



## Assemblage of birds in forest nurseries

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### Abstract

Forest systems in a range of periods of alteration and change endow with commodities and service that assistance human race. Bird, being a part of ecosystem components, contributes ecosystem services. The present paper highlights the assembly of birds in forest nurseries of Jhansi district, Uttar Pradesh. The three selected forest nurseries (Bhasneh, Sukwa and Bangua) were explored during the summers, to know the bird species as well as their potential to serve as bird watching sites. Forest nurseries contribute an incredibly significant role in the development of plantations of forest trees. The study also aimed to determine the importance of Forest nurseries for amateur bird watchers and to suggest methods to conserve birds in these habitats. The study was undertaken during the summers (May and June) in 2016 and 2017. Total 74 different species of birds were recorded. The birds that were observed during this study were made up of mainly resident (species). Continuity and variability of the habitat seems to be the prime factor deciding the bird population in any area. The regular care of the nurseries suggest that with standard monitoring of these areas, the protection and conservation of the bird community will be possible. Forest nurseries have the sympathetic environment for bird species. Workshops on ornithology for school and college students can be organized in Forest nurseries. The participants can acquire a prospect to observe various bird species at a single place. After conducting bird studies by the Ornithologists, Bird boards can be inserted in these Nurseries so that maximum visitors discover about the birds.

**Keywords:** forest nurseries, habitat, birds

### Introduction

In a layman's language, a nursery is a place where plants are proliferated and grown to a standard size that can be planted to further places as required. Forest nurseries play a very important role in the development of plantations of forest trees. All nurseries primarily aim to produce sufficient quantities of high quality seedlings to satisfy the needs of users. With the outsized demand for quality forest plants and the scanty availability of high-quality seed, it has become crucial to manage the forest nurseries professionally to produce the desirable quality of plants. India has only 23.81% forest cover, which is far below the recommended 33% of our National Forest Policy, 1988 (Krishnan *et al.*, 2014) <sup>[1]</sup>. Forest systems in a range of periods of alteration and change endow with commodities and service that assistance human race. Bird, being a part of ecosystem components, contributes ecosystem services. Birds are the most observable and regularly encountered fauna found in manmade landscapes. There are opportunities to observe birds in daily routine. Bird watching is a direct opportunity to connect with the natural world of these bright, melodious, active and joyful creatures. Birds play a myriad of imperative functions in an ecological unit, supporting with pollination, seed dispersal, as bio-control for insects and as scavengers. Birds are valuable to the health of ecosystems, whether urban, semi-urban or rural. All birds require food and water, roost and a safe nesting site, which may be a bush, a tree hole, dense thicket, tall tree or hollow. Most of these requirements can be met by the availability of

suitable vegetation. Forest Nurseries provide one such suitable habitat to the aves. Because the selected district has fragmented habitats, one nursery will not be large enough to provide all of the requirements that a bird will need. However, each nursery is vital in forming the web of habitat that birds use.

### Study Area

The study was carried out in three Forest Nurseries (Bhasneh, Sukhwa and Bangua) of Jhansi district of Southern Uttar Pradesh in India. Jhansi is located at 25. 07'-25. 57' N and 78.10'- 79. 25' E, covering an area of 5,028 km<sup>2</sup>. The area is chiefly drained by the river Betwa and minor rivers like Dhasan and Pahuj. The Betwa and Pahuj rivers are tributaries of Yamuna and Dhasan is tributary of Betwa. The major tributaries of Dhasan are the Lakheri, Sukhnai, Kurera etc which are mainly ephemeral. All three main rivers are perennial (Prasad 2008) <sup>[11]</sup>. The average annual rainfall is 850 mm. The climate is sub-humid and it is characterized by a hot dry summer and cold winter. About 91% of rainfall takes place from June to September. January is the coldest month of the year when the mean daily maximum temperature is 24.10°C and the mean daily minimum temperature is 9.20°C, May is the hottest month with mean daily maximum temperature 42.60°C and mean daily minimum temperature 28.80°C. The mean monthly maximum temperature is 32.60°C while mean minimum temperature is 19.20°C.

