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RESEARCH ARTICLE

NESTING PATTERN AND NEST PREDATORS OF SOME RESIDENT BIRDS OF ECOPARK, AN URBAN PARK IN KOLKATA, WEST BENGAL, INDIA

L. Chatterjee[1], T. Samanta[2], S. Sinha[3] and S. Besra[3] and A.B. Roy*[4]

1. Research Associate, Nature Mates-Nature Club, 6/7, Bijoygarh, Kolkata-700032.
2. Field Biologist, Nature Mates-Nature Club, 6/7, Bijoygarh, Kolkata-700032.
3. Research Intern, Nature Mates-Nature Club, 6/7, Bijoygarh, Kolkata-700032.
4. Secretary, Nature Mates-Nature Club, 6/7, Bijoygarh, Kolkata-700032.

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Abstract

This Study was conducted from May 2020 to April 2022 at an urban park name Ecopark, located in Kolkata. A total of 116 nests of 38 birds were observed in this study area. Out of these 116 bird nests, 82 bird nests were found to have well developed young, while the other 34 were discovered to be unsuccess due to various reasons. Common Myna's (11) nests were found most. 8 types of nesting structures were observed during this survey namely Deep cup nest, Shallow cup nest, Hole nest, Platform nest, Dome shaped nest, Flat shaped nest, Hanging nest and pear-shaped nest. Hole nest (11) was the most visible nest in this study. Birds were seen nesting lowest on the surface of the water 0 ft to highest over 40 ft height. Storms, heavy rains, human activities, birds of prey, monitor lizards, snakes, rats, ants were indicated as the nests, chicks and bird's egg damager.

Introduction:-

Among all creatures, birds are the most skilled nest builders. They construct their nests primarily to shield their eggs and young from predators and bad weather during the mating season, when they are most vulnerable. They use a wider variety of materials and forms to construct their nests, and they place them in more diverse locations than other animals (Welty & Baptista 1988). It was once believed that finished nest designs were chosen by natural selection and the need to reduce the risk of predation. The role of sexual selection on nest design is, however, is becoming more and more clear. This is a significant development because it implies a clear trade-off between the competing demands of natural and sexual selection (Mainwaring et al. 2014). Bird populations are frequently constrained by the lack of adequate nesting locations, therefore nest boxes are frequently offered with the express purpose of enhancing the availability of nesting places. However, birds also commonly build their nests on man-made structures including houses, barns, factories, bridges, metal pipes in fences, and pylons that are not intended for use by breeding birds. These man-made buildings are frequently utilised as nesting locations by a variety of birds, and their main benefit is that they frequently offer nesting sites in places where they are scarce (Mainwaring 2014).

Corresponding Author:- Arjan Basu Roy
Address:- Secretary, Nature Mates-Nature Club, 6/7, Bijoygarh, Kolkata-700032.

Materials and Methods:-

Study area:

This experimental data collection process was conducted from May 2020 to April 2022 at an urban park name Ecopark (fig. 1), located in Kolkata, India's one of the most populous city. Its area is 480 acres. In which wetlands, grasslands, water bodies are present with large trees and small shrubs, which are ideal as nesting places for wild birds. Beside that different building of the park, poster holders, sheds, lamp posts and manmade nesting boxes are also used by birds as nesting places. So this park was chosen for this survey.

