ISSN NO. 2320-5407

Journal homepage: http://www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH

RESEARCH ARTICLE

Study of *Anastomus oscitans* (Boddaert) population in relation to rainfall and nest formation in Barachaka Village of Bankura District, West Bengal, India

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Manuscript Info

Manuscript History:

Received: 14 October 2013
Final Accepted: 27 October 2013
Published Online: November 2013

Key words:
Asian open bill stork, positive correlation, microhabitat, breeding.

Abstract

Out of the nine species of storks found in India, smallest and commonest is the Asian open bill storks (*Anastomus oscitans)* . In this study we have tried to find the relation between rainfall and nest formation with the open bill stork population in Barachaka village of Bankura District , West Bengal , India. A total number of 38 species belonging to 23 families were observed in this area. Big woody plants like Papri (*Holoptelea integrifolia*) and Ankura (*Alangium lamarckii*) were mainly selected as nest building trees by them. A positive correlation (r = 0.820) was found between number of nest plants and numbers of individual storks. Paddy is the chief crop in this area. Asian Open bill Stork mostly feeds on Apple snails (*Pila globosa*) which are very common in the paddy fields. The average rainfall during the study period varied between 176.1 mm in the year 2008 to 384.6 mm in the year 2011. The average rainfall has been found to be positively correlated (r =0.813) with the stork population. The overall result and discussion reveal that there is an interesting relationship between arrival of Asian Open Bill Stork and rainfall. This is because of the fact that the nest building trees along with the available food, particularly snails in that micro habitat significantly depends on rainfall which triggers their reproductive success. Therefore, planning should be oriented both at local and administrative level to protect their habitat and secure their food availability so that these barriers cannot affect nesting and breeding of those species.

Introduction

The Asian Open Bill Stork (*Anastomus oscitans*) is a resident colonial breeder. Out of the nineteen species of storks found globally, nine species occur in India (Ali & Ripley, 1987). Of these smallest and commonest of the storks is the Asian Open bill-Stork. These birds have been observed in Barachaka tribal village of Bankura District, West Bengal, India for last 30 years. They migrate to North India in June and to Southern part of the country in November every year and spent about six months in this region for breeding. Their estimated global population was 1, 30,00,000 in the year 2002 (Wetland International, 2002). The species have been evaluated by IUCN as "Least Concern" (IUCN, 2013). Open bills prepare their nest in trees or areas that are mainly inundated with water. But this place is not inundated so they prepare nest little away form surrounding water bodies. It has generally been accepted that the configuration and composition of vegetation of a habitat acts as one of the determining factors for the distribution and abundance of bird species (Cody, 1985).Their nest formation time and success of reproduction is also related with the rain fall of that particular area as well as availability of food resources.

In the present study, an attempt has been made to compare the open bills population and nest formation in relation to the average rainfall in the study area in the study period.

Study area

This study was conducted in the 'Barachaka pakhiralaya' (Figure 1) near the Barachaka tribal Village (23° 19´ 13´´ N latitudes and 87°00´20´´ E longitudes), of Bankura District in West Bengal, India. The Pakhiralaya is bounded by

Gandheswari and Dwarakeswer rivers. In addition three more water bodies are also in the close proximity of the study area .Total area covering the study site is approximately 12.99 hector where only 37 tribal families live. Average rainfall in the study area during the study period ranges from 176.12 in the year 2010 to 384.67 in the year 2011.Agriculture in this area is mainly dependent on monsoon rain.

Figure1: Map showing the location of study area

Material and methods

The entire study was done by rigorous field survey. The study was done at fortnightly interval between June to November each year during consecutive years 2008 to 2012, by visiting the study area at different hours of the day as well as before sunrise and after sunset in different months. The total numbers of individual birds were counted in the middle of September every year because during this time most of the eggs were hatched and chicks were grown up. All the nest building trees were counted and marked. Other relevant data were collected by conversation with the local tribal people and official documents of respective departments. Observation was done using Olympus DPS Binocular (8—16X 40 zoom and documentation was done using a digital camera (Model Nikon Coolpix 110 & Sony DSC- H70).

Results and Discussion

A total number of 38 species of birds belonging to 23 families were observed in this area. Table 1 shows the total avian diversity at Barachaka pakhiralaya Out of them Asian open bill storks dominate in number in the study area during the study period. Big woody plants like Papri (*Holoptelea integrifolia*) and Ankura (*Alangium lamarckii*) were mainly selected as nest building trees by these birds. (Figure2). The preferences of plant species for nest building have been represented in figure 3. Similar observation has been made by Daniels (1992) who reported the relationship between bird and woody plant species diversity. All the nests were build in the upper and upper middle canopy layer and were at a distance of 5 meters to 50 meters from the human habitation. Similar observation has been made by Coulson J.C. 1968. Nests located in the more densely populated areas of the colonies are more sheltered from predation than those at the periphery (Wittenberger, J.F. 1985).

