 6 sq km., Dubri beel 1 sq km. area, Koya beel having 1 sq km., Kaukavia having ½ sq. km. in area, Puma Haor having 2 sq km. area, Thapimi beel having 4 sq. km. area. During rainy season all the low-lying areas of the Valley including the beels and Haors or the flood plain wetlands gets filled up with water. Many aquatic birds of different families are predominantly found in this low lying water fed area. During winter these areas are also remarkable for visit of many migratory birds. (Hunter, 1879)

The investigation on the avifauna of Barak Valley, Assam, North East India, with special reference to family Ardeidae, revealed the presence of 239 species of birds in the forests, wetlands, tea gardens, urban and rural areas, and other habitats of this area. Of these 239 species, as many as 27 (11.3 %) are considered threatened at a global level. Additionally another 78 species are now rarely encountered in Barak Valley. Thus about 38 % of the bird diversity in this area may be considered as threatened to varying degrees. Factors such as degradation of bird-rich habitats like wetlands and dense, primary forests, as well as hunting and trapping are instrumental in bringing about this decline in bird diversity. Three 'Important Bird Areas' (IBAs), viz., the Shon Beel, a large floodplain wetland in Karimganj district, the Katakhal and Inner Line Reserve Forests in Hailakandi and partly Cachar districts, and the Barail Reserve Forest in hilly tracts of Cachar bordering North Cachar Hills district have been recognized. Based on the avifaunal diversity recorded in the present investigation, recognition of two additional IBAs is suggested viz., the Bauwaa Beel, a wetland in Hailakandi district, and the Barak Reserve Forest in the eastern part of Cachar adjoining Manipur. Adoption of suitable protective and ameliorative measures including habitat restoration and reduction of hunting pressure, especially in the IBAs are likely to go a long way towards conserving avifaunal diversity in Barak Valley. A special emphasis ought to be given to the maintenance of structural complexity of vegetation in the forests that in turn maintains high foliage height diversity. However, the forests in Barak Valley are rapidly becoming species poor and homogenous, thereby affecting the thriving of birds in such habitats. The forests of Barak Valley are naturally rich in tree species like *Artocarpus chaplasha* and several species of figs (*Ficus* spp.). These trees produce fruits with numerous small seeds that are dispersed by generalist frugivores. Such fruits constitute important food resources for forest birds like thrushes, flycatchers and parrots. Hence, the conservation of such trees can help attract these birds and improve bird diversity in the forests of Barak Valley. It may be noted here that several species of thrushes and flycatchers in the forests of Barak Valley have been found to of rare occurrence. Habitat heterogeneity is drastically declining in wetland areas as well, with clearing of swamp trees, draining of marshes, and the resultant creation of turbid, vegetation poor ecosystems. Removal of nesting trees such as *Bombax ceiba*, other wetland trees like *Barringtonia acutangula* and *Lagerstroemia flosreginae*, is also creating unfavourable conditions for many wetland species. Extension of legal protection under the Indian Wildlife Protection Act (IWPA) to additional species of birds is also necessary. Several species found in Barak Valley (and in other areas of Assam) that need to be brought under the protective umbrella of Schedule I or II of IWPA include the Baer's Pochard (*Aythya baeri*), the Black-necked Stork (*Ephippiorhynchus asiaticus*), the Greater Spotted Eagle (*Aquila clanga*), and the Burmese Sarus (*Grus grus sharpii*). Among the members of the Ardeidae, the Little Green Heron (*Butorides striatus*) and the Grey Heron (*Ardea cinerea*) deserves immediate protective measures in Barak Valley.

List of Threatened Species Of Birds In Barak Valley

Family	English Name	Scientific Name	Status
Phalacrocoracidae	Darter	<i>Anhinga melanogaster</i>	NT
conidae	Greater Adjutant Stork	<i>Leptotilos dubius</i>	VU
"	Lesser Adjutant Stork	<i>Lepototilos javanicus</i>	VU
"	Open Bill Stork	<i>Anastomus oscitans</i>	N.T
Anatidae	Baer's Pochard	<i>Aythya baeri</i>	VU
Accipitridae	White Backed Vulture	<i>Gyps bengalensis</i>	N T
"	Greater Spotted Eagle	<i>Aquila clanga</i>	VU
"	White Legged Falconet	<i>Microhierex melanoleucos</i>	N T
Phasianidae	White Cheeked Hill Partridge	<i>Arborophila atrogularis</i>	N T
Charadriidae	Grey Headed Lapwing	<i>Venellus cinerius</i>	N T
Columbidae	Purple Wood Pigeon	<i>Columba punicea</i>	VU
Strigidae	Spot Bellied Eagle Owl	<i>Bubo nipalensis</i>	NT ; SCH-I
Alcedinidae	Blyth's King Fisher	<i>Alcedo hercules</i>	VU
"	Brown Winged Stork- billed Kingfisher	<i>Pelargopsis amauroptera</i>	N T
Bucerotidae	Rufous necked Harnbill	<i>Acaros nipalensis</i>	VU; SCH-I
"	Assam Brown Backed Hornbill	<i>Ptilolaemus tickelli</i>	N T; SCH-I
Sturnidae	Spotted Winged Stare	<i>Saroglossa spiloptera</i>	N T
Muscicapidae	Marsh Spotted Babbler	<i>Pellorneum palustre</i>	VU; RRSP

