

BIRD TREE INTERRELATIONSHIP IN TERM OF FOOD IN THE SUB-TROPICAL FOREST OF MEGHALAYA NORTH-EAST INDIA

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Abstract

It is widely known that different tree species provide different opportunities in terms of food and microhabitats to different species of birds. Forest provides abundant food resources in the form of leaves, flowers, fruits, arthropods and other organisms for elucidating the structure and functioning of wild bird. We recorded a total of 32 wild birds which rely on 26 tree species for fruit, nectar and bark.

Keywords: Sustainable management, wild, fruit, nectar, bark

Introduction

Over-exploitation of wildlife particularly wild birds in the tropical countries (Peres 2000) in conjunction with intense destruction of forest ecosystem represents one of the main worldwide threats to biodiversity and has directly affected the bird community. The increase of human population causes the conversion of many natural forests into farmland, which in turn reduces habitats for wild flora and fauna and at the same time, most natural forests become more fragmented. The new habitats created as a result of human disturbances are not those to which wild species are naturally adopted. As vegetation density changes, from a particular area, many bird species may increase in abundance if there is an increase in vegetation cover, or decrease in abundance, as vegetation cover

decreases. Wiens (1989) observed that changes in forest cover directly impacted on abundance of individual bird species. This is further substantiated by Block and Brennan (1993) who reported that the vegetation habitat concept is one of the unifying theories in avian biology. It is well known that availability of many bird species are determined by the density and composition of the plant species which comprises a major element of a particular area (Block and Brennan 1993). There are two aspects of vegetation as habitat affect birds: the physical structure of the vegetation and its species composition. It is widely known that different tree species provide different opportunities in terms of food and habitats to different species of birds (Ukmar *et al.*, 2007). For example, placement of nests and sheltering from predators, is one of the reason where different assemblages of

birds will be found in different assemblages of trees. Forest are important for elucidating the structure and functioning of wild birds as they provide abundant food resources in the form of leaves, flowers, fruits, arthropods and other organisms (Reid *et al.*, 2004). In this study we are trying to extend previous analyses of bird community relationships to plant communities and habitat structure within a forest ecosystem from the angle of bird-tree interrelationship in term of food dependent.

Study Area

The study was conducted in southern part of Meghalaya, India covering an area of about 1,350 km². Five surveyed villages were: Nongkwai (25°20' N and 91°54' E), Mawriang (25°12' N and 91°85' E), Umkrem (25°14' N and 91°55' E) Nolikata (25°15' N and 91°13' E) and Ranikor (25°15' N and 91°11' E) (Fig. 1). Cherrapunjee-Mawsynram Plateau, one of the wettest places in the world is located in this

region. The altitude varies from 10 to 1200 m above mean sea level. The mean annual maximum and minimum temperatures are around 23°C and 13°C, respectively. The mean annual rainfall is recorded at 11, 565 mm. The slope of the area is predominantly towards the south and the angle of the slope varies between 10° and 40°. The area has a large numbers of rivers and rivulets, which drain into the plains of Bangladesh. At times, narrow and deep river valleys separate one hill range from the other. The population density is sparse. Horticulture, forestry and fisheries are the principal occupation of the local people. Agriculture is limited to some small valleys where mainly tuber crops are grown. The area is inhabited by *War Khasi* people, a tribal community having long tradition of forest conservation (Tynsong and Tiwari 2010). The natural vegetation of south Meghalaya ranges from tropical evergreen to subtropical evergreen forests (Balakrishnan 1983).

