

Role of *Ficus* spp. in the avifauna conservation of Jahangirnagar University campus

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Abstract

A study was conducted on *Ficus* species to evaluate its role in avifauna conservation Jahangirnagar University campus from December 2012 to September 2013. *Ficus benghalensis* and *Ficus rumphii* were found to provide food and shelter to the bird community of Jahangirnagar University throughout the year because of their asynchronous fruiting. A total of twenty four *Ficus* trees were selected for the study. Number of fruit providing trees varied in different months ($\bar{x} = 11.6$, range = 4-22, $sd \pm 6.29$). Twenty seven species of birds were recorded from *Ficus* spp. throughout the year. Dependency of bird species on *Ficus* varied in different months ($\bar{x} = 18.1$, $sd \pm 2.42$, range = 16-22). Common Myna was found to visit *Ficus* tree more frequently while Oriental White Eye was less frequent. The height of the studied *Ficus benghalensis* ranged from 17 – 45 feet with the mean $\bar{x} = 26.67 \pm 7.51$ while *Ficus rumphii* ranged from 30-48 feet with the mean $\bar{x} = 39.33 \pm 9.0$.

Key words: Conservation, avifauna, JU campus, *ficus* spp.

INTRODUCTION

Ficus generally known as fig tree is one of the significant keystone species plays an important role in avifauna conservation (Shanahan *et al.*, 2001; Snow, 1981). *Ficus* help in avifauna conservation for its aseasonal fruiting capacity. The diversity of frugivores is correlated with the abundance and diversity of fig species (Kissling *et al.*, 2007). Frugivores, especially birds get support from fig species throughout the year. In Bangladesh 47 *Ficus* species have been recorded (Ahmed *et al.*, 2009) and found as asynchronous fruiting tree providing food to the frugivore birds and other wild animals. Due to the year round fruiting capability of *Ficus*, frugivores depend on them in many ways. The university campus is the suitable habitat of 180 species of birds including 33 species of waders (Mohsanin & Khan, 2009). Several studies on ecology and behaviour of different bird species in Jahangirnagar university campus were conducted (Begum, 2000, 2001, 2002, 2003; Joarder, 1997; Akhtar *et al.*, 2007, 2009). Only a preliminary survey was conducted on *Ficus* species in Jahangirnagar university campus (Azmiri, 2011) but there is no information available on the dependency of avifauna on *Ficus*. Hence, the study was conducted to determine the dependency of avifauna on *Ficus* spp. in Jahangirnagar University (JU) campus.

Jahangirnagar University Campus is situated at 32 km north of Dhaka city (90°47'50" N to 90°48'10" N and 23°4' E to 23°4'15" E). Total area of this campus is 280 ha. The ground of

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the campus is slightly undulating and the soil is deep brown to yellowish red due to high iron content. It is a part of the Bhawal and Madhupur Tract. There are three main seasons: summer (March to May), monsoon (June to October) and winter (November to February). Average annual rainfall is about 2400 mm and mean relative humidity is 78.44%. The Campus has diverse ecological habitats and vegetation types including wetlands (24 ha), woodland, bushes and grasslands. Diverse habitat types of this campus provide feeding and breeding ground for many resident and migratory birds (Joarder, 1997; Begum, 2000; Akhtar *et al.*, 2009).

MATERIALS AND METHODS

The study was conducted between December 2012 and September 2013. Twenty four fig trees were selected for the study. A total of 120 days in ten months were spent to determine the dependency of avifauna on *Ficus*. Binocular, Camera, GPS, measuring tape, field guide, pen & pencil and data sheet were used for data collection. All the selected fig trees were recorded with GPS coordinates and numbered with tag mark. Following parameters were considered for phenological study of *Ficus* (Feeroz *et al.*, 2011).

Girth: It is a measurement of the distance around the trunk of a tree at the breast height.

Tree height: From tree base to the tip of the highest branch of a tree.

Bole height: From tree base to the first live branch on the main stem of a tree.

Tree covered area: It is the area covered by a tree.

Crown volume: Total measurement of crown.

Systematic observation on birds visiting fig trees were quantified using scan sampling (Akhtar *et al.*, 2013; Hasan, 2003). The bird species were identified using Grimmett *et al.* (1999) and the number of individuals of each species visited *Ficus* tree was followed carefully.

RESULTS AND DISCUSSION

***Ficus* abundance:** Two species of *Ficus* viz. *Ficus benghalensis* and *Ficus rumphii* were recorded at Jahangirnagar University. Twenty one *F. benghalensis* and three *F. rumphii* were recorded and regularly followed for the study. Density of fig tree in Jahangirnagar University was 0.08 / ha. They are found scattered all over the campus.

