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Nesting Behaviour of Baya Weaver (*Ploceus philippinus*) in Dr. Babasaheb Ambedkar Marathwada University Campus, Chhatrapati Sambhajnagar, Maharashtra, India

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Abstract: The nesting behaviour of the Baya Weaver (*Ploceus philippinus*) was studied in the campus area of Dr. Babasaheb Ambedkar Marathwada University (BAMU), located in Chhatrapati Sambhajnagar, Maharashtra, India. The Baya Weaver is a highly social, gregarious passerine bird known for its remarkable nesting abilities and complex communal nesting structures. The study was conducted during the breeding season, spanning from June 2022 to January 2023, to observe and document the various aspects of the nesting behaviour of this species. A combination of direct field observations and photography techniques was employed to collect data on nesting site selection, nesting material, nest construction and breeding success. The findings revealed a high level of site fidelity among the Baya Weavers, with most of the nests predominantly constructed on Acacia trees. The study also revealed interesting insights into the intricate process of nest building undertaken by the male weavers to attract potential mates. The study contributes valuable information to our understanding of avian reproductive strategies, social behaviours, and the importance of preserving natural habitats for the conservation of this charismatic species. The insights gained from this study will aid in formulating effective conservation strategies to safeguard the Baya Weaver populations in the region.

Keywords: Baya Weaver, Nest, Nesting behaviour, Nesting material, *Ploceus philippinus*

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Introduction

The nesting behaviour of the Baya Weaver (*Ploceus philippinus*) has captivated the attention of ornithologists and ecologists alike, giving ideas about avian architecture and social dynamics. This

study gives a detailed exploration of the nesting habits and behaviours exhibited by the Baya Weaver, shedding light on the remarkable complexity and adaptability of these avian

architects. The Baya Weaver, a small passerine bird native to South and Southeast Asia, is famous for its distinctive and intricate woven nests. These nests, often resembling upside-down baskets, are built by male Baya Weavers as part of their elaborate courtship displays (Collias and Collias, 2014).

Baya Weavers exhibit colonial nesting behaviour, meaning they build their nests in large groups or colonies (Collias and Collias, 1970). These colonies can be found in trees, usually near water bodies. The Baya Weaver is renowned for its exceptional weaving skills. The male weavers construct intricately woven, pendulous nests using long strips of grass, palm leaves, and other plant materials (Solomon, 2009). These nests are often suspended from the tips of branches. They prefer to nest in close proximity to one another, forming dense colonies with multiple nests hanging from the branches of a single tree. This communal living arrangement may provide protection against predators and promote social interactions among the birds.

The nesting season for Baya Weavers is typically during the breeding season i.e., on the onset of monsoon. The nests are often built during the monsoon season because the availability of nesting materials is abundant and the availability of food for their nestlings is also abundant during monsoon season. The male Baya Weaver weaves the nest, creating a complex structure with a tubular entrance at the bottom. The process of nest-building plays a crucial role in mate selection, as females are known to inspect and choose mates based on the quality of their nests and if satisfied, female may lay eggs inside (Quader, 2005).

The nesting behaviour of the Baya Weaver (*Ploceus philippinus*) was studied in the campus area of Dr. Babasaheb Ambedkar Marathwada University (BAMU), located in Chhatrapati Sambhajnagar, Maharashtra, India. The study was conducted during the breeding season, spanning from June 2022 to January 2023, to observe and document the various aspects of the nesting behaviour of this species.

Materials and Methods

Study Area:

The survey was conducted in a 10 sq. km area around Dr. Babasaheb Ambedkar Marathwada University Campus, Chhatrapati Sambhajnagar, Maharashtra, India for the observations of Baya weaver's nesting sites from June 2022 to January 2023. In the selected area of survey, each tree was observed for the potential location of Baya Weaver nest construction. Through a point count method, we gathered data on both the presence of Baya Weaver nests and the specific locations chosen for nesting. In addition to documenting the nesting sites and nests, we took note of the ecological conditions near each nesting site.

One nesting site was selected for further detailed observations of nest building where 18 nests were found on the *Butea monosperma* tree. The observations were done by using Bushnell 20×50 binoculars and a Nikon D7500 camera was used for taking photos and videos of the nest-building process and activities of the Baya Weaver.

The nest construction activity of the Baya weaver was observed by standing at close quarters and by using the above-mentioned binoculars. The time spent on the field was 3 h per day with each hour in 3 sessions- morning session (7 am to 8 am), afternoon session (12 noon to 1 pm), and evening session (5 pm to 6 pm). 10 days were used for collecting accurate information on visits of male Baya Weaver to the nest in those three sessions.

