



# Population Status of Baya Weaver (*Ploceus Philippinus*) in Peninsular Region Saurashtra of Gujarat, India

Yusufkhan Pathan <sup>a\*</sup>, Arvindgiri Goswami <sup>a</sup>  
and Varsha M. Trivedi <sup>b</sup>

<sup>a</sup> Biology Department, M. V. M. Sci. & Home Science College, Saurashtra University, Rajkot, Gujarat, India.

<sup>b</sup> Department of Biosciences, Saurashtra University, Rajkot 360 005, Gujarat, India.

## Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

## Article Information

DOI: <https://doi.org/10.56557/upjoz/2024/v45i164313>

## Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://prh.mbimph.com/review-history/3885>

Original Research Article

Received: 24/05/2024

Accepted: 28/07/2024

Published: 31/07/2024

## ABSTRACT

The Baya Weaver (*Ploceus philippinus*) is a weaver bird found across the Indian Subcontinent and Southeast Asia. The study was concerned with the population status of Baya weavers among the peninsular region Saurashtra of Gujarat, India. Fieldwork was conducted over six months across 17 sites in Rajkot City, utilizing focal and point count methods for bird population assessment. Observations recorded the spatial and temporal distribution of *P. philippinus* populations. Statistical analyses (Two-way ANOVA) revealed significant spatial ( $P=0.0013$ ) and temporal ( $P=0.0201$ ) variations in population dynamics. An average total population of Baya Weaver at different site records 55.25 individuals, average male population was higher (30.41) than female population

\*Corresponding author: Email: [pathanyn4@gmail.com](mailto:pathanyn4@gmail.com);

(24.82). The spatial distribution confirmed that the Baya Weaver population was greater near rural and suburban areas while decrease in urban areas. As the breeding season of this bird is between April to October, temporal distribution suggested that maximum male and female population of Baya Weaver was recorded during October; whereas minimum population recorded in November. All sites of the study reflected a higher male population than a female population. The population of *P. philippinus* tends to decline due to diet and habitat loss because of rapid urbanization as well as industrialization. This study underscores the importance of continuous monitoring and conservation efforts for *P. philippinus*, emphasizing the need for research on breeding ecology, habitat preferences, and the impacts of agricultural practices to develop effective conservation strategies.

**Keywords:** *Ploceus philippinus*; baya weaver; population; focal & point count method; spatio-temporal distribution.

## 1. INTRODUCTION

India is home to four species of Weaver birds or Bayas: Baya Weaver (Common Baya or Indian Weaver- *Ploceus philippinus*); Streaked Weaver (*Ploceus manyar*); Black-breasted Weaver (Black-throated Weaver- *Ploceus benghalensis*) and Finn's Weaver (Finn's Baya or Yellow Weaver), belonging to family Ploceidae. In Gujarat, three species of Baya have been recorded [1]. These are (i) Baya weaver (*Ploceus philippinus*), (ii) Black-breasted weaver (*Ploceus benghalensis*) and (iii) Streaked weaver (*Ploceus manyar*). [2] reported the inter-relationship between vegetation and bird population. *P. philippinus* prefers wider varieties of herbs and forage in flocks for grains in cultivated fields and sometimes this bird is considered as an agricultural pest [3]. Along with the diet, reproduction is another factor that plays an important role as it ensures a species survival. An important behavioural reproductive decision of a bird is where to place the nest [4 and 5]. The Baya Weaver, *P. philippinus*, has been considered an architectural genius for the delicate craftsmanship of building intricate pendant nests. The farmers are the prime reason behind the declining population of *P. philippinus* in India [6]. A rapid urbanization and industrialization have resulted in declining areas of cultivation up to 20%, particularly cereal crops, thus causing lack of food grains and insect fauna to *P. philippinus* [7]. India hosts over 1,295 bird species, with Gujarat reporting 479 species in 2001 [8], 526 species in 2004 [1], and 574 species in 2016 [9]. Human activities have accelerated bird extinctions, with 100 species lost in the past 600 years and over 1,000 currently at risk. Dr. Deepak Apte, noting that Baya Weavers were once integral part of Maharashtra backyards, observed only a few nests during his village visit in 2016. He suggested that the declining population reflects