Phenology: Tree height of *F. benghalensis* varied from 17- 45 feet with the mean (\bar{x} =26.7) while *F. rumphii* varied from 30 - 48 feet with the mean (\bar{x} =39.3). Bole height of *F. benghalensis* ranged from 0.5-10 feet (\bar{x} = 5.5) while in *F. rumphii* it ranged from 6-11 feet (\bar{x} =8.7).

Crown volume of *F. benghalensis* varied from 1.82 - 1093.94 m³ (\bar{x} =216.5) while the crown volume of *Ficus rumphii* varied from 254.8-924.6 m³ (\bar{x} = 682.6).

Girth varied from 45.7-584.2 cm (\bar{x} =248.6) in *Ficus benghalensis* and 355.6 - 533.4 cm (\bar{x} = 448.7) in *Ficus rumphii*.

Tree covered area of *Ficus benghalensis* varied from 9.2-383.6 m² (\bar{x} =155.84) while in *Ficus rumphii* it varied from 201.06 - 262.5 m² (\bar{x} =228.04).

Ficus benghalensis and *Fiucus rumphii* both are deciduous. Leafless condition of the trees was found from December to early march except January. Leafless condition of the trees was also found in May and September. Most of the new leaves bearing trees are found during March and April. Mature leaves dominate fig trees throughout the year (Fig. 1).

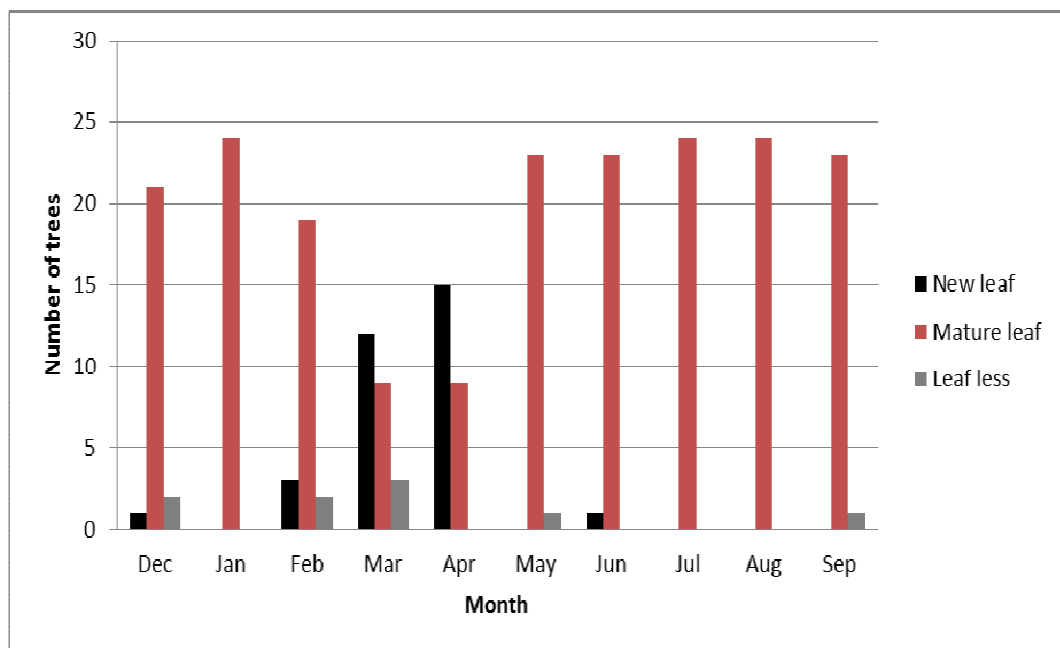


Fig. 1. Number of different types of leaf bearing trees in different months

Mature leaves, new leaves and leafless trees were found in December, February and March. Most of the trees were in new leaves in early April. From late April to September mature leaves were found available in the fig trees. Percentage of different types of leaf bearing trees per month were recorded (Fig. 2).

Fruits were available throughout the year with the highest productivity in summer. During Rainy season (June to September) fig production was relatively low. Most of the young fruit bearing trees were found in April, mature fruits in May and the ripe fruits in March (Fig. 3).

Bird dependency: Birds are largely dependent on fig tree. A total of 27 species of birds in 15 families (Table 1) those used *Ficus* in various purposes were recorded during the study period. Among the bird families 4 species of Sturnidae, 1 species each of

Pycnonotidae, Zosteropidae, Passeridae, Muscicapidae, Halcyonidae, Alcedinidae, Phalacrocoracidae and Strigidae, 2 species of Sylviidae, Columbidae, Cuculidae, Megalaimidae and Picidae each and 5 species of Corvidae family were recorded.