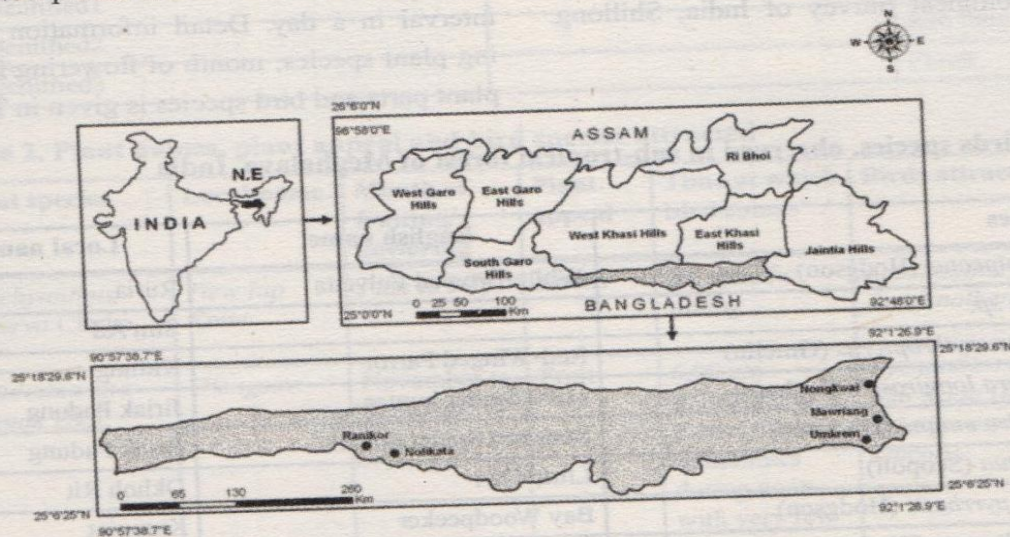


Fig. 1: Map of the study area

Methodology

The study was designed to record the various plant species on which different birds depended for their food. Various participatory research tools such as group discussions, semi-structured interviews, key informants survey and on-site observations were used to acquire insight into bird behaviors (Tynsong *et al.*, 2012). A total of 150 questionnaires were distributed to individual birdwatchers of five study sites; regarding data on bird composition, type of fruits on which they fed and vegetation configuration. The occurrence of birds and their relative abundance at each study site were recorded by hunter mainly during winter in the year 2008. The plant species are identified with the help of Flora of Assam (Kanjilal *et al.*, 1934–1940). The bird species were identified by local people, who recorded in their local language and then verified their zoological name by comparing with the preserved bird specimens available in the Zoological Survey of India, Shillong.

Results

Table 1 presents the total of 32 wild birds recorded during the study period, which reliant on 26 different trees for its fruit, nectar and bark. It is also observed that from November to February there are 10 different tree species which are flowering/fruited. Maximum numbers of bird species have been observed in *Macaranga denticulate* and *Macaranga peltata* in which 10 different species fed upon their fruits. Other important tree species include *Bischofia javanica*, *Leea umbraculifera* and *Ligustrum robustum* 8 different species followed by *Croton caudatus*, *Ehretia acuminata*, *Ficus faveolata*, *Ficus glomerata* and *Litsea leiantha* with about 6 different species. The bird species usually in groups come early in the morning at about 6.00 am to 9.30 am and again from 2.30 pm to 5.00 pm. It is also observed that bird species that feed on tree's nectar generally do not have specific timing; as come almost at every one hour interval in a day. Detail information regarding plant species, month of flowering/fruited, plant parts and bird species is given in Table 2.

Table 1. Birds species, observed in sub-tropical forest of Meghalaya, India

Bird species	English name	Local name
<i>Alcippe vinipectus</i> (Hodgson)	White-Browed Fulvetta	Ruria
<i>Alophoixus sp.</i>	-	Sim Ad
<i>Aprosictus erythropterus</i> (Gmelin)	Red-Winged Parrot	Khlung
<i>Arachnothera longirostra</i> (Latham)	Little Spider hunter	Jiriak Padung
<i>Arachnothera magna</i> (Hodgson)	Streaked Spider hunter	Jiriak Padung
<i>Athene noctua</i> (Scopoli)	Little Owl	Dkhoh Rit
<i>Blythipicus pyrrhotis</i> (Hodgson)	Bay Woodpecker	Kumpiat
<i>Cettia flavolivacea</i> (Blyth)	Aberrant Bush-Warbler	Sim Um