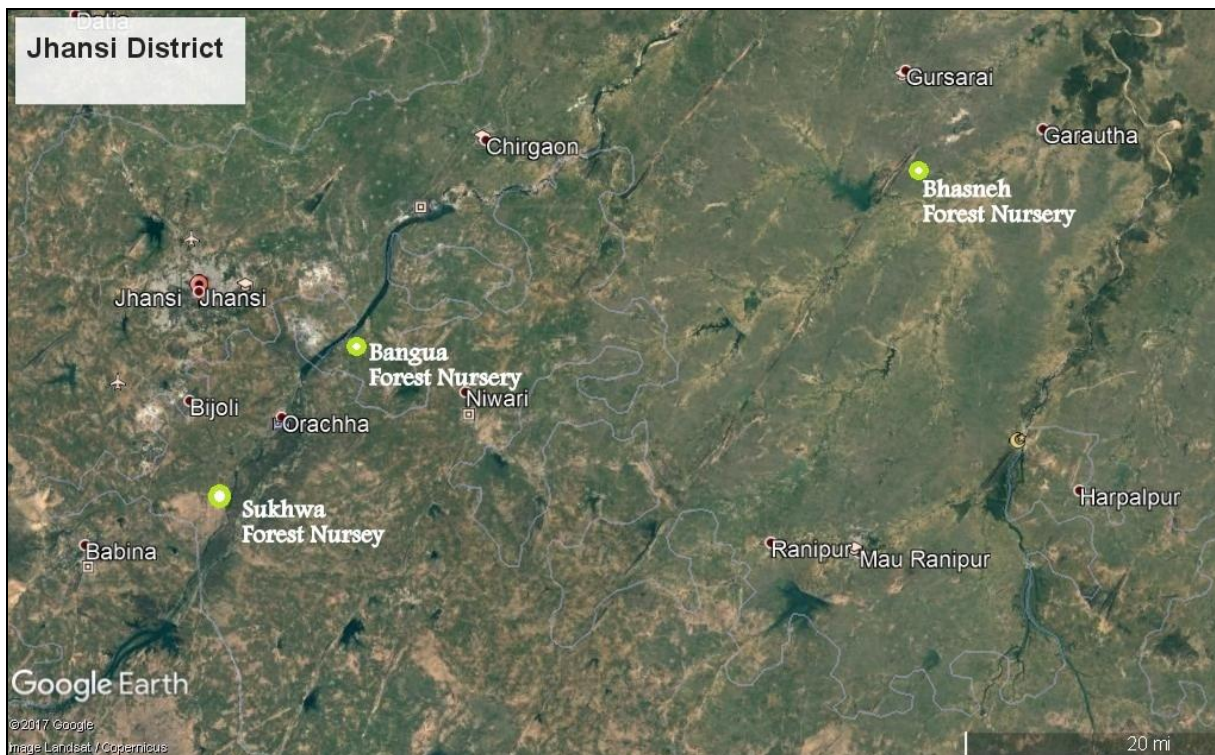


Fig 1: Map of study area (Source: Google Earth)

**Material and methods**

The avifauna of three forest nurseries (Bhasneh, Sukhwa and Bangua) of Jhansi district was studied during the summers (May and June) in 2016 and 2017. Survey work were carried out for 4 hrs in the morning and 2 hrs in the evening (morning: 6:00 am to 10:00 am, evening: 4:30 pm to 6:30 pm). Observations were made along line transects with the aid of 10x50 binoculars and Canon 7D DSLR Camera. Point Count method was also followed. Birds sighted during the study period were categorized according to their presence (month-wise) status as residents (R) or migrants (M). The abundance code and the IUCN Status of the birds recorded were also noted. Identification of birds was done with the help of key reference books (Grewal *et al.*, 2013, Ali S. 2002 and Grimmett *et al.*, 2007) [8, 9, 10].

**Results and discussion**

The three selected forest nurseries (Bhasneh, Sukhwa and Bangua) were explored to know the bird species as well as their potential to serve as bird watching sites. Forest nurseries contribute an incredibly significant role in the development of plantations of forest trees. The study also aimed to determine the importance of Forest nurseries for amateur bird watchers and to suggest methods to conserve birds in these habitats. Total 74 birds belonging to 34 families were recorded (Table 1). The birds that were observed during this study were made up of mainly resident (species). The study was undertaken particularly during the summers, when the birds find difficult to find water and relief from the scorching heat. Reliable and adequate source of water supply is available for all forest nurseries for the maintenance of the saplings.