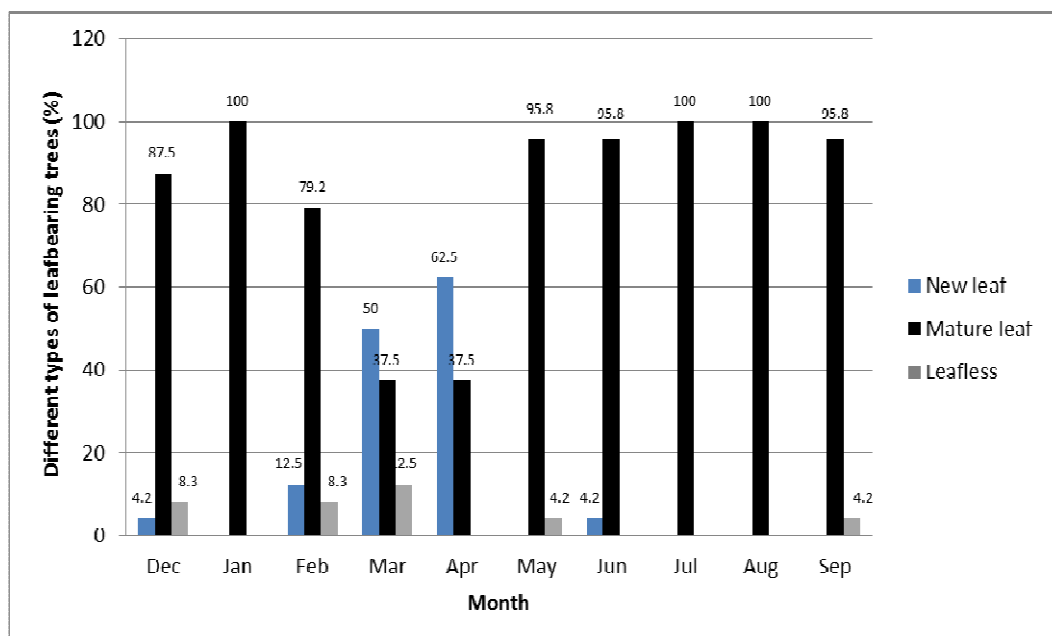


Fig. 2. Percentage of different types of leaf bearing trees per month

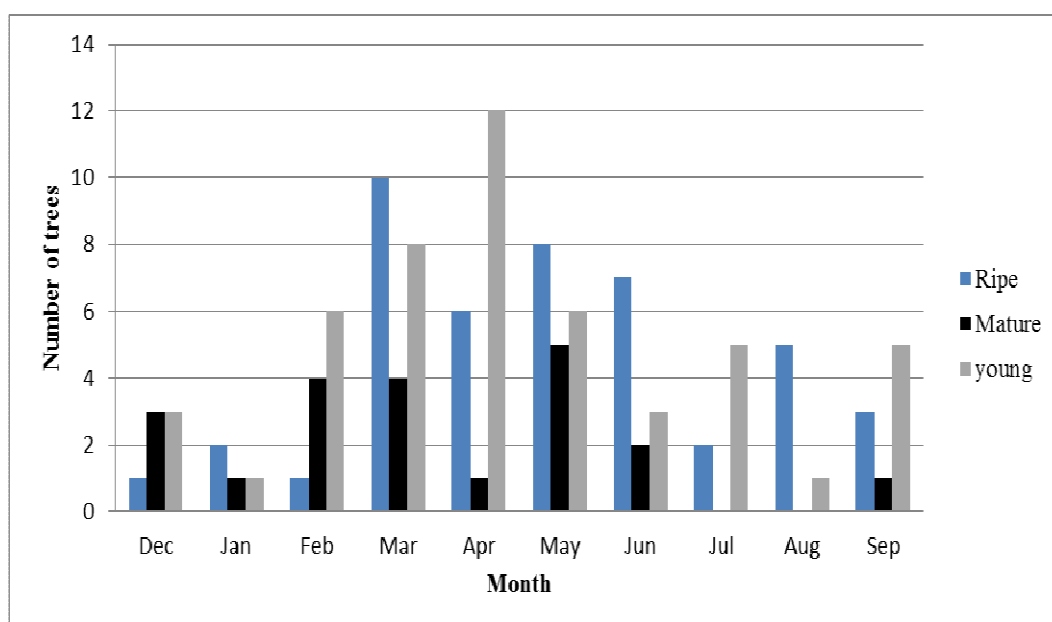


Fig. 3. Fruiting stages of *Ficus* in different months

Table 1. English name and Scientific name of bird species that were found

Sl No.	English name	Scientific name	Purpose of visit / used object
1.	Common Myna	<i>Acridotheres tristis</i>	Feeding / ripe fruit
2.	House Sparrow	<i>Passer domesticus</i>	Feeding / insect
3.	Red Vented Bulbul	<i>Pycnonotus cafer</i>	Feeding / ripe fruit
4.	Coppersmith Barbet	<i>Megalaima haemacephala</i>	Feeding / ripe fruit
5.	Jungle Myna	<i>Acridotheres fuscus</i>	Feeding / ripe fruit
6.	House Crow	<i>Corvus splendens</i>	Feeding / ripe fruit
7.	Jungle Babbler	<i>Turdoides striatus</i>	Feeding / insect
8.	Black Drongo	<i>Dicrurus macrocercus</i>	Feeding / insect
9.	Spotted Dove	<i>Streptopelia chinensis</i>	Resting / substrate
10.	Black Hooded Oriole	<i>Oriolus xanthornus</i>	Feeding / ripe fruit
11.	Chestnut Tailed Starling	<i>Sturnus malabaricus</i>	Feeding / ripe fruit
12.	Asian Pied Starling	<i>Sturnus contra</i>	Feeding / ripe fruit
13.	Oriental Magpie Robin	<i>Copsychus saularis</i>	Feeding / insect
14.	Rufous Treepie	<i>Dendrocitta vagabunda</i>	Feeding / ripe fruit
15.	Little Cormorant	<i>Phalacrocorax niger</i>	Resting / substrate
16.	Asian Koel	<i>Eudynamis scolopacea</i>	Feeding / ripe fruit
17.	Fulvous Breasted Woodpecker	<i>Dendrocopos macei</i>	Feeding / insect
18.	Common Tailorbird	<i>Orthotomus atrogularis</i>	Feeding / insect
19.	Common Kingfisher	<i>Alcedo atthis</i>	Resting / substrate