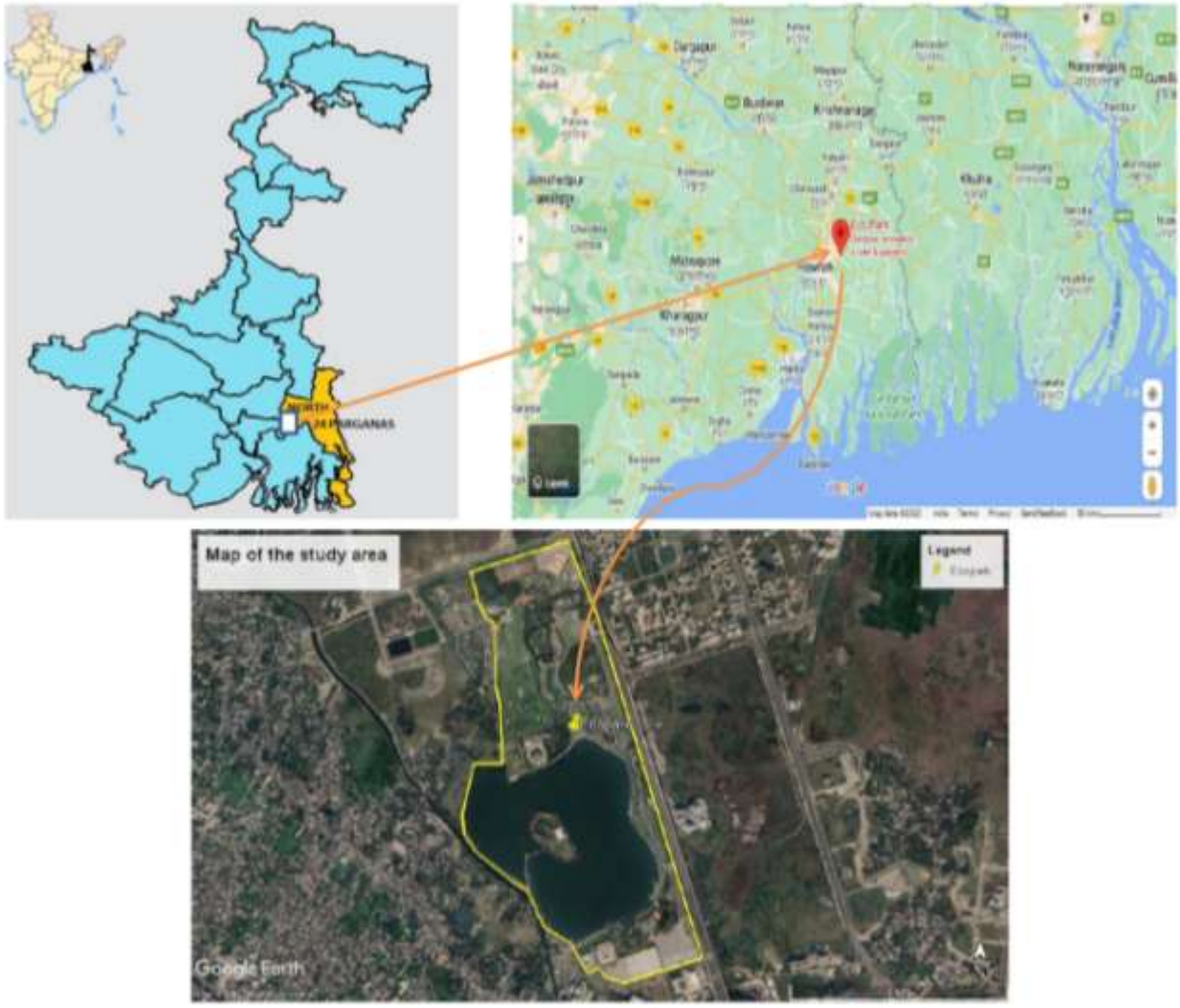

Fig 1:- Map of the Study Area.

Nest Survey:

Nest of the birds was followed by continuous direct observation until the chicks were grown. Then, when the chicks had grown up and left the nest, the nests were bring down and marked with nesting materials. Nests that could not be bringing down were observed with binoculars. Eggs and hatchlings were photographed carefully from far away from the nest with a high zoom camera without any disturbance and harmful activity. Birds were identified by using "Pocket guide to the birds of the Indian subcontinent" (Grimment et al. 1999).

