International Journal of Zoology Studies
ISSN: 2455-7269; Impact Factor: RJIF 5.14
Received: 11-01-2021; Accepted: 23-02-2021; Published: 19-03-2021
www.zoologyjournals.com
Volume 6; Issue 2; 2021; Page No. 28-30

Studies on abnormal nests of baya weaver bird *Ploceus philippinus* in different zones of Shivamogga district, Karnataka

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Abstract
Baya weavers build nests and love to live in colonies. It is named for the construction of elongated inverted bottle shaped nest. An attempt was made to study abnormal nests of baya weaver bird Ploceus philippinus in different zones of Shivamogga district, Karnataka. The study was carried out from August 2019 to July 2020 and the detail nests data was obtained using direct count method. A total of 56 abnormal nests were observed in four different zones, of which 10 (11.36%) in zone-1, 13 (13.40%) in zone-2, 27 (15.34%) in zone -3 and 6 (5.61%) in zone-4 respectively. These 56 abnormal nests were broadly classified into simple and mixed abnormal nests which belong to 8 different types namely stalk-less nests (4), multi-stalk nests (3), wide-stalk nests (15), chained nests (1), fused nests (2), pseudo bistoreyed nests (9), bistoreyed nests (20), and crown shaped nests (2). It is clear that there was a trend towards building of pseudobistoreyed nests, bistoreyed nests followed by wide stalked nests.

Keywords: baya weaver bird, *Ploceus philippinus*, abnormal nests, shivamogga

Introduction

The Baya weaver bird Ploceus philippinus (Linn.) is called 'The king of nest building birds' that occurs throughout the Indian subcontinent. The Weaver bird is named for the construction of elongated inverted bottle shaped nest. It breeds between Augusts to December. It constructs the nests in colonies that range from 2-100 in numbers. During the breeding season male acquires golden yellow plumage on the chest and head, whereas the female is dull light brown in colour. For building a complete nest it takes about 18 days. Males are polygamous and they alone build the nests; the females do not engage in the job of building the nest except for lining the egg chamber after she accepts the nest. The baya bird constructs the nests in five different stages namely- initial attachment, ring stage, helmet stage, egg chamber, ant chamber and entrance tube completed stage. If any abnormality or deviation is seen in these stages of the nest, then the nest is called as "abnormal nest". Several abnormal nests have been seen. The abnormality may be either structural or orientational, or both.

Sixteen types of abnormal nests were noted and were broadly categorized based on the structural abnormality, orientational abnormality and mixed abnormality in Alwar and Bharatpur, Jaipur, and Udaipur districts of Rajasthan (Sharma, 1995) [6]. Naik (2007) [4] studied on 5502 nests and observed 504 abnormal nests belonging to 17 different types in Shimoga district, Karnataka. Asoken *et al*. (2008) [2] studied on the nest construction and the nest microclimate of the baya weaver bird Ploceus philippinus. In their study they assessed the nest construction pattern at different stages of nest and variations in the nest microclimate i.e., temperature and light intensity in different nests of baya weaver (Ploceus philippinus) between November 2002 and March 2003 in Nagapattinam and Tiruvarur district of Tamil Nadu.

Ali (2010) [1] studied on the morphometry of totally 17 complete and 33 incomplete nests by the one-way analysis of variance (ANOVA). Dhande *et al*. (2015) [3] worked on the 'Morphometric study of baya weaver (Ploceus philippinus passeriformes) in Chakiston Tehsil of Jalgaon district. In their study, the statistical analysis by one-way ANOVA showed that complete nest differed insignificantly [$p<0.05$] from that of incomplete ones. A total of 33 nests (7 complete and 26 incomplete) were studied. Pandian (2018) [5] recorded about nest- supporting plants (n=270) belonging to 13 species and 10 families. Nine of them were trees, two shrubs, one herb, and one twiner. In total, 4408 nests were counted on nest-bearing plants and power cables in 55 villages among which abnormal nests constituted 2.5% (n=112).