<i>Chalcophaps sp.</i>	-	Lyngtliew
<i>Chloropsis cochinchinensis</i> (Gmelin)	Blue-Winged Leafbird	Sim Jalaeit
<i>Chloropsis hardwickii</i> (Jardine & Selby)	Long-Tailed Minivet	Jala Eit
<i>Dicrurus leucophaeus</i> (Vieillot)	Ashy Drongo	Shyrwat
<i>Dicrurus sp.</i>	Racket-Tailed Drongo	Risei
<i>Lonchura punctulata</i> (Linnaeus)	Scaly-Breasted Munia	Pdit
<i>Macropygia sp.</i>	-	Shiir
<i>Megalaima asiatica</i> (Latham)	Blue-Throated Barbet	Pohrong
<i>Megalaima virens</i> (Boddaert)	Great Barbet	Jyllup
<i>Niltava sundara</i> (Hodgson)	Rufous-Bellied	Thabalong
<i>Otus sunia</i> (Hodgson)	Oriental Scops-Owl	Dkhoh Heh
<i>Pericrocotus ethologus</i> (Bangs & Phillips)	Long-Tailed Minivet	Jaraitsiaw Stem
<i>Pericrocotus sp.</i>	-	Jaraitsiaw Saw
<i>Picus camus</i> (Gmelin)	Grey-Faced Woodpecker	Kynjar
<i>Psarisomus dalhousiae</i> (Jameson)	Long-Tailed Broadbill	Lakadia
<i>Psittacula columboides</i> (Vigors)	Malabar Parakeet	Kyrkhiah
<i>Psittacula himalayana</i> (Lesson)	Slaty-Headed Parakeet	Shynrang
<i>Pycnonotus leucotis</i> (Gould)	White-Eared Bulbul	Pait Puraw
<i>Pycnonotus melanicterus</i> (Gmelin)	Black-Crested Bulbul	Sim Klong
<i>Seicercus sp.</i>	-	Sim Rit
<i>Treron apicauda</i> (Blyth)	Pin-Tailed Green Pigeon	Kuwo
Unidentified1	-	Sim Kdait
Unidentified2	-	Sim Iong
Unidentified3	-	Phreit

Table 2. Plant names, plant appeal and bird species attracted

Plant species	Local name	Month of fruiting/flowering	Plant appeal	Time at which bird comes*	Birds attracted
<i>Aeschyanthus superva</i> Clarke.	Tiew Iap Kmie	June to July	Nectar	No specific timing	<i>Arachnothera longirostra</i> , <i>Arachnothera magna</i> .
<i>Antidesma khasianum</i> Hk.f.	Diengsaw	November to February	Fruit	6.00 am - 9.30 am and 2.30-5.00 pm. Sometimes during noon with very few in number.	<i>Pycnonotus melanicterus</i> , <i>Sim Kdait</i> (K), <i>Megalaima asiatica</i> and <i>Pycnonotus leucotis</i> .

<i>Bischofia javanica</i> Blume.	<i>Lymbuh</i>	May to July	Fruit	6.00 am - 9.30 am and 2.30-5.00 pm. Sometimes during noon with very few in number.	<i>Pycnonotus melanicterus</i> , <i>Sim Kdait</i> (K), <i>Megalaima asiatica</i> , <i>Alophoixus</i> sp., <i>Blythipicus pyrrhotis</i> , <i>Pycnonotus leucotis</i> , <i>Pycnonotus melanicterus</i> and <i>Treron apicauda</i> .
<i>Bombax malabaricum</i> DC.	<i>Diengsong</i>	November to February	Nectar	No specific timing	<i>Megalaima asiatica</i> , <i>Chloropsis hardwickii</i> , <i>Chloropsis cochinchinensis</i> , <i>Arachnothera longirostra</i> and <i>Aprosmictus erythropterus</i> .
<i>Breynia retusa</i> (Dennst) Alst.	<i>Sohthiang</i>	November to February	Fruit	No specific timing	<i>Alcippe vinipectus</i> , <i>Cettia flavolivacea</i> and <i>Niltava sundara</i> .
<i>Bridelia montana</i> Willd.	<i>Diengsyiar</i>	November to February	Fruit	6.00 am - 9.30 am and 2.30-5.00 pm.	<i>Treron apicauda</i> and <i>Alophoixus</i> sp.
<i>Calicarpa vestita</i> Roxb.	<i>Lakhiat</i>	May to September	Fruit & bark	No specific timing	<i>Pycnonotus leucotis</i> , <i>Pycnonotus melanicterus</i> , <i>Sim Kdait</i> (K) and <i>Aprosmictus erythropterus</i> .
<i>Croton caudatus</i> Geisel.	<i>Diengsoh</i>	November to February	Fruit	6.00 am - 9.30 am and 2.30-5.00 pm. Sometimes during noon with very few in number.	<i>Pycnonotus leucotis</i> , <i>Pycnonotus melanicterus</i> , <i>Sim Kdait</i> (K), <i>Dicrurus leucophaeus</i> , <i>Pericrocotus ethologus</i> and <i>Psarisomus dalhousiae</i> .
<i>Duabanga grandiflora</i> (Roxb. Ex DC.) Walp.	<i>Diengbai</i>	May to September	Nectar	No specific timing	<i>Arachnothera longirostra</i> and <i>Arachnothera magna</i> .
<i>Ehretia acuminata</i> Br.	<i>Bsier</i>	September to March	Nectar	No specific timing	<i>Arachnothera longirostra</i> , <i>Arachnothera magna</i> , <i>Chloropsis cochinchinensis</i> , <i>Chloropsis hardwickii</i> and <i>Megalaima asiatica</i> .
<i>Ficus faveolata</i> Wall.	<i>Sohjri</i>	March to December	Fruit	6.00 am - 9.30 am and 2.30-5.00 pm. Sometimes during noon with very few in number.	<i>Megalaima asiatica</i> , <i>Megalaima virens</i> , <i>Pycnonotus leucotis</i> , <i>Pycnonotus melanicterus</i> , <i>Treron apicauda</i> and <i>Sim Iong</i> (K).