Table 1: List of bird species in Forest Nurseries

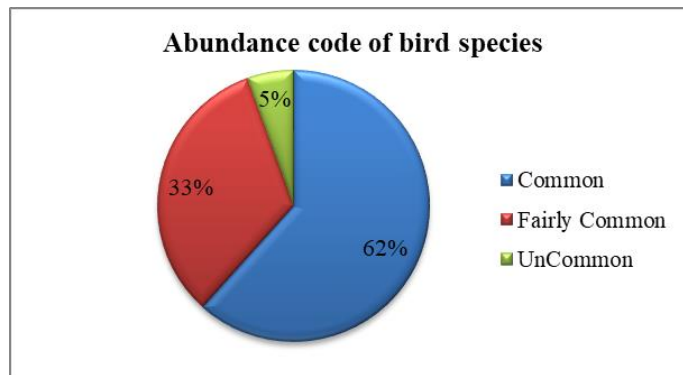
S. No	Common Name	Zoological Name/ Local name	Family	R/M	AC	IUCN Status	Bhasneh	Bangua	Sukhwa
1.	Grey Francolin	<i>Francolinus pondicerianus</i> / Safed teetar	Phasianidae (3)	R	C	LC	+	+	+
2.	Jungle Bush Quail	<i>Perdica asiatica</i>		R	UC	LC	+	+	+
3.	Peacock	<i>Pavo cristatus</i> / Mor		R	C	LC	+	+	+
4.	Barred buttonquail	<i>Turnix suscitator</i>	Turnicidae (1)	R	FC	LC	-	-	+
5.	Black-rumped Flameback	<i>Dinopium benghalense</i> /kathfudwa	Picidae (3)	R	C	LC	+	+	+
6.	Yellow-crowned woodpecker	<i>Dendrocopos mahattensis</i> / Katphora		R	C	NA	+	+	+
7.	Brown-capped Pygmy woodpecker	<i>Dendrocopos nanus</i>		R	FC	LC	+	+	-
8.	Coppersmith Barbet	<i>Megalaima haemacephala</i> / Chota basanta	Megalaimidae(2)	R	C	LC	+	+	+
9.	Brown-headed Barbet	<i>Megalaima zeylanica</i> / Bada basanta		R	FC	NA	+	+	+
10.	Indian Grey Hornbill	<i>Ocyeros birostris</i> / Dhanesh	Bucerotidae(1)	R	FC	LC	+	+	-
11.	Common Hoopoe	<i>Upupa epops</i> / Hudhud	Upupidae (1)	R	C	LC	+	+	+
12.	Indian Roller	<i>Coracias benghalensis</i> / Neelkanth	Coraciidae (1)	R	C	LC	+	+	+
13.	Common Kingfisher	<i>Alcedo atthis</i> / Chhota kilkila	Alcedinidae(1)	R	FC	LC	+	+	+
14.	White-throated kingfisher	<i>Halcyon smyrnensis</i> / Kilkila	Halcyonidae (1)	R	C	LC	+	+	+