Result and Discussion:-

A total of 116 nests of 38 birds were observed in this study area during observation. Out of which most nests were found of Common Myna (11) followed by House Crow (9), Rock Pigeon and Scaly-breasted Munia each 8. Areas surrounded by aquatic plants, trees, tree's and house's holes, lamp posts, nesting boxes were found to be nesting

sites for recorded birds. 8 types of nesting structures were observed during this survey. Hole nest (11) was the most visible followed by platform nest (8), shallow cup nest (7), deep cup nest (5), dome shaped nest, flat shaped nest and hanging nest each 2. Only one pear-shaped nest was found during this study. Aquatic plants, hard branches of plants, soft sticks of trees, feathers, plastics, ropes, fibres, leaves, snake skin, fish scales, dry grass, spider silk, pieces of cloth have been found to be used as nesting materials by birds. Some birds were seen not to using any nesting materials. In case of those who make nests by weaving, it has been seen that it takes more time to build the nest by gathering the nest materials from various directions, while those who just lay eggs in the hole without using any nesting materials, it has been seen that it takes less time to make the nest. Among the birds observed, some birds were seen nesting as high as 40 ft, while water birds were seen nesting surface on the water. Out of these 116 bird nests, 82 bird nests were found to grow up properly and the remaining 34 nests were found to be failing due to various reasons. Adverse weather conditions such as storms, heavy rains and human activities have been found to cause harm to bird nests. In addition to this, due to the attacks of various predatory birds, monitor lizards, snakes, rats, ants the nests, chicks and eggs of birds have been found damaged.

Nest Site Characteristics:

Birds have been seen nesting wetland, surface of water, tree canopy, tree branch, tree hole, building hole, lamp post, construction shade, nesting box in all these places. Common Myna has been found to build nests in most places like tree holes, house holes, lamp posts, nesting boxes. Water birds such as Moorhen, Waterhen, Little Grebe and Jacana were seen nesting surface on the water. Three types of Bitterns were seen nesting on the marsh land in the cattail and reed grass. Lesser Whistling-duck was found nesting both surfaces on the water and in the reed grass just besides of the water. Black-crowned Night Herons were seen building nest on a large tree at the edge of the marshland. Black Kite, Shikra, House Crow has been seen building nests on large trees canopy. Black Kite also found to use silent, undisturbed place of house corner for their nesting place. Common Myna, House Sparrow, Spotted Owlet, Spotted Dove found to build their nest in the house hole. Black Drongo, Black-hooded Oriole, Spotted Dove,Yellow-footed Green-Pigeon, Rufous Treepie, Red-vented Bulbul, Jungle Babbler and Asian Pied Starling were found building their nest on the branch of the trees. Common Tailorbird was found chosen plant leaves for their nesting. Plain Prinia and purple sunbird were found to use small plant bushes to build up their nest. Baya Weaver and Scaly-breasted Munia selected plum tree leaves for their nesting site. Rose-ringed Parakeet, Barbets, Chestnut-tailed Starling, Jungle Myna, Black-rumped Flameback were found to use trees hole for their nesting place. The artificial nesting boxes were used by Common Myna, Oriental Magpie-Robin and Black Rumped Flameback for their nesting. Black-hooded Orioles, Red-vented Bulbuls have been seen nesting next to Black Drongo nests to protect their nests from other birds of prey. Although other birds have not been seen nesting around humans, but Spotted Dove, Red-vented Bulbul, Common Myna have been seen nesting around humans. They have been seen wandering around the nest even in the presence of people.

Nest Structure:

Different birds have different nesting techniques. Some are very organized about it, some are messy, and some are weaving their nest quite perfectly. Nests are important in mate selection for some birds. The structure of the nest plays a special role in the life of the bird as well as in analyzing the characteristic features of that bird. In this observation, 8 types of nest structures were found and they are: deep cup nest, shallow cup nest, hole nest, platform nest, dome shaped nest, flat shaped nest, hanging nest and pear-shaped nest. Black Drongo, Red-vented Bulbul, Black-hooded Oriole, Common Tailorbird, Jungle Babbler have been seen to build round bowl nests which are mention here as deep cup nest. Although the Black-hooded Oriole's nest was more basket-like and the Common Tailorbird's nest was a small, hanging from leaves. Lesser Whistling-Duck, Moorhen, Little Grebe, Waterhen, Bittern have been seen to made round but not too deep nests that conform to their body shape which are mention here as shallow cup nest. Jacanas have been observed laying eggs on the leaves of water hyacinth or water lily. This type of nest mentioned here as flat shaped nest. The nest of purple sunbirds and Baya Weaver nest were hanging from the leaves so their nest is mentioned here as hanging nest. The Shape of Purple Sunbird’s nest was found like balloon and the shape of the Baya Weavers nest was like snake bin. Black Kite, Shikra, House Crow, Pigeon were found to build their nest just store few sticks like a platform that’s why this type of nest are mentioned here as platform nest. During this study Scaly-breasted Munia and Asian Pied Starling were found to build their nest like dome shaped. Plain Prinia nest was found to look like a pear shape in the bushes of grasses. The rest of the birds were found built nests in holes of the trees or houses. These burrow nests are often tunnel-shaped, although nesting boxes are square in shape.