The nesting material used by the Baya Weaver was identified manually by observing its morphological characters.

Results and Discussion

Nest Site Selection in the Baya Weaver (*Ploceus philippinus*):

The process of nest site selection in the Baya Weaver is a critical aspect of its nesting behaviour and reflects the species' adaptability to varying environmental conditions. Observations indicate that Baya Weavers exhibit a preference for specific

habitats that offer a combination of suitable vegetation and environmental features. Baya Weavers commonly select sites with specific types of vegetation for nest construction. They were often found in open habitats, including grasslands, rice fields, and wetlands (Ali, 2009), where suitable plant materials for weaving are readily available.

In our study area of 10 sq. km area around the Dr. Babasaheb Ambedkar Marathwada University Campus, Chhatrapati Sambhajnagar, Maharashtra, India, 81 trees were found on which the nest of Baya weaver were constructed. On that total of 81 trees, 381 nests of Baya weaver were found i.e., an average of 4.70 nests/tree was found (Table 1). Environmental factors, such as the availability of water sources and food supply, play a role in nest site selection. Observations suggest that Baya Weavers may favour nesting sites in close proximity to water bodies, which not only contribute to their dietary needs but also provide mud for nest construction.

Nesting Preference Given by Baya Weaver on Different Types of Tree Species:

In our research area, 7 tree species were selected by the Baya weaver for their nest building which were *Acacia nilotica*, *Vachellia farnesiana*, *Azadirachta indica*, *Ziziphus mauritiana*, *Cocos nucifera*, *Phoenix sylvestris* and *Butea monosperma*. Out of the 381 nests found most of the nests were built on *Acacia nilotica* trees i.e., 54.86 % nests and the least preferable tree species for nest building was *Cocos nucifera* i.e., 3.67 % of nests were built on that tree species (Table 1). Nests are commonly situated on the outer branches of trees, providing both security from ground predators and easy access to open spaces for foraging. Weaver birds often exhibit a colonial nesting strategy, with multiple nests clustered together in proximity (Echeverry-Galvis *et al.*, 2014). This colonial behaviour is thought to provide advantages such as increased protection against predators and communal defence of the colony. The average number of nests per tree was 4.70 nests/tree with which the maximum number of

nests were found on *Butea monosperma* (14 nests/tree) and the minimum number of nests were found on *Azadirachta indica* (3.11 nests/tree). Details of different types of trees preferred for nesting by Baya Weavers and the number of nests on those trees are given in Table 1.

Nesting Material Used by the Baya Weaver (Ploceus philippinus):

The choice of materials is a crucial aspect of their nesting behaviour, and it reflects not only the bird's adaptability but also its ability to assess and utilize the environment for optimal nest construction. The primary building blocks of Baya Weaver nests are grass and plant fibres (Kumar and Sharma, 2017). The birds meticulously select long, flexible grass blades and other plant materials from their surrounding environment. We observed that nest material used for nest construction by Baya Weavers was from the surrounding area of the colony in which various species of green grasses specially *Cynodon dactylon* and the torn strips from the leaves of *Phoenix sylvestris* (Fig. 1) were used. These materials provide additional strength and flexibility to the nest, contributing to its durability. The availability of these materials often dictates the location of their nests, as Baya Weavers prefer habitats with an abundance of suitable vegetation.

One distinctive feature of Baya Weaver nests is the use of mud as a binding agent (Crook, 1963). The birds mix mud with saliva to create a sticky and pliable substance that serves as an adhesive, securing the woven materials in place. Mud not only enhances the structural integrity of the nest but also contributes to thermal regulation and protection against predators.

Nest Construction Stages in the Baya Weaver (Ploceus philippinus):

The nest construction process of the Baya Weaver is a highly intricate and coordinated endeavour, showcasing the species' remarkable architectural skills. The construction involves a series of well-defined steps, from the selection of materials to the cooperative efforts of the Weavers in a colony.