Total number of nest plants was found to vary between 45 plants in the year 2010 to 74 plants in the year 2012. A positive correlation ($r = 0.820$) was found between number of nest plants and nos. of individual storks . However, the decline in the stork population in the year 2012 may be due to their death caused by the natural calamity. The graphical representations of the Comparision of number of nest plants with stork population have been shown in figure 4.

Paddy is the chief crop in this area. Asian Open bill Stork mostly feeds on Apple snails (*Pila globosa*) which are very common in the paddy fields. Similar observations have been made by Johnson. (1992), who commented that these storks are principally molluscivorous and favour snails belonging to the genus *Pila* . As there is no large water reservoir for irrigation, cultivation is mainly dependent on rains .So, the study was conducted throughout the rainy seasons during the years 2008 to 2012. The average rainfall during the study period varied between 176.1 mm in the year 2008 to 384.6 mm in the year 2011 .The rainfall and the number of stork population is given in the table2. The average rainfall has been found to be positively correlated ($r = 0.813$) with the stork population. This may be due to

the abundance of *Pila globosa* in the paddy fields during the rainy season Similar observation has been made by Ali & Ripley (1987) who stated that the breeding season of storks is highly dependent on the monsoon and related water conditions, which trigger the abundance of food. The comparison of average rainfall with the stork population has been given in the figure 5.

Figure2: Open bill stork colony with their nestlings

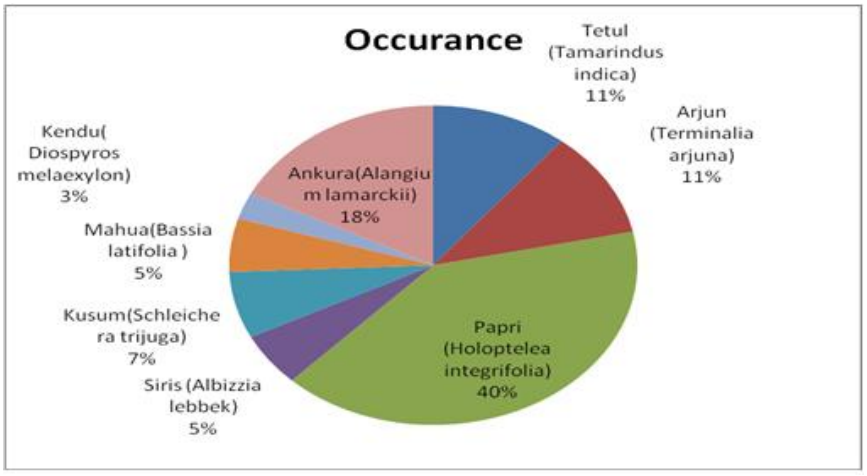

Figure 3: The preferences of plant species for nest building by Open Bill Storks

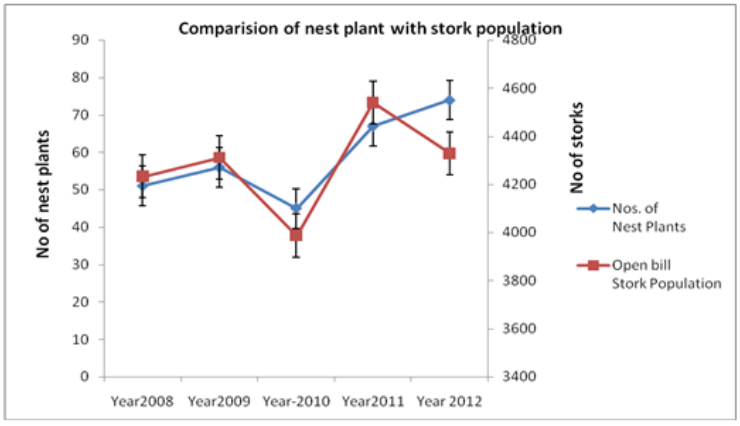

Figure 4: Comparison of number of nest plants with stork population.