Nest Materials:

Nesting materials play an important role in nest building. During this study water birds like Lesser Whistling-Duck, Little Grebe, Jacanas, Common Moorhen, Waterhen were found to used the parts of aquatic plant to build their nest. Yellow Bittern, Cinnamon Bittern, Black Bittern were found made their nest to use marsh land grasses like giant reeds, cattail. Although Black Crowned Night Heron is a wetland bird but it was found to make nest on the big trees with the help of sticks. The birds like Black Kite, Shikra, Yellow-footed Green-Pigeon etc which were found to make platform shaped nest was marked that they usually use sticks as their nesting materials. The birds such as Black Drongo, Red-vented Bulbul, Black-hooded Oriole, Jungle Babbler that weaved their nest like deep cup shape they used twigs, fibre soft tissue of tree, tinder for their nest. Leaves, snake skin, fish scale, piece of plastic, rope etc were found from Common Myna's nest as nesting materials. Asian Pied Starling used lots of long piece of cloth, plastic rope and dry grasses as their nesting materials. House Crow were found to use lots of man wastage materials for their nest. Scaly-breasted Munia was found to use feather, fibres, and dry grasses for their nest. Plain Prinia used dry grass, spider silk, cotton, fibres for made their nest. Purple Sunbird was made their nest to use soft tissues of trees, fibre, cotton and rope. Baya Weaver mainly used grasses for build their nest. Some birds like Barbet, Parakeet that used hole, as their nest, not seen to use any type of nesting materials, some of them like House Sparrow, Jungle Myna used few twigs, leaves for their nest. Spider Silk was found to use to weave many nests specially Common Tailorbird, Purple Sunbirds, Plain Prinia, Black-hooded Oriole.

Nest Building Time:

Everyone wants to save energy and time. It is no different in making nests for birds. But those whose nest plays an important role in choosing a partner are very careful to take their time in this matter. In this study aquatic birds were found not to take much time to build their nests by dragging nearby aquatic vegetation. But those who make deep cup shape nests have been found to take a long time to build nests by gathering nesting materials from the surrounding area. Bulbuls have been seen many times re-using old nests by adding some materials to them to reduce their nest build time. Common Tailorbirds, Baya Weaver, Purple Sunbird, Scaly-breasted Munia are quite fond of building nests. Therefore, it has been seen that they took quite a bit more time to weave their nests. During this study it has been found that platform-shaped nests do not take as much time to build nests. It took time to find and gather nesting materials. It has also been observed that those who build nests in pre-existing tree holes do not need much time except gather some materials in the nest. It was observed that those who do not use any nest building materials often start moving to the hole earlier and lay eggs when it is time to lay eggs.

Nest Height:

During this study different birds have been seen building their nests at different heights. Water birds like Jacanas, Moorhens, Waterhens, and Little Grebe have been seen nesting on the surface of the water. Lesser Whistling-Duck found build up their nest both surface of the water on 0ft height and on a small height beside the water body in the giant reeds bushes. Bulbuls have been seen nesting everywhere from high to low. Platform-shaped nests were seen quite high up. Hole nests were usually seen from mid-height upwards. Common Tailorbirds, Purple Sunbirds and Plain Prinia's nests were seen on the lower side of the trees. Bittern's nest were also found on the just above of the marshland.