15.	Stork billed Kingfisher	<i>Ceryle rudis</i> / Kilkila	Cerylidae (1)	R	C	LC	+	-	-
16.	Green bee-eater	<i>Merops orientalis</i> / Harrial	Meropidae (1)	R	C	NA	+	+	+
17.	Brain-fever bird/ Common Hawk Cuckoo	<i>Hierococcyx varius</i> / Papiya	Cuculidae (3)	R	FC	LC	+	+	+
18.	Asian koel	<i>Eudynamys scolopacea</i> /Koel		R	C	LC	+	+	+
19.	Pied Crested Cuckoo	<i>Clamator jacobinus</i> / Kala Papiya		R	FC	LC	+	-	-
20.	Greater Coucal	<i>Centropus sinensis</i> / Mahoka	Centropodidae (1)	R	C	LC	+	+	+
21.	Rose-ringed Parakeet	<i>Psittacula krameri</i> /Tota	Psittacidae (2)	R	C	LC	+	+	+
22.	Plum-headed Parakeet	<i>Psittacula cyanocephala</i> / Tuiya Tota		R	FC	LC	+	+	+
23.	House Swift	<i>Apus affinis</i> / Ababeel	Apodidae (1)	R	C	LC	+	+	+
24.	Spotted Owlet	<i>Athene brama</i> / Chughad	Strigidae (3)	R	C	LC	+	+	+
24.	Jungle Owlet	<i>Glaucidium radiatum</i> / Jangli choghad		R	FC	LC	+	+	+
25.	Collared Scops Owl	<i>Otus bakkamoena</i>		R	FC	LC	+	-	+
26.	Laughing dove	<i>Streptopelia senegalensis</i> / Chhota fakta	Columbidae (5)	R	C	LC	+	+	+
27.	Spotted dove	<i>Streptopelia chinensis</i> / Chitroka fakhta		R	C	LC	+	+	+
28.	Red collared dove	<i>Streptopelia Tranquebarica</i> / Lali pohu		R	FC	LC	+	+	+
29.	Rock Pigeon	<i>Columba livia</i> / Kabutar		R	C	LC	+	+	+
30.	Yellow footed green pigeon	<i>Treron phoenicoptera</i> / Harial		R	C	LC	+	-	-
31.	White-breasted waterhen	<i>Amaurornis phoenicurus</i> / Dauk, Dawak	Rallidae (1)	R	C	LC	+	+	+
32.	Red-wattled lapwing	<i>Vanellus indicus</i> / Titeeri	Charadriidae (1)	R	C	LC	+	+	+
33.	Besra	<i>Elanus caeruleus</i> / Kapassi	Accipitridae (4)	R	FC	LC	+	+	-
34.	Long-billed Vulture	<i>Gyps indicus</i> / Giddh		R	UC	CE	+	-	+
35.	Egyptian vulture	<i>Neophron percnopterus</i> / Gobar Giddh		R	UC	E	+	-	+
36.	Shikra	<i>Accipiter badius</i> / Chipka		R	C	LC	+	+	+
37.	Little Cormorant	<i>Phalacrocorax Niger</i> / Pan-kowwa	Phalacrocoracidae (1)	R	C	LC	+	+	+
38.	Cattle egret	<i>Bubulcus ibis</i> / Surkhia bagla	Ardeidae (2)	R	C	LC	+	+	+
39.	Indian pond heron	<i>Ardeola grayii</i> /Andha Bagla		R	C	LC	+	+	+
40.	Woolly-necked stork	<i>Ciconia episcopus</i> / Laglag	Ciconiidae (1)	R	FC	V	+	-	+
41.	Bay –backed shrike	<i>Lanius vittatus</i> / Pachanak	Laniidae (2)	R	FC	LC	+	+	+
42.	Rufous –backed Shrike	<i>Lanius schach</i> / Kajala latora		R	C	LC	+	+	+
43.	Rufous Treepie	<i>Dendrocitta vagabunda</i> / Mahalat	Corvidae (9)	R	C	LC	+	+	+