Materials and Methods

The study was conducted in different zones which is situated in Shivamogga district of Karnataka state (longitude 13□552□ 183□ North and latitudes 75□, 342□ 123□ east). The survey was carried out from August 2019 to July 2020 in 4 different zones *viz*. zone-1 (Ayanur), zone-2 (Shivamogga), zone-3 (B.R. Project) and zone-4 (Bhadravathi). Possible sites of nest building of Ploceus

philippinus were observed carefully for the existence of Baya weaver nest by direct count methods to collect the data about the birds and nests (Naik, 2007) [4].

Normal and abnormal nests were sensed visually when they occurred proximally. When they were at a distance, census notes were made using a 10□50 DPSI field binoculars without disturbing the nests and the birds. Photographs and videography of nest colonies and abnormal nests were made on the spot using a camera Canon EOS 700D and Nikon Coolpix L810.

Results and Discussion

The study was focused on the trends of the abnormalities of nests of Baya weaver birds in different zones of Shivamogga, Karnataka. During the present study a total of 468 nests were sited from different zones of the study area of which 88 were in zone-1, 97 in zone-2, 174 in zone -3 and 104 in zone-4 respectively (Table,1).

A total of 56 abnormal nests were observed in four different zones, of which 10 (11.36%) in zone-1, 13 (13.40%) in zone-2, 27 (15.34%) in zone -3 and 6 (5.61%) in zone-4 respectively (Table 2 & Fig. 1). The 56 abnormal nests were classified into simple and mixed abnormal nest based on their type of abnormality. Among 56 abnormal nests, 23 structural abnormal nests which included 4-stalkless, 3-multistalked, 15-wide-stalked and 1-chained nest. The baya weaver bird builds stalkless, multi stalked, large stalked, chained and fused nests to prevent the eggs and hatchlings falling from the nest because of high winds. The powerful winds often cause the nest to entangle to the spines present on the branch of tree.

In normal cases more than one stalk may occur. Hence multi-stalked (mostly bistalked) nests are built as the presence of two or more stalks provide extra attachment strength to the nests. Sometimes the gap between two stalks *is blocked by a woven mesh, due to which the nest becomes 'wide stalked'*. These multi stalked nests and wide stalked nests are equally good to minimize the simple harmonic motion. In other cases, weaver bird fabricates stalk-less nests on trees that are hardly accepted by female birds.

Only one type of orientational abnormal nest was observed i.e. 2 fused nests. And 29 were mixed abnormal nests, of which 9 were pseudobistoryed and 20 were bistoreyed nests. The pseudobistoreyed nests are constructed to overcome the predation from crows and other birds because, the predators like crows make whole from the upper part of the nest of baya weaver. So, the baya bird makes false chambers to avoid the predation. In addition to this, they fabricate long entrance tube which protects them from the predation of snakes and crows. Short length of entrance tube is made to facilitate large number of feeding trips (Naik, 2007) [4].

Out of 20 bistoreyed nests 16 were two chambered, 3 were one and half storeyed (1+1/2) and a half and half storeyed (1/2+1/2) in vertical plane (Table 1). Bistoreyed nests were common in all the four zones. Such abnormal nests are built because of overcrowding of nests in the colony and in case of damaged nests due to wind and cyclonic conditions. In some cases, these kind of nests are built by some young males who lack the skills of nest building and some of the adult males also alter the structure of the nest. When a female accepts a male in a nest built on a high tree level for breeding, she has to make multiple trips in a day to care for her nestling. This is not a feasible energy strategy, and she will soon be drained. Because of this purpose, many females typically do not accept the nest built at very high levels and even the male becomes restless and is stimulated to go for various gimmicks to construct abnormal nests, especially bistroreyed nests. Hence, under the above conditions bistoreyed are more commonly constructed by the weaver bird.

In addition to this, 2 crown shaped nests were recorded which is fabricated by male weaver birds in which the lower part of stalk looked like crown of 'mosques or mandir'. The bistoreyed nests, pseudobistoreyed nests and wide stalked nests were the major abnormal nests. A statistical analysis made by one- way ANOVA showed that normal nests statistically significant with abnormal nests [P=0.0018] i.e P≤0.05.

Table 1: Abnormal nests of baya weaver birds.