Nest Predators:

Nest predators play an important role in controlling the number of birds in an area because they prevent the population from increasing. In this study, various enemies of bird nests have been observed. Greater Coucal and rat snakes have been observed feeding on eggs in Plain Prinia nests. Rat Snake was also seen eating the eggs of Jungle Myna, Common Myna and Yellow Bittern. Monitor lizards have been seen attacking Waterhen, Moorhen, and Lesser Whistling-Duck water birds' nests. Shikras have been seen pouncing on Red-vented Bulbul bird nests and picking up chicks. Red-vented Bulbul chicks were also attacked by House Crow and ant. Oriental Magpie-Robin nest found affected by birds of prey. Also, it has seen mice to throw away the nesting materials from the bird's nest. Occasionally the Common Myna has been seen attacking Woodpecker nests to take over the nest. The nests, chicks, and bird eggs were seen to be damaged by Raptors, monitor lizards, snakes, rats, and ants.

Table 1:- Nesting place, materials, pattern and height of the observed species.

Species	Scientific name	Nesting Place	Nesting materials	Nesting Patterns	Nesting height (foot)
Lesser Whistling Duck	Dendrocygna javanica (Horsfield, 1821)	Aquatic Vegitation	Part of giant reed	Deep Cup Nest	1 ft-10ft
Common Moorhen	Gallinula chloropus (Linnaeus, 1758)	Aquatic Vegitation	Part of cattail	Shallow Cup Nest	0.5 ft
White-breasted Waterhen	Amaurornis phoenicurus (Pennant, 1769)	Aquatic Vegitation	Part of giant reed, cattail	Shallow Cup Nest	0.5ft
Little Grebe	Tachybaptus ruficollis (Pallas, 1764)	Aquatic Vegitation	Aquatic plant	Shallow Cup Nest	0.5ft
Bronze-winged Jacana	Metopidius indicus (Latham, 1790)	Aquatic Vegitation	Hyacinth	Flat Shaped	0ft
Pheasant tailed Jacana	Hydrophasianus chirurgus (Scopoli, 1786)	Aquatic Vegitation	Water lily	Flat Shaped	0ft
Rock Pigeon	Columba livia Gmelin, 1789	Building	Sticks	Platform nest	10-30 ft
Yellow-footed Green-Pigeon	Treron phoenicopterus (Latham, 1790)	Tree	Sticks	Platform nest	25-30ft
Spotted Dove	Spilopelia suratensis (Gmelin, 1789)	building ,Tree,Shade of poster holder,over the office fan	Sticks, twigs	Platform nest	5ft-15ft
Spotted Owlet	Athene brama (Temminck, 1821)	building hole	Twigs	Hole nest	40 ft
Black Kite	Milvus migrans (Boddaert, 1783)	Tree,Building	Sticks, twigs	Platform nest	35ft
Shikra	Accipiter badius (Gmelin, 1788)	Tree	Sticks, twigs	Platform nest	35 ft
Black Drongo	Dicrurus macrocercus Vieillot, 1817	Tree	Twigs, fiber	Deep Cup Nest	20-30 ft
Rufous Treepie	Dendrocitta vagabunda (Latham, 1790)	Tree	Sticks ,twigs	Platform nest	25 ft
House Crow	Corvus splendens Vieillot, 1817	Tree	Sticks, twigs, man wastage	Platform nest	15-20 ft
House	Passer domesticus	Building hole	Twigs	Hole nest	8ft