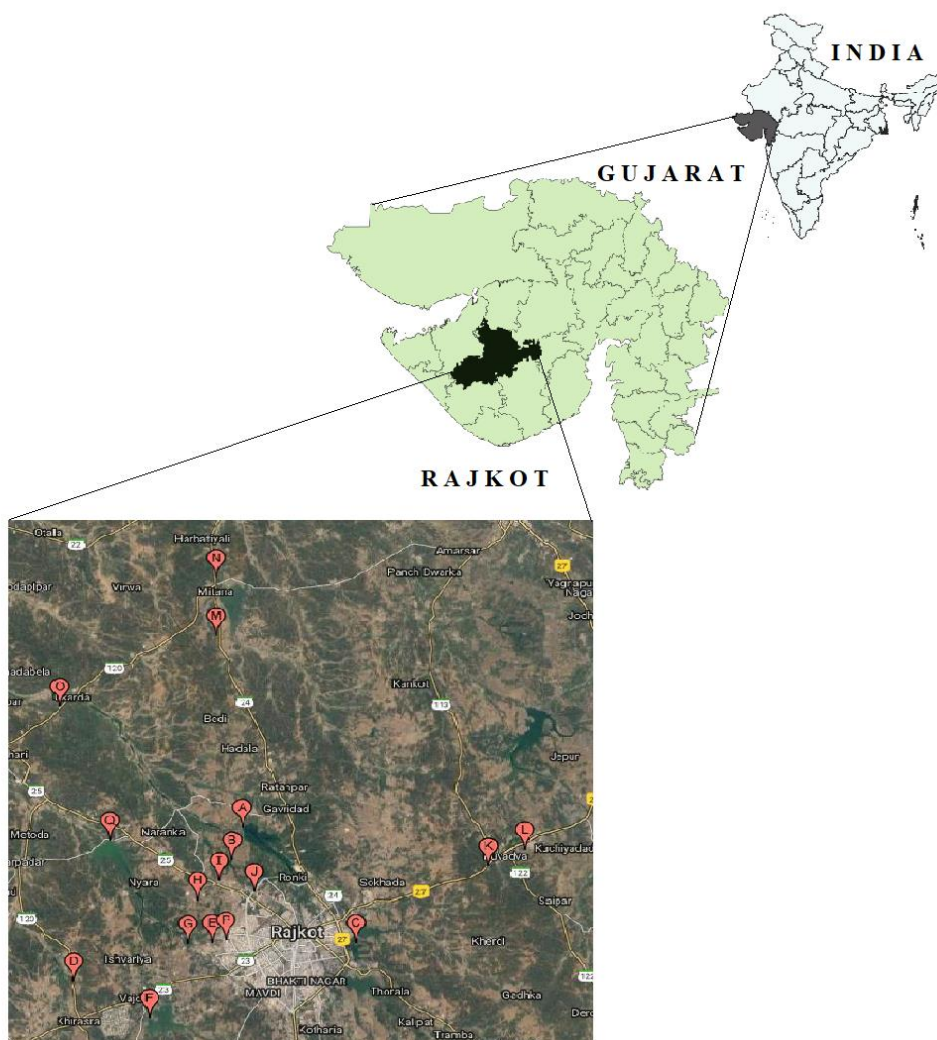
environmental damage, emphasizing the need for continuous monitoring. In response, BNHS organized a one-day bird count under its citizen science initiative to involve the public in monitoring and gathering data on Baya Weaver populations. All Indian Weaver Bird species are protected and listed in Schedule IV of the Wildlife (Protection) Act, 1972. There are many authors [10,11,12] and [13] among India work on Baya Weaver nesting but the data on population of Baya Weaver is very scarce. Hypothetically, it is assumed that the overall Baya Weaver population expected to decline or decreasing in Rajkot City and vicinity. There is little known data about population status of Baya Weaver (*Ploceus philippinus*) in Central Saurashtra. Hence some new details were added on current status of population of this Baya Weaver (*Ploceus philippinus*) bird species in and around Rajkot City, Gujarat, India the present investigation was planned.