20.	Yellow Footed Green Pegion	<i>Treron phoenicoptera</i>	Feeding / ripe fruit
21.	Spotted Owlet	<i>Athene brama</i>	Feeding / insect
22.	Common Hawk Cuckoo	<i>Hierococcyx varius</i>	Feeding / insect
23.	Lineated Barbet	<i>Megalaima lineate</i>	Feeding / ripe fruit
24.	Oriental White Eye	<i>Zosterops palpebrosus</i>	Feeding / insect
25.	Large Billed Crow	<i>Corvus macrorhynchos</i>	Feeding / ripe fruit
26.	Black Rumped Flameback	<i>Dinopium benghalense</i>	Feeding / insect
27.	White Throated Kingfisher	<i>Halcyon smyrnensis</i>	Resting / substrate

Birds of the Family Pycnonotidae were mostly visited *Ficus* while the birds of the Family Zosteropidae and Strigidae were less frequent (Fig. 4).

Different kinds of bird species visited *Ficus* for different purposes. Among the species Common Myna was found more frequently than the other species for food and resting purposes. Number of bird species visited *Ficus* per month were recorded (Fig. 5).

Birds were depended on fig tree for their food and resting especially when the trees bore fruits. Common Kingfisher and White Throated Kingfisher were found on fig tree for resting purposes which were located beside the lakes. Number of fruit bearing trees, seasonal variations and weather played an important role on bird species diversity such as Little cormorant was found only in winter season. Some species were very common throughout the year. Asian Koel and Coppersmith Barbet were very common in fruit bearing trees. It was found that fruits were available throughout the year and birds were highly dependent on fig trees for their food and resting purposes.