Sparrow	(Linnaeus, 1758)				
Red-vented Bulbul	Pycnonotus cafer (Linnaeus, 1766)	Tree	Twigs, fiber	Deep Cup Nest	2ft-15ft
Oriental Magpie Robin	Copsychus saularis (Linnaeus, 1758)	Nesting Box		Hole nest	8ft
Common Myna	Acridotheres tristis (Linnaeus, 1766)	Tree Hole,Building,Nesting Box,Electric Pole	Snake skin, plastic, leaves, twigs, feather, man wastage	Hole nest	10ft-30ft
Jungle Myna	Acridotheres fuscus (Wagler, 1827)	Tree Hole	Feathers, leaves, plastic, tinder	Hole nest	8ft
Asian Pied Starling	Gracupica contra (Linnaeus, 1758)	Tree,Building	Rope, cloths, tinder	Domed Shaped nest	20ft-30 ft
Chestnut-tailed Starling	Sturnia malabarica (Gmelin, 1789)	Tree Hole		Hole nest	15ft
Black-rumped Flameback	Dinopium benghalense (Linnaeus, 1758)	Tree Hole,Nesting Box		Hole nest	10-15 ft
Black-hooded Oriole	Oriolus xanthornus (Linnaeus, 1758)	Tree	Soft tissue of tree, fiber, tinder	Deep Cup Nest	25 ft
Common Tailorbird	Orthotomus sutorius (Pennant, 1769)	Tree	Dry grass, fiber	Deep Cup Nest	2ft-3ft
Plain Prinia	Prinia inornata Sykes, 1832	Tree	Dry grass, fiber, tinder	pear-shaped	2ft-3ft
Scaly	Lonchura punctulata	Tree	Dry	Dome	10-15 ft

Breasted Munia	(Linnaeus, 1758)		grass, fiber, feather, tinder	Shaped nest	
Baya Weaver	Ploceus philippinus (Linnaeus, 1766)	Tree	Dry grass	Hanging nest	25ft
Coppersmith Barbet	Psilopogon haemacephalus (Müller, 1776)	Tree Hole		Hole nest	15-20 ft
Lineated Barbet	Psilopogon lineatus (Vieillot, 1816)	Tree Hole		Hole nest	10-15ft
Blue Throated Barbet	Psilopogon asiaticus (Latham, 1790)	Tree Hole		Hole nest	15-20ft
Yellow Bittern	Ixobrychus sinensis (Gmelin, 1789)	Aquatic Vegitation	Part of cattail	Shallow Cup Nest	3ft-5ft
Black Bittern	Ixobrychus flavicollis (Latham, 1790)	Aquatic Vegitation	Part of cattail	Shallow Cup Nest	4ft
Cinnamon Bittern	Ixobrychus cinnamomeus (Gmelin, 1789)	Aquatic Vegitation	Part of cattail	Shallow Cup Nest	3ft-5ft
Black-crowned Night Heron	Nycticorax nycticorax (Linnaeus, 1758)	Tree	Sticks, twigs	Platform nest	25 ft
Purple Sunbird	Cinnyris asiaticus (Latham, 1790)	Tree	Grass, leaves, rope	Hanging nest	4ft
Rose-ringed Parakeet	Alexandrinus krameri (Scopoli, 1769)	Tree Hole		Hole nest	20ft
Jungle Babbler	Argya striata (Dumont, 1823)	Tree	Dry grass, soft tissues of trees ,leaves	Deep Cup Nest	30ft

Table 2:- Composition of success and failure count of the nest with nest predators.

Species	**No of nest observed**	**Success**	**Failure**	**Nest predators**
Lesser Whistling Duck	2	0	2	Monitor lizard
Common Moorhen	5	3	2	Rat snake
White-breasted Waterhen	7	6	1	Rat snake, Monitor lizard
Little Grebe	1	0	1	Reason unknown
Bronze-winged Jacana	1	0	1	Reason unknown
Pheasant tailed Jacana	1	0	1	Reason unknown
Rock Pigeon	8	8	0	–