44..	Eurasian Golden Oriole	<i>Oriolus oriolus</i> / Peelak		R	C	LC	+	+	+
45.	Black drongo	<i>Dicurus macrocerus</i> / Bhujanga		R	C	LC	+	+	+
46.	Common Iora	<i>Aegithina tiphia</i> / Shaubeegi		R	FC	LC	+	+	+
47.	Large Cuckoo shrike	<i>Coracina macei</i> / Kasya		R	UC	LC	+	+	+
48.	Small minivet	<i>Pericrocotus cinnamomeus</i> / Saheli		R	FC	LC	+	+	+
49.	Asian Paradise Flycatcher	<i>Terpsiphone paradisi</i> / Dudhraj		R	FC	LC	+	+	-
50.	White-browed Fantail	<i>Rhipidura aureola</i>		R	FC	LC	+	+	+
51.	Common Woodshrike	<i>Tephrodornis pondicerianus</i>		R	FC	LC	+	+	+
52.	Oriental Magpie Robin	<i>Copsychus saularis</i> /Dhaiyar	Musciapidae (3)	R	C	LC	+	+	+
53.	Indian Robin	<i>Saxicoloides fulicata</i> / kalchuri		R	C	LC	+	+	+
54.	Tickell’s Blue Flycatcher	<i>Cyornis tickelliae</i> / Adharanga		R	FC	LC	-	+	-
55.	Brahminy Starling	<i>Sturnus pagodarum</i> /Brahmini myna	Sturnidae (4)	R	C	LC	+	+	+
56.	Asian pied starling	<i>Sturnus contra</i> / Ablak myna		R	C	LC	+	+	+
57.	Common Mynah	<i>Acridotheres tristis</i> / Desi myna		R	C	LC	+	+	+
58.	Bank Mynah	<i>Acridotheres ginginianus</i> / Ganga myna		R	C	LC	+	+	+
59.	Great Tit	<i>Parus major</i> / Ramgangra	Paridae (1)	R	FC	LC	+	+	+
60.	Red-vented Bulbul	<i>Pycnonotus cafer</i> / Bulbul	Pycnonotidae (1)	R	C	LC	+	+	+
61.	Ashy Prinia	<i>Prinia socialis</i> / Kali phutki	Cisticolidae (2)	R	C	LC	+	+	+
62.	Plain Prinia	<i>Prinia inornata</i> / Phutki		R	C	LC	+	+	+
63.	Oriental White-eye	<i>Zosterops palpebrosus</i> /Baboona	Zosteropidae (1)	R	C	LC	+	+	+
64.	Common Tailorbird	<i>Orthotomus sutorius</i> /Darzee	Sylviidae (4)	R	C	LC	+	+	+
65.	Common Babbler	<i>Turdoides caudatus</i> Genga/dumri		R	FC	LC	+	+	+
66.	Yellow eyed babbler	<i>Chrysomma sinense</i> /Gulab-chasm		R	C	LC	+	+	+
67.	Jungle Babbler	<i>Turdoides striatus</i> /Sat bhai		R	C	LC	+	+	+
68.	Purple Sunbird	<i>Nectarinia asiatica</i> /Phul soohgni	Nectariniidae (1)	R	C	LC	+	+	+
69.	White-browed Wagtail	<i>Motacilla maderaspatensis</i> /Khanjan	Passeridae (5)	M	FC	NA	+	+	+
70.	Chestnut-shouldered Petronia	<i>Petronia xanthocollis</i> /Jangli chiria		R	FC	LC	+	+	+
71.	Baya Weaver	<i>Ploceus philippinus</i> / Baya/son chiri		R	C	LC	+	+	+
72.	Indian Silver bill	<i>Lonchura malabarica</i> / Pidida		R	C	LC	+	+	+
73.	Spotted Munia	<i>Lonchura punctulata</i> / Seenabaz		R	FC	LC	+	+	+
Total bird species in each nursery							72	66	66