## 2. MATERIALS AND METHODS

### 2.1 Study Area

The study was conducted in Rajkot City and their Vicinities. Rajkot is located at the centre of Peninsular Saurashtra region in Gujarat State (Fig. 1). The actual coordinates of Rajkot lie between latitude 21°34' N and longitude 70°52' E. The total area of Rajkot city is 104.86 km<sup>2</sup>. The city is located on the bank of Aji River and Nyari River which remains dry except the monsoon months of July to September.

**Climate:** Rajkot has a tropical arid to semi-arid climate with three distinct seasons: monsoon, winter, and summer. The annual rainfall is 375 mm, occurring erratically. Humidity ranges from 57% to 81%.



**Fig. 1. Map of the study sites for the Baya weaver (*Ploceus philippinus*) population. (Source- QGIS & Google map)**

A. Site 1- Aji 2 Dam, B. Site 2- Ishwariya Park, C. Site 3-Lakheshwar Temple, D. Site 4- Rupeshwari River, E. Site 5- Botanical Garden, F. Site 6 - Nyari 1 Dam, G. Site 7- Munjka River, H. Site 8-Ghanteshwar road, I. Site 9- Jamnagar Road, J. Site 10- Madhapar Chokadi, K. Site 11-Kuvadava Road, L. Site 12- Kuvadava village, M. Site 13- Mitana village, N. Site 14-Chhatar village, O. Site 15- Ukarda village, P. Site 16- Near TN Rao collage, Q. Site 17-Nyari 2 Dam.

**Winter (November to February):** Cool, dry northeastern winds prevail, with clear skies and occasional short showers. January is the coldest month, with an average minimum temperature of 14.3°C.

**Summer (March to May):** This dry, hot season sees average high temperatures from 30.2°C to 42.1°C, with May being the hottest month at an average maximum of 42.1°C.

**Monsoon (June to September):** Southwestern monsoon winds bring rainfall, with relative humidity averaging 81.4%-56.9% in the morning and 47.8%-21.0% in the evening.

**Soil Type:** Rajkot primarily features alluvial and black soils. The alluvial soils are found in riverine areas, while the black soils, rich in clay and minerals, are prevalent in agricultural zones.

**Altitude Range:** Rajkot is situated at an average altitude of around 138 meters above sea level. The city's terrain is relatively flat with some minor undulations.

## 2.2 Data Collection

The work was carried out for six months (June - November 2022). Regular field trips were made throughout this period at weekly intervals for one or two days exploring at random. Sighting and counting of Baya weaver (*Ploceus philippinus*) population were recorded using focal [14] and point count methods. The Visual observation, and identification of Baya Weaver using a pair of binoculars (Olympus, 12 X 50) and photographs were captured using Sony cyber shot 18.2 megapixels 20x zoom digital camera. The location of explored sites of the Baya Weaver was recorded using GPS coordinates. Identification of birds with their sex, status and distribution were followed by [15,16 and 17].

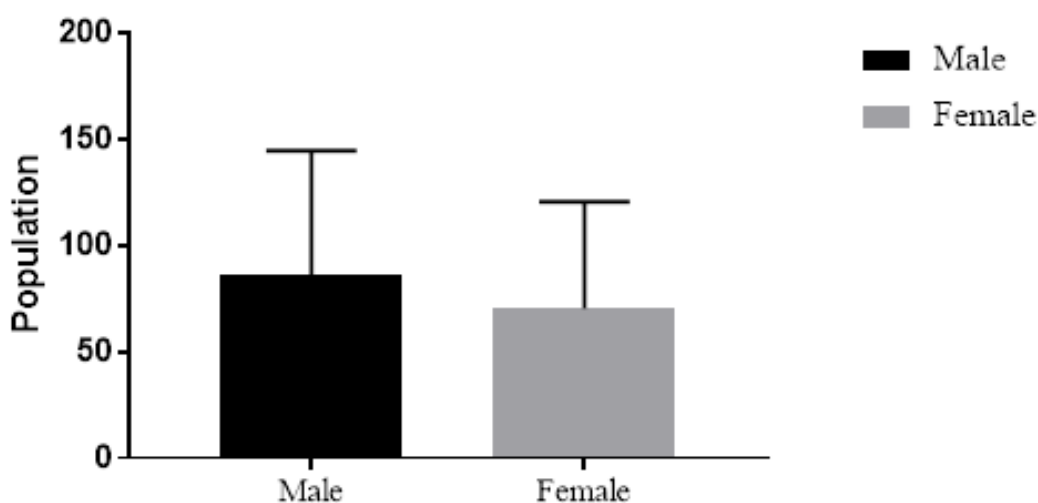
## 3. RESULTS AND DISCUSSION

The Baya Weaver (*Ploceus philippinus*) is a widespread and common bird species found across the Indian subcontinent and Southeast Asia. During present study Population of Baya Weaver (*Ploceus philippinus*) has been observed. Baya Weavers prefer open grasslands, cultivated areas, and wetlands. They are often seen in proximity to human habitation, particularly in agricultural landscapes where