<i>Ficus glomerata</i> Roxb.	Sohjrisim	March to December	Fruit	6.00 am - 9.30 am and 2.30-5.00 pm. Sometimes during noon with very few in number.	<i>Megalaima asiatica</i> , <i>Megalaima virens</i> , <i>Pycnonotus leucotis</i> , <i>Pycnonotus melanicterus</i> , <i>Treron apicauda</i> and <i>Sim Iong</i> (K).
<i>Glochidion khasicum</i> Hk.f.	Diengjyrtieng	June to September	Fruit	6.00 am - 9.30 am and 2.30-5.00 pm. Sometimes during noon with very few in number.	<i>Dicrurus leucophaeus</i> , <i>Pericrocotus ethologus</i> , <i>Pericrocotus sp.</i> , <i>Pycnonotus leucotis</i> and <i>Pycnonotus melanicterus</i> .
<i>Leea umbraculifera</i> C.B. Clarke.	Shynriang	May to July	Fruit	6.00 am - 9.30 am and 2.30-5.00 pm. Sometimes during noon with very few in number.	<i>Alophoixus sp.</i> , <i>Blythipicus pyrrhotis</i> , <i>Cettia flavolivacea</i> , <i>Macropygia sp.</i> , <i>Megalaima asiatica</i> , <i>Megalaima virens</i> , <i>Pycnonotus leucotis</i> and <i>Pycnonotus melanicterus</i> .
<i>Ligustrum robustum</i> (Roxb.) Blume.	Sohlyngshieng	November to February	Fruit	6.00 am - 9.30 am and 2.30-5.00 pm. Sometimes during noon with very few in number.	<i>Alophoixus sp.</i> , <i>Macropygia sp.</i> , <i>Megalaima asiatica</i> , <i>Megalaima virens</i> , <i>Picus canus</i> , <i>Pycnonotus leucotis</i> , <i>Pycnonotus melanicterus</i> and <i>Sim Iong</i> (K).
<i>Litsea leiantha</i> (Kurz) Hk.f.	Sohjyllup	November to February	Fruit	6.00 am - 9.30 am and 2.30-5.00 pm. Sometimes during noon with very few in number.	<i>Blythipicus pyrrhotis</i> , <i>Dicrurus leucophaeus</i> , <i>Megalaima asiatica</i> , <i>Megalaima virens</i> , <i>Picus canus</i> , <i>Pycnonotus leucotis</i> and <i>Pycnonotus melanicterus</i> .
<i>Macaranga denticulata</i> Muell. Arg.	Lakhar	March to July	Fruit	6.00 am - 9.30 am and 2.30-5.00 pm. Sometimes during noon with very few in number.	<i>Chalcophaps sp.</i> , <i>Dicrurus leucophaeus</i> , <i>Macropygia sp.</i> , <i>Niltava sundara</i> , <i>Psarisomus dalhousiae</i> , <i>Pycnonotus leucotis</i> , <i>Pycnonotus melanicterus</i> , <i>Seicercus sp.</i> , <i>Sim Kdait</i> (K) and <i>Sim Iong</i> (K).