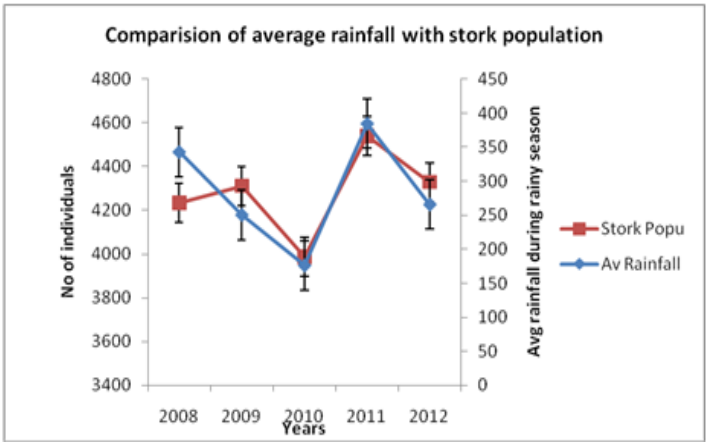

Figure 5: Comparison of average rainfall with stork population

Table 1: List of resident birds in Barachaka village, Bankura, West Bengal

Family	Common Name	Scientific Name
Ardeidae	Cattle Egret	*Bubulcus ibis*
	Black Crowned Night Heron	*Nycticorax nycticorax*
	Indian pond Heron	*Ardeola grayii*
	Large Egret	*Casmerodius albus*
	Little Green Heron	*Butorides striatus*
Phalacrocoracidae	Little Cormorant	*Phalacrocorax niger*
Alcedinidae	Kingfishers	*Alcedo atthis*
Meropidae	Small Bee- Eater	*Merops orientalis*
Cuculidae	Asian Koel	*Eudynamys scolopacea*
	Pied Crested Cuckoo	*Clamator jacobinus*
Centropodidae	Grater Coucal	*Cenrtropus sinensis*
Coraciidae	Indian Roller	*Coracias benghalensis*
Daniidae	Rufous- Backed Shrike	*Lanius schach*
Upupidae	Common Hoopoe	*Upupa epops*
Oriolidae	Eurasian Golden Oriole	*Oriolus oriolus*
Dicruridae	Black Drongo	*Dicrurus macrocercus*
Ploceidae	Spotted Munia	*Lonchura punctulata*
	House Sparrow	Passer domesticus
Sturnidae	Common Myna	*Acridotheres tristis*
	Asian Pide Starling	*Sturnus contra*
	Brahminy Starling	*Sturnus pagodarum*

Corvidae	House crow	*Corvus splendens*
	Indian Treepie	*Dendrocitta vagabunda*
Pycnonotidae	Red-Vented Bulbul	*Pycnonotus cafer*
	Red-Whiskerd Bulbul	*Pycnonotus jocosus*
Capitonidae	Coppersmith Berbet	*Megalamia haemacephala*
Picidae	Lesser Golden Backed Woodpecker	*Dinopium benghalense*
Columbidae	Green pigeon	*Treron bicincta*
	Spotted dove	*Streptopelia chinensis*
	Red- Collared dove	*Streptopelia tranquebarica*
Psittacidae	Rose-Ringed Parakeet	*Psittacula krameri*
	Alexandrine parakeet	*Psittacula eupatria*
Ciconiidae	Asian Open bill-Stork	*Anastomus oscitans*
Apodida	Asian Palm Swift	*Cypsiurus balasynensis*
Turdina	Oriental Magpied-Robin	*Copsychus saularis*
	Black Redstart	*Phoenicurus ochruros*
Nectariniidae	Loten's Sunbird	*Nectarinia lotania*

Table2: Year wise rainfall and the number of stork population in the study area (Source: India Meteorological Department, District Bankura, West Bengal)

YEAR	JUNE	JULY	AUGUST	SEPTEMBER	Mean Rainfall during study period	Stork population
2008	398.6	438.5	302.8	231.7	342.9	4233
2009	56.8	307.3	325.9	311.7	250.425	4312
2010	188.6	180.7	135.7	199.5	176.125	3987
2011	544.1	183.6	394.3	416.7	384.675	4541
2012	173.2	301.4	345.8	242.7	265.775	4329

Conclusion

The overall result and discussion reveal that there is an interesting relationship between arrival of Asian Open Bill Stork and rainfall. This is because of the fact that the nest building trees along with the available food, particularly snails in that micro habitat significantly depends on rainfall which triggers their reproductive success. Preference of selection of nesting plant very close to human habitation also give them better chance to avoid their predator as well as colonial nest formation behaviours also give them better chance to survive. Excessive use of pesticides to the paddy fields are also killing the non target organisms like snails, fish, crab, tadpoles etc. which decreases their food availability. For this reason it creates an adverse effect on their reproduction and global population. Therefore, planning should be oriented both at local and administrative level to protect their habitat and secure their food availability so that these barriers cannot affect nesting and breeding of those species.

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