Table 1: Nesting preference of Baya weaver on different trees in the study area

S. No.	Scientific Name of Trees	Vernacular Name	Total no. of Trees	Total no. of Nests	Average no. of Nests per Tree	Percentage of Nests on Trees
1.	<i>Acacia nilotica</i>	Babool	42	209	4.98/tree	54.86 %
2.	<i>Vachellia farnesiana</i>	Deo-babhul	12	48	4.00/tree	12.60 %
3.	<i>Azadirachta indica</i>	Neem	09	28	3.11/tree	7.35 %
4.	<i>Ziziphus mauritiana</i>	Ber	07	37	5.29/tree	9.71 %
5.	<i>Cocos nucifera</i>	Coconut	05	14	2.80/tree	3.67 %
6.	<i>Phoenix sylvestris</i>	Indian date	04	17	4.25/tree	4.46 %
7.	<i>Butea monosperma</i>	Palash	02	28	14.00/tree	7.35 %
		Total	81	381	4.70/tree	100 %

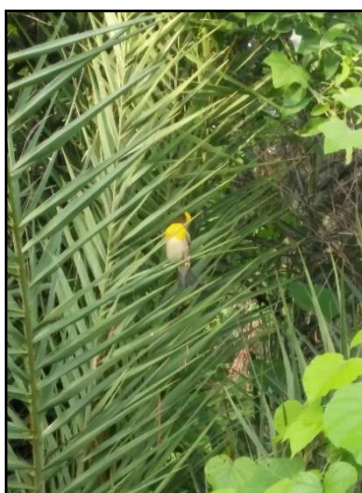


Fig.1: Male Baya Weaver collecting nesting material from *Phoenix sylvestris*.



Fig. 2: Baya Weaver nest colony on *Butea monosperma* in the study area of Dr. BAMU, Chh. Sambhajinagar.



Fig. 3: Male Baya Weaver constructing a ring stage of the nest.



Fig. 4: Courtship behaviour shown by male after completion of helmet stage of the nest.

For detailed observation of the nest construction steps of the Baya weaver, one nest colony was selected in the research area. That Baya Weaver nest colony was present on the *Butea monosperma* tree (Fig. 2).

(i) Initial Attachment of the Nest:

In the initial stage of building the nest, the male decides where to attach his nest. When a male arrives with an initial strip at the twig where he intends to make a nest, he holds the strip with one or both feet against the twig, seizes one and doubles back the strip. After attaching the initial strip, others are soon added at the same spot and a small pad of woven material is quickly formed (Collias and Collias, 1962). Baya Weaver takes

about 2 days for this stage to complete.

(ii) Construction of the Ring:

The male continues the building nest leading to the growth of the initial nest mass into the form of a ring that will provide the basic supporting framework for the whole nest. In thickening the ring, the male enters the ring with one end of a strip in his bill and pokes the strip into the opposite side. One of the most striking and significant features of the orientation of the male in his ring is that he almost always enters it from one side and almost always faces the same way. This stage was completed in about 5 days (Fig. 3).

(iii) Helmet Stage:



Fig. 5: Male Baya Weaver weaving the entrance tube and female is sitting beside the nest.



Fig. 6: Blobs of mud inside the nest of Baya weaver.

With each successive strip, the ring tends to become more and more difficult for the male to push and pull a strip through the mass of the ring. The male continues to enter from the same side of the ring and face into the developing egg chamber. At this stage males may continue to thicken the nest and to attract females start displays and vocalizations i.e., courtship behaviour (Fig. 4). According to Prakash *et al.* (2020), this behaviour of males induces visiting females to enter and inspect their nest. If a female accepts the nest and settles down it, the male continues an entrance tube. This stage was completed in about 6 days.

(iv) Entrance Tube:

The male now generally adds a short tube about

the entrance, whereas nests not accepted by a female are likely to be torn down without ever having had an entrance tube (Asokan *et al.*, 2008). From that, we can say that the nests with helmet stage and without entrance tube are the nests that are rejected by the females. The entrance tube was only about one layer of woven material which was not thick. The male takes about 5 days to complete the entrance tube (Fig. 5).

(v) Completion of Nest:

While the female incubates, the male quite often works on the outside of the nest. He strengthens the attachment of the nest, weaving in fresh green strips. Dry clay was also found in the nests of Baya Weavers. They collect blobs of mud when wet and