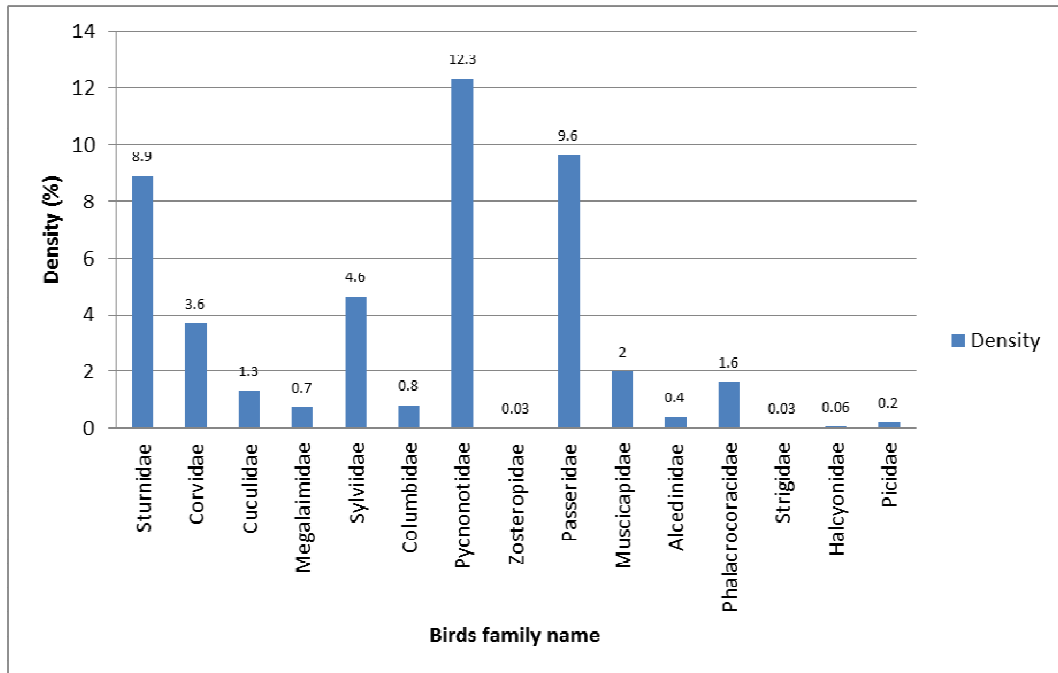


Fig. 4. Percentage of birds in different families visited *Ficus*

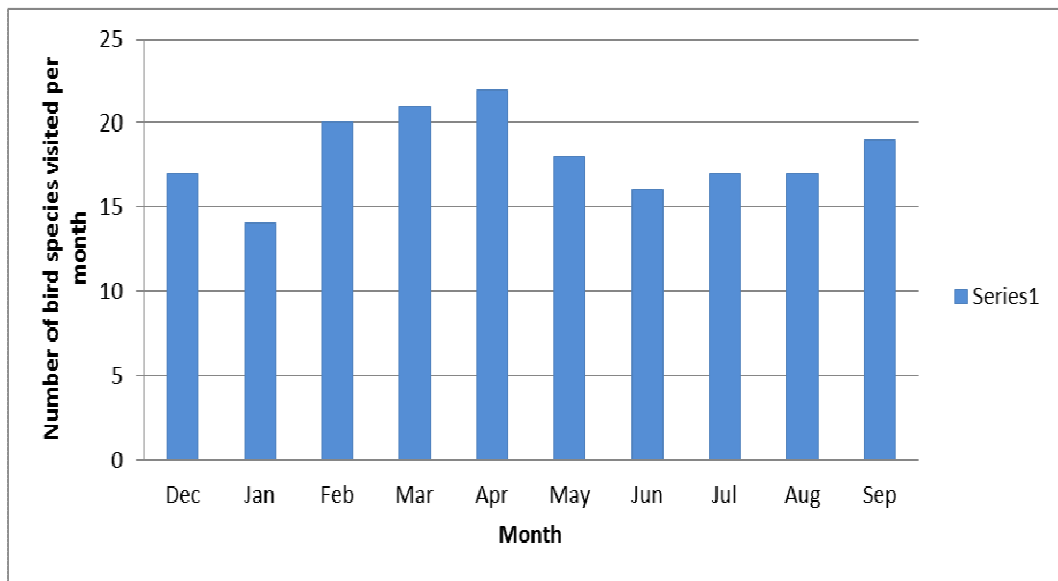


Fig. 5. Number of bird species visited *Ficus* per month

From this study it is evident that fig trees revealed as keystone species provide a great support to the bird communities regardless of species. Birds are dependent on fig trees for their food especially when the trees bear fruits. From Chi- square test it has been found that fruits are growing successively in the campus ($\chi^2 = 25.06$). Density of birds both

frugivores and insectivores were high in fruit bearing trees because of huge amount of fruit and insect production at that time. From the statistical analysis it is seen that the number of birds was significantly correlated with the number of fruit bearing trees ($r = 0.71$). All the three types of fruits (Young, Mature and Ripe) were found from winter to summer season (December to June). The number of fruit bearing tree was less during the rainy season. Number of bird species and their density varied in different months. Out of twenty seven, twenty four species of birds were recorded in April when the fruiting condition of the fig trees was very good.

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