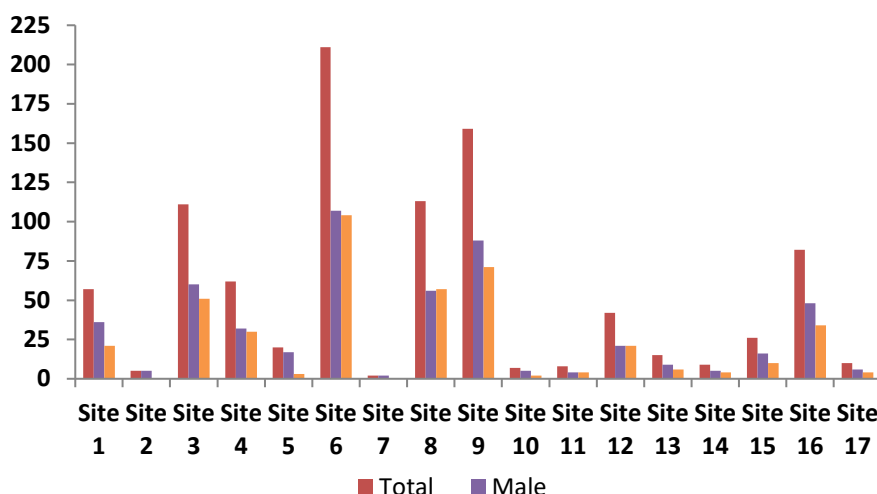
grain crops provide ample food resources. Total of 17 different sites were located and studied.

### 3.1 Spatial Distribution

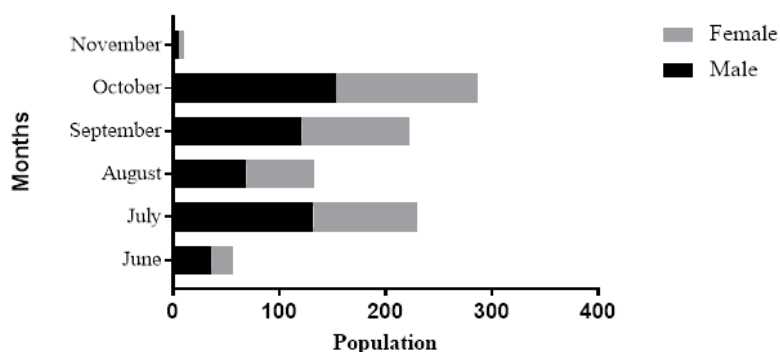
The spatial distribution pattern was obtained an average total population of Baya Weaver of 55.25 individuals, average male population was higher (30.41) than female population (24.82). Site-wise total population revealed greater (211 and 159 individuals) at Niyari 1 Dam (Site-6) and Jamnagar Road (Site-9) locations. Male (107 and 88 individuals) and female (104 and 71 individuals) population were almost similar. A very low population of Baya Weaver were found at Ishwariya Park (Site-2) and Munjka River (Site-7). The explored 17 occupancy habitats of Baya Weaver (*Ploceus philippinus*), their status, and population with sex (Fig. 3) record reveal decrease population in such urban ecosystem viz Rajkot city and vicinities. It reveals that the Baya Weaver population was greater near rural and suburban areas (Fig. 2) decrease in Rajkot City. Mixed farming systems with abundant woody edge habitats and crop heterogeneity in the farmed landscape in rural areas help retain high avian species richness on farmlands [18] and [19]. Villages surrounding cities are increasingly transformed into suburban-like areas, with housing estates surpassing agricultural uses. This shift in the character of the Polish countryside is a significant reality [20] and has a strong impact on bird communities.