<i>Macaranga peltata</i> (Roxb.) Muell.Arg.	Lakharong	March to July	Fruit	6.00 am - 9.30 am and 2.30-5.00 pm. Sometimes during noon with very few in number.	<i>Chalcophaps</i> sp., <i>Dicrurus leucophaeus</i> , <i>Macropygia</i> sp., <i>Niltava sundara</i> , <i>Psarisomus dalhousiae</i> , <i>Pycnonotus leucotis</i> , <i>Pycnonotus melanicterus</i> , <i>Seicercus</i> sp., <i>Sim Kdait</i> (K) and <i>Sim Iong</i> (K).
<i>Machilus khasyana</i> Meissn.	Diengjali	May to September	Fruit	6.00 am - 9.30 am and 2.30-5.00 pm. Sometimes during noon with very few in number.	<i>Alophoixus</i> sp., <i>Megalaima asiatica</i> (Latham), <i>Megalaima virens</i> (Boddaert), <i>Pycnonotus leucotis</i> (Gould) and <i>Pycnonotus melanicterus</i> (Gmelin).
<i>Melastoma malabathricum</i> L.	Sohthut	May to November	Fruit	6.00 am - 9.30 am and 2.30-5.00 pm.	<i>Psittacula himalayana</i> and <i>Aprosmictus erythropterus</i> .
<i>Musa paradisiaca</i> L.	Kait Khlaw	Whole year	Nectar	No specific timing	<i>Arachnothera longirostra</i> and <i>Arachnothera magna</i> .
<i>Plogacanthus parviflorus</i> Ham.	Sohthiang	June to September	Nectar	No specific timing	<i>Chloropsis cochinchinensis</i> and <i>Chloropsis hardwickii</i> .
<i>Saprosma ternatum</i> Hk.f.	Pungkhnai	May to July	Fruit	6.00 am - 9.30 am and 2.30-5.00 pm. Sometimes during noon with very few in number.	<i>Macropygia</i> sp., <i>Megalaima asiatica</i> and <i>Megalaima virens</i> .
<i>Travesia palmata</i> (Roxb.) Vis.	Pythrew	November to February	Fruit	6.00 am - 9.30 am and 2.30-5.00 pm. Sometimes during noon with very few in number.	<i>Megalaima virens</i> and <i>Megalaima asiatica</i> .
<i>Trema polytoria</i> Planch.	Lyngta	November to February	Fruit	6.00 am - 9.30 am and 2.30-5.00 pm. Sometimes during noon with very few in number.	<i>Pericrocotus ethologus</i> , <i>Pericrocotus</i> sp. and <i>Treton apicauda</i> .

<i>Villebrunea intig-rifolia</i> Gaud.	Kyrwoh	May to July	Fruit	6.00 am - 9.30 am and 2.30-5.00 pm. Sometimes during noon with very few in number.	<i>Alcippe vinipectus</i> , <i>Cettia flavolivacea</i> , <i>Niltava sundara</i> , <i>Pycnonotus leucotis</i> and <i>Pycnonotus melanicterus</i> .
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*India Standard Time (IST) is 5:30 hours ahead of GMT; K-Khasi (local name)

Discussion and Conclusion

The study revealed that especially during winter season (November to February) many plant species are flowering and fruiting. These plant species play a very important role for the survival of many wild birds that rely on the fruits for food. Tynsong and Tiwari (2011) reported that in the state of Meghalaya, many natural forests have been converted to agroforests which impacted the density of wild fruits. This in turn will have a negative impact on the bird density. This is also confirmed by most hunters who feel that non-sustainable activities in these areas such as slash and burn agriculture and conversion of natural forests into agroforests resulted in loss of habitat for many species including many fruit trees. The informants shared their knowledge on the effects of forest disturbance on avian diversity that is similar to conventional studies conducted by researchers working in other regions of the world. For instance, studies from Gabon to Peru also indicate that disturbed areas and secondary forests harbour fewer species of birds than primary forests in the same locations (Harris and Pimm 2004, Alves 2008). We suggest that further research should be carried out, on bird tree interrelationship to develop a

more sustainable management approaches to various natural resources of Meghalaya, India.

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