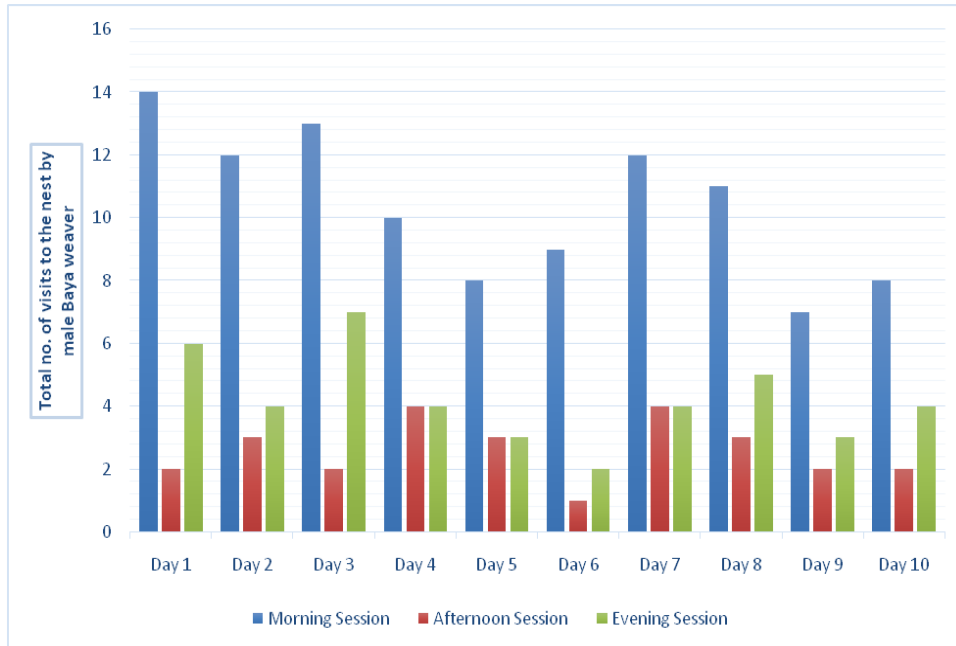


Fig. 7: Total number of visits to the nest by male Baya Weaver during three sessions.



Fig. 8: Irregularly shaped nest built by immature male Baya Weaver.

stick them inside the dome near the egg chamber (Davis, 1973) (Fig. 6). So, in about 18 days a male completes a single nest (Asokan *et al.*, 2008).

Male Baya Weaver Visits to the Nest with Nesting Material:

We have recorded the total number of visits of male Baya Weavers with nesting material to the nest in three sessions. Observations were done in the morning session (7 am to 8 am), afternoon session (12 noon to 1 pm), and evening session (5 pm to 6 pm) for about 10 days. We observed that the activity in the morning session is more than

the other two sessions (Fig. 7). Average visits by the male Baya Weaver to the nest in the morning session were 10.4 visits, in the afternoon session were 2.6 visits and in the evening session were 4.2 visits.

Breeding Behaviour of Baya Weaver:

One male can have more than one nest at a time and if each females accept his multiple nests, then he can breed in those multiple nests. That is the males are polygamous, mating with 2-3 females one after another (Ulman, 2020). Males built many partial nests and began courting females. The male

finishes the construction of the nest only after finding a mate. The female lays about 2 to 4 white eggs and incubates them for about 14 to 17 days (Ali *et al.*, 1957). The females are solely responsible for incubating and bringing up the food for their nestlings (Quader, 2005).

Behaviour of the Premature Male:

Another behaviour of the premature males was seen near the colony of nests that we observed. 2-3 premature males practicing the art of nest building. The shape of these nests is irregular but the ring stage was seen in those nests. The immature males that have no yellow pigmentation on their crowns were seen working on that irregularly shaped nest. They were active only in the morning session and were not seen in the afternoon and evening sessions. They built a nest on *Vachellia leucophloea* (Fig. 8). Baya Weaver nests are typically built on the outermost branches of a tree, and it is possible that the closer to the outer tips of the branches (Quader, 2006) but that irregularly shaped nest was constructed on the middle branch of the tree.

Conclusion

The Baya Weaver's (*Ploceus philippinus*) nesting behaviour, from site selection to construction and breeding success, gives the species the ability to thrive in diverse environments. They constructed retort-shaped nests on a total 81 number of trees which belong to 7 species in our study area. In the monsoon season, male Baya Weavers complete the nest-building process in about 18 days. On those 81 trees, we observed that 381 nests are constructed in which 342 nests are completed i.e., having a complete entrance tube. About 39 nests were without entrance tubes and abandoned at the helmet stage. Hence, the success rate of completion of the nest in the study area was about 89.76%. Out of 381 nests, 209 nests were constructed on *Acacia nilotica* i.e., 54.86% of nests were found on that tree species. Even if we observed nests on *Acacia nilotica*, *Vachellia farnesiana*, *Azadirachta indica*, *Ziziphus mauritiana*, *Cocos nucifera*, *Phoenix sylvestris* and