**Fig. 2. Comparative aspect of Male and Female Population of Baya Weaver (*Ploceus philippinus*) in Rajkot City and Vicinity areas**



**Fig. 3. Spatial distribution pattern of Baya Weaver (*Ploceus philippinus*) population including male and female population in Rajkot City and Vicinity areas**



**Fig. 4. Temporal distribution pattern of Baya Weaver (*Ploceus philippinus*) Population including male and female population in Rajkot City and Vicinity areas**

### 3.2 Temporal Distribution

The baya weaver bird mainly breeds during the rainy season (monsoon) such as between April to October in the Indian subcontinent [16]. The temporal (month-wise) distribution pattern suggests that maximum total population, male and female population (287, 153, and 134) of Baya Weaver was recorded in October; whereas the minimum population was recorded in November (10, 6, and 4). All sites reflect higher male population than female population (Fig. 4). The Baya Weaver breeds during the monsoon season in the Indian subcontinent [21]. The timing of its breeding is influenced by seasonal changes and food availability, which are in turn dependent on environmental factors such as

temperature and rainfall that ultimately regulate seasonal breeding and temporal variation [22 and 23].

The variables like population of Baya Weaver and the selected sampling site for Spatial distribution of Baya Weaver, population of Baya Weaver and total survey month were subjected to Two-way ANOVA ( $P = 0.05$ ). It was found that the population of Baya weaver showed significant spatial ( $P = 0.0013$ ) and temporal variation ( $P = 0.0201$ ).

The result of this study showed that population of Baya weaver highly dynamic along the habitat availability and seasonal fluctuation. The Bombay Natural History Society's (BNHS) Pan-



**Fig. 5. Baya Weaver (*Ploceus philippinus*) A & B. Nesting over host plant, C. Female Weaver bird, D. Male weaver bird among Rajkot City and Vicinity areas**

India Baya Weaver birds count was held in the year 2016 among the 18 States across India and the count concluded with a record of 6354 birds and 3401 nests, but only one bird with no nest was counted in Tamil Nadu [24,25] reported 4476 birds and 4273 nests were counted on 270 nest-supporting covering a stretch of 52 rural villages in a single district Tindi Vanam of state Tamil Nadu. The present survey covering a Rajkot city and vicinity areas among the Gujarat state reveals an average total population of Baya Weaver are 55.25 individuals among the 17 different sites. [26] observed that the indirect predation on the Baya weaver by the House Crow, *Corvus splendens* (Passeriformes: Corvidae) for the nesting and food is very common. [27] reported that farmers are the prime reason behind the declining population of the *Ploceus philippinus* in India. The presence of heavy metal contamination in excreta has indicated that it might have had a negative impact on the abundance of Baya Weaver Bird in Punjab state [28]. *P. philippinus* has been assessed for The IUCN Red List of Threatened Species in 2024 and it is listed as Least Concern

[29]. Continuous monitoring of population trends and habitat conditions is essential for the conservation of Baya Weavers. Studies focusing on their breeding ecology, habitat preferences, and the impacts of agricultural practices can provide valuable insights for developing effective conservation strategies.

#### 4. CONCLUSION

The explored 17 occupancy habitats of Baya Weaver (*Ploceus philippinus*), their status, population with sex record reveal decrease population in such urban ecosystem viz Rajkot city and vicinities. The result shows a significant spatial distribution pattern ( $P= 0.0013$ ) due to habitat characteristics, water availability, food availability, shelter, climate and Anthropogenic pressure. The significant temporal distribution ( $P= 0.0201$ ) may be due to food availability as well as environmental factors such as temperature and rainfall as ultimate cause to control seasonal fluctuation in population. In conclusion, the Baya Weaver population was greater near rural and suburban areas of Rajkot

City; but decreased in Rajkot City due to rapid urbanization and industrialization.

#### DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declares that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during writing or editing of manuscripts.

#### ACKNOWLEDGEMENT

The authors wish to acknowledge Government Agencies, Scheme of Developing High-quality Research (SHODH) fellowship (YP) for providing financial support to carry out this research work. They are greatly thankful to the Saurashtra University, Biology Department, M. V. M. Sci. & Home Science College for giving various permissions to conduct our research.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

#### REFERENCES

1. Parasharya BM, Borad