Zones	Total No. of nests observed	Simple abnormal nests					Mixed abnormal nests		Crown shaped nests	Total no of abnormal nests	Percentage of abnormal nests
		Monostoreyed nests					Multistoreyed nests				
		Structural abnormality				Orientational abnormality	Pseudo bistoreyed nests	Bistoreyed nests			
		Stalk less	Multi stalk	Wide stalk	Chained	Fused nests					
1	88	1	-	1	1	-	5	1	1	10	11.36%
2	97	-	2	2	-	-	-	8	1	13	13.40%
3	176	2	1	10	-	2	4	8	-	27	15.34%
4	107	1	-	2	-	-	-	3	-	6	5.61%
Total	468	4	3	15	1	2	9	20	2	56	12.02%

Table 2: One-way ANOVA of normal and abnormal nests during the study period.

Zones	Total Number of nests Observed	No. of normal Nests	Number of abnormal nests
1	88	78	10
2	97	84	13
3	176	149	27
4	107	101	6
Total	468	412	56
	ANOVA	P = 0.0018	(P ≤ 0.05)

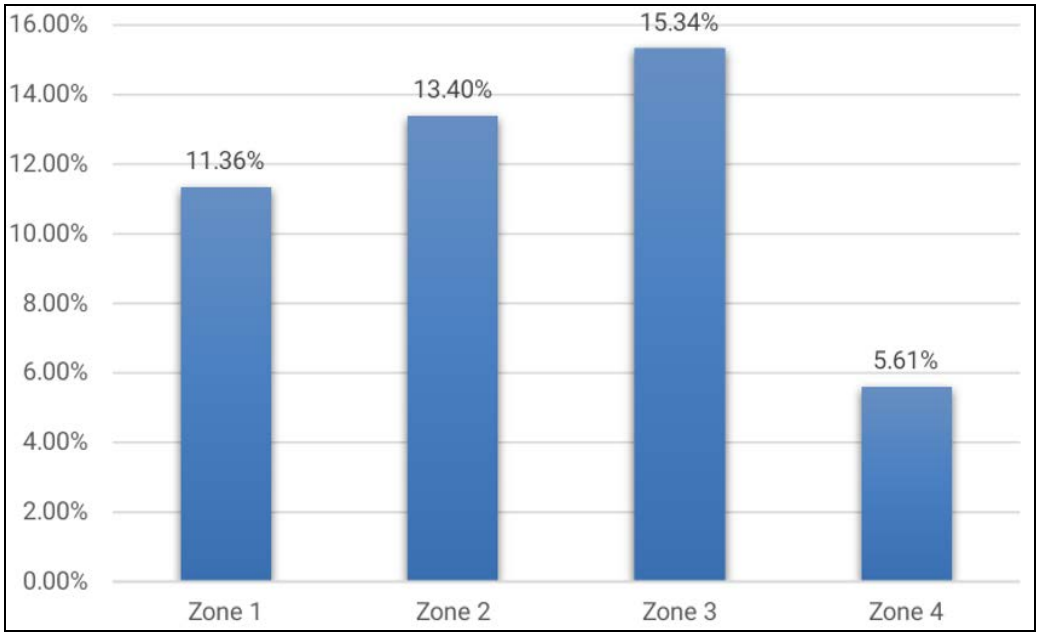

Fig 1: Percentage of abnormal nests in different zones during study period.

Conclusion

The number of nests were constructed by baya weaver bird is more in zone 3 (B.R. Project) compare to other three zones which may be due to increased host plants, nesting materials and food availability. Out of 56 abnormal nests, 25 are structural abnormal these may be preventing the eggs and hatchlings falling from nest during powerful winds. And 31 mixed abnormal nests, the mixed abnormal nests such as pseudo- bistoreyed and bistoreyed nests were constructed to avoid the predators like crows and snakes. It is clear that, there was a trend towards construction of pseudobistoreyed and bistoreyed nests followed by wide stalked nests.

In the present study, baya weaver birds found to prefer more nesting in different trees and shrubs like Prosopis spicigera, Tamarindus indica, Delonix regia, Acacia leucopyrus and Lantana camara, Cassia siamia etc., Our findings emphasize the need for future work to examine the exact reasons to know why baya birds build crown shaped nests and different types of incomplete nests hanging from different habitats.

Acknowledgments

We express heartfelt gratitude to the chairman and the staff Department of Zoology, Kuvempu University, Shankaraghatta for their support and encouragement.

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