Butea monosperma, the most preferable tree for Baya weaver nest building was *Acacia nilotica*. To construct their nest, the nesting material used was leaves of *Cynodon dactylon* and the torn strips from the leaves of *Phoenix sylvestris*. We observed that while constructing the nest, the activity of male Baya Weaver in the morning session is more. Average visits by the male Baya weaver to the nest in the morning session were 10.4 visits, in the afternoon session were 2.6 visits and in the evening session were 4.2 visits. So, we can say that due to increased temperature during the day which can reduce the efficiency of the male Baya weaver, they work mostly in the early morning to increase their efficiency. At the helmet stage of the nest, male Baya weaver shows a typical behaviour to attract females which includes different call sounds and flapping their wings. Once the female selects the best nest for their upcoming offspring, the male starts mating with the female and completes the nest by weaving the entrance tube. The female may lay about 2 to 4 white eggs and incubate them in about 14 to 17 days. Another behaviour shown by immature males was they practice the nest construction before maturity but they do not have perfect knowledge of nest building as the nest was irregularly shaped. In conclusion, the Baya Weaver's nesting behaviour serves as a fascinating case study in avian biology, offering a window into the interconnected web of ecological, behavioural, and environmental factors that shape the lives of these remarkable birds. By unravelling the intricacies of their nests, we gain a deeper appreciation for the resilience and adaptability of avian species, providing a foundation for future research and conservation endeavours.

References

- Ali AMS. (2009) Studies on nest-site selection and prey delivery patterns to nestlings by the Baya Weaver *Ploceus philippinus* (Aves: Passeriformes) in Tamil Nadu, South India. World J Zool. 4(4): 308-312.
- Ali S, Ambedkar VC and Vijayakumar C. (1957) Further notes on the Baya weaver bird *Ploceus philippinus* Linn. J Bombay Natural History Soc. 53: 491-502.

- Asokan S, Ali AMS and Nagarajan R. (2008) Studies on nest construction and nest microclimate of the Baya weaver, *Ploceus philippinus* (Linn.). J Environ Biol. 29(3): 393.
- Collias NE and Collias EC. (1962) An experimental study of the mechanisms of nest building in a weaverbird. The Auk 79(4): 568-595.
- Collias NE and Collias EC. (1970) The behaviour of the West African village weaverbird. Ibis 112(4): 457-480.
- Collias NE and Collias EC. (2014) Nest building and bird behavior. Princeton University Press.
- Crook, J. H. (1963). A comparative analysis of nest structure in the weaver birds (Ploceinae). Ibis, 105(2), 238-262.
- Davis TA. (1973) Mud and dung plastering in Baya nests. J Bombay Natural History Soc. 70(1): 57-71.
- Echeverry-Galvis MA, Peterson JK and Subo-Caceres R. (2014) The social network: Tree structure determines nest placement in kenyan weaverbird colonies. PloS One 9(2): e88761.
- Kumar A and Sharma M. (2017) Traditional home garden agroforestry systems: habitat for conservation of Baya Weaver *Ploceus philippinus* (Passeriformes: Ploceidae) in Assam, India. J Threatened Taxa 9(4): 10076-10083.
- Prakash D, Niangthianhoi SL, Kumar R and Khudsar FA. (2020) Nest construction process in Streaked Weaver *Ploceus manyar*. Indian Birds 15(6): 168-174.
- Solomon Raju AJ. (2009) Nesting behaviour of the Baya Weaver bird, *Ploceus philippinus* (Ploceidae) and the life-cycle of the Plains Cupid butterfly, *Chilades pandava* (Lycaenidae) with the red-listed *Cycas sphaerica* and *C. beddomei* (Cycadaceae). J Threatened Taxa 1(8): 429.
- Quader S. (2005) Elaborate nests in a weaverbird: a role for female choice? Ethology 111(12): 1073-1088.
- Quader S. (2006) What makes a good nest? Benefits of nest choice to female Baya Weavers (*Ploceus philippinus*). The Auk 123(2): 475-486.
- Ulman Y. (2020) Nature's Marvels-Weaver birds: Coexisting with humans. Sci Rep. [https://nopr.niscpr.res.in/bitstream/123456789/55017/1/SR%2057\(9\)%2060-61.pdf](https://nopr.niscpr.res.in/bitstream/123456789/55017/1/SR%2057(9)%2060-61.pdf)