+ Present; - Absent; R-Residential; M-Migratory; AC-Abundance Code; C-Common; FC-Fairly Common; UC-Uncommon; NA-Not Assessed; LC-Least Concern; V-Vulnerable; E-Endangered; CE-Critically Endangered

The family Corvidae had 9 bird species followed by Passeridae and Columbidae with 5 species each. The figure 1 for Abundance code shows that 62% of the bird species were

common in the nurseries while 33% were fairly common (Fig.1A-F) and 5% were uncommon (Fig.2A-B).



**Fig 2:** Percentage of bird species according to the Abundance code



**Fig 3: A-F** fairly common birds in the nurseries



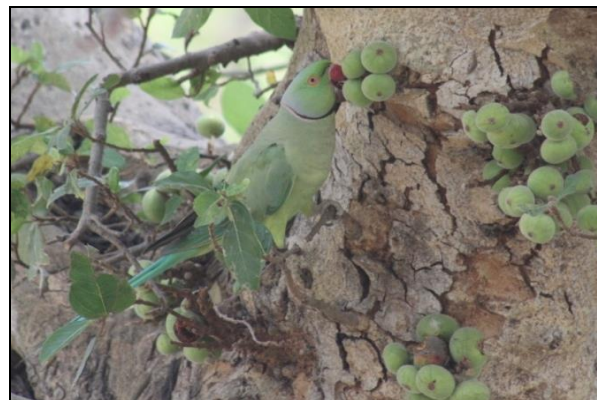
a) Egyptian vulture



b) Long-billed vulture

**Fig 4:** A & B: Uncommon birds in the nurseries

The major tasks in nurseries include soil transportation and pot filling. The labor available for the construction and maintenance of the nurseries occasionally perform these tasks. This helps the birds to feed on the soil dwelling insects through these activities by the labor. Thus they act as bio-indicators in ecosystems. Insectivorous birds help to diminish a large numbers of pest species in the nurseries. Since birds are usually natural predators of a diversity of insect pests and assist in pest management of a number of harmful insects. They play a constructive role in agriculture by putting a control on insects and rodent pests (Subramanya and Radhamani, 1993; Neelanarayanan, 2007) <sup>[5, 6]</sup>. Birds through their movements unite habitats in a site, relating the transmission of energy amongst ecosystems, and contribute to bionetwork functions and buoyancy through their foraging activities and dispersal of seeds. The ecosystems are largely affected by the Bird-plant interaction of pollination and seed dispersers (Lunberg and Moberg, 2003) <sup>[4]</sup>. Birds disperse seeds through fruit consumptions. Frugivorous birds (Such as Hornbill, barbets, parrots, Oriental-white eye, pigeons) that consume fruits as their diet, were come across in the forest nurseries (Fig.3A & B). Birds disperse seeds of many woody plant species with direct value to humans for timbers, medicine, food and other uses (Daniel, 2011) <sup>[7]</sup>.



**Fig 5A:** Parrot feeding on figs of Indian fig tree (*Ficus glomerata*)



**Fig 5B:** Barbet feeding on figs of banyan tree (*Ficus benghalensis*)

Some bird species includes predator and raptors that are beneficial for agriculture. Raptors (e.g. kites, family: Accipitridae) and predators (e.g. owls, family: Strigidae) consume rats (rodents), which are considered as pest of crops and tree crops. In general, Forest nurseries provide two habitats flanking each other and thus enhance species diversity at their shared edge. These are the Forest habitat (outside the nurseries) and the agricultural habitat (Inside the nurseries). Edges specifically benefit bird species with different habitat requirements, including species that require specific habitat types, as well as generalists that occur on both sides of the edge (Harris, 1988; Matlack and Litvaitis, 1999) <sup>[2, 3]</sup>. The observations during the study divulge the importance of forest nurseries in bird conservation. They provide safe habitat for the bird species with no hunting and poaching. They can breed, forage and roost in the suitable habitats with no disturbance. There is high food availability for all bird species (insectivorous, frugivorous, and omnivorous). There is no shortage of water even during the summers. There is a wide scope for studying the response of birds for artificial bird nests such as for owls and hornbills. It provides opportunities for involving the Forest firstline officials and the local people in bird conservation initiatives. Various bird studies can be undertaken in Forest nurseries that can further assist in the conservation plans.

### **Model of Live Bird Library at Forest nurseries: An Awareness Drive**

Similar to one of the recent important concepts to establish a live plant library (Krishnan *et al.*, 2014) <sup>[1]</sup>, a live bird library can also be established to emphasize the importance, value, fascination and diversity of birds among the public. The bird facts such as its local/common name, activities, habitation, ecological importance, threats, as well as conservational aspects may also be provided to the visitors through the live library. By itself, bird library can be defined as a comprehensive compilation of avifauna through bird boards to endow knowledge about birds to beginners, professionals, and local people in a significant way. The information displayed in the bird library should be organised in a way to encourage the visitors towards conservation of nature by providing awareness and education services. Space for this kind of live bird library establishment may be allocated near the entry gate of nursery which will attract attention of visitors and potential for proper dissemination of information. The bird library place may also be used for the demonstration of artificial nest boxes for important birds that are nesting in the nursery. The live Bird Library can be visited by schools as study tours and by bird watchers as good bird sighting spots.

### **Conclusion**

There are few studies on the potential relation of birds in the Forest nurseries. It's a global challenge to meet the requirements of growing human inhabitants while protecting biodiversity and natural ecosystems. Therefore conservation programme for birds should reflect on every remaining space of natural forests that may support their diversity. Sustaining such spaces for the sake of conservation and organization will further recover the fragile balance of environment. Forest nurseries have the sympathetic environment for bird species. The location of nursery near a village increase awareness among common people and their participation in bird conservation programmes. There can be proviso to promote bird species analogous to plantation of fruit and flowering trees. A live bird library can also be established to emphasize the importance, value, fascination and diversity of birds among the public Nest boxes of various types can be installed for diverse bird species. Workshops on ornithology for school and college students can be organized in Forest nurseries. The participants can acquire a prospect to observe various bird species at a single place. After conducting bird studies by the Ornithologists, Bird boards can be inserted in these Nurseries so that maximum visitors discover about the birds.

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