[Abbreviations Used : NT= Species treated as Near Threatened ; VU = Species treated as Threatened or Vulnerable; SCH-I= Species included in Schedule-I of the Wild Life (Protection) Act, 1972 of India ; RRSP = Restricted – Range Species ; DD = Species treated as Data Deficient (Collar et al, 1994 ; Stattersfield et al , 1998.)]

Feeding and Nesting Pattern of Birds of Ardeidae family:

The food habits and feeding propensities of six species of Ardeidae viz. *Egretta garzetta*, *Ardeola grayii*, *Bubulcus ibis*, *Ixobrychus minutus*, *Ixobrychus cinnamomeus* and *Botaurus stellaris*, reveal that wetland ecosystems like marshes and swamps, small streams and canals, inundated paddy fields, and other low-lying floodplain areas constitute important foraging grounds for these species. The conservation of these resource-rich areas could be instrumental in providing adequate supply of food not only to the egrets, herons and bitterns, but also to a host of other wetland species of birds. The six species of Ardeidae that were studied for their food habits and feeding behaviour, revealed a certain degree of both spatial as well as temporal trophic niche partitioning. For instance, *Bubulcus ibis* exploited the paddy field areas more as compared to the other species. They also obtained their food such as ticks from the grazing animals with which they were found to be associated. During the dry season, they were also found to forage in dry paddy fields, small hillocks and high ground habitats. The pond heron, along with cattle egret, utilized the inundated paddy fields the most. However, the herons and egrets exhibited differences in timings of peak feeding. For instance, the pond heron fed most intensively during early morning and afternoon, the cattle egret during forenoon and the little egret during afternoon. The bitterns, on the other hand, foraged deep in marshy areas, with some degree of temporal separation in peak feeding activities. These mechanisms appear to allow them to coexist in similar habitats.

Feeding and Nesting Pattern of Birds of Ardeidae family

Bamboo grooves were found to be a very important habitat for nesting by the two egret species and the pond heron. Nests of *A. grayii* occupied the highest portions of the bamboo culms between 5-5.5 m, those of *B. ibis* intermediate at 4-4.5 m, and the lowest level was occupied by *e. garzetta* at 3.5-4 m. They shared the bamboo grove habitat with the little cormorant, *P. niger*, which occupied the highest level.

A redeeming feature observed during the present study was the protection offered by several communities such as the Bisnupriyas and the Meeteis, the tea garden labourers and Bengali Hindus to the nesting sites of these species, as they are believed to usher in prosperity for the villagers. This greatly influenced nesting site selection by the birds, along with the availability of suitable foraging sites in close proximity to the heronries. Needless to say, continued availability and conservation of bamboo groves in the countryside of Barak Valley appears to be an important factor in the conservation of these species of Ardeids. The Hindustan Paper Corporation (HPC) has recently mooted a proposal to utilize wastelands in rural areas for bamboo plantations that could later be periodically harvested to meet the demands of the paper mill at Panchgram, Hailakandi district. By properly adjusting the harvesting schedule, and earmarking certain groves as protected, this plantation programme could perhaps be profitably utilized for improved nesting site availability for cormorants, egrets and herons.

The analysis of chromium, cadmium and lead in the eggshells of six species of Ardeidae revealed that lead, and to some extent chromium were accumulated in the eggshells, while cadmium levels were very low and much below the adverse effect level. Lead was found to be the most significant metal contaminant among the three metals analyzed. Thus the present study reveals that eggshells of Ardeids, and possibly other bird species as well, could be profitably utilized for the monitoring of this metal in the ambient environment. It may be worthwhile to watch for any decline in lead levels with the marketing of non-leaded petrol in this area in the recent years.

It is evident that while the three districts of Barak Valley harbour a fairly diverse avifauna, the birds inhabiting different habitats are facing a mounting pressure on anthropogenic threats in the form of deforestation, hunting, wetland reclamation and the like.

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