Yellow-footed Green-Pigeon	2	2	0	–
Spotted Dove	4	3	1	Reason unknown
Spotted Owlet	1	0	1	Reason unknown
Black Kite	1	1	0	–
Shikra	1	1	0	–
Black Drongo	3	1	2	Shikra
Rufous Treepie	1	1	0	–
House Crow	9	9	0	–
House Sparrow	1	1	0	–
Red-vented Bulbul	6	3	3	Shikra, House Crow, ant
Oriental Magpie Robin	1	1	0	–
Common Myna	11	9	2	Rat, rat snake
Jungle Myna	2	1	1	Rat snake
Asian Pied Starling	6	6	0	–
Chestnut-tailed Starling	1	1	0	–
Black-rumped Flameback	2	1	1	Common myna,
Black-hooded Oriole	1	1	0	–
Common Tailorbird	2	2	0	–
Plain Prinia	5	3	2	Greater Coucal, rat snake
Scaly Breasted Munia	8	0	8	Reason unknown
Baya Weaver	2	0	2	Reason unknown
Coppersmith Barbet	3	3	0	–
Lineated Barbet	2	2	0	–
Blue Throated Barbet	2	2	0	–
Yellow Bittern	2	1	1	Rat snake
Black Bittern	1	1	0	–
Chinnamon Bittern	3	3	0	–
Black-crowned Night Heron	5	5	0	–
Purple Sunbird	1	1	0	–
Rose-ringed Parakeet	1	0	1	Rat snake
Jungle Babbler	1	0	1	Shikra

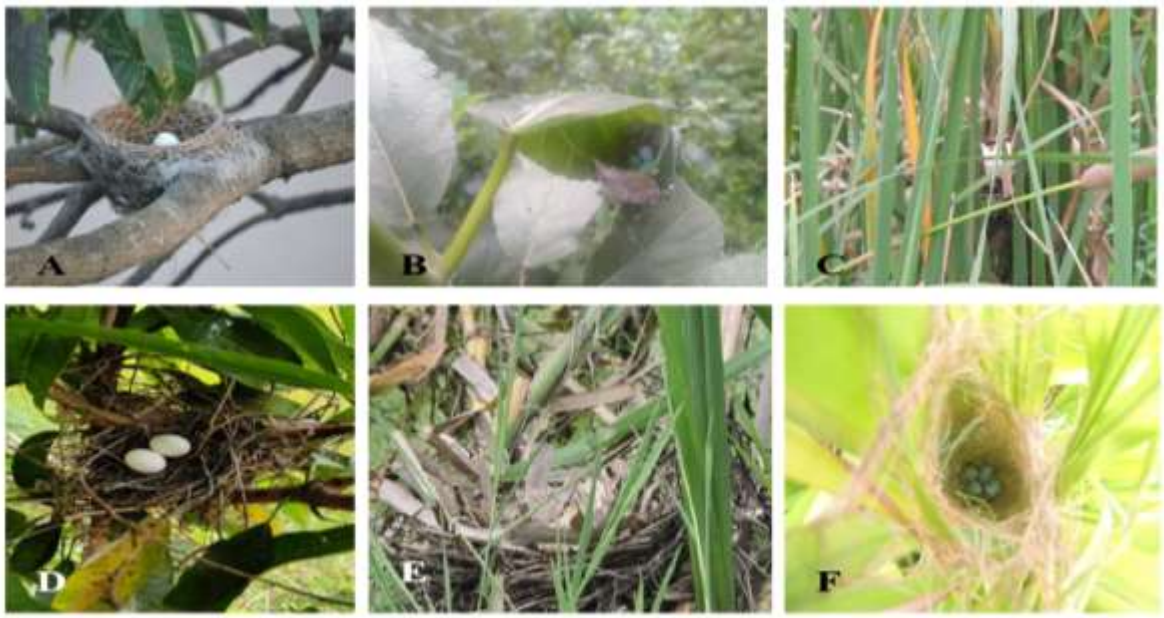

Photo plate 1:- Some photographs of observed nest with eggs- A) Black Drongo (Deep cup nest), B) Common Tailorbird (Deep cup nest), C) Yellow Bittern (Shallow cup nest), D) Spotted Dove (Platform nest), E) Common Moorhen (Shallow cup nest), F) Plain Prinia (Pear-shaped nest).

Photo plate 2:- Some photographs of observed nest with identified species - A) Common Myna, B) Asian Pied Starling, C) Black-rumped Flameback, D) Red-vented Bulbul, E) Jungle Myna, F) Yellow-footed Green Pigeon, G) Jungle Babbler, H) Scaly-breasted Munia, I) Purple Sunbird, J) Lesser Whistling Duck, K) Cinnamon Bittern, L) White-breasted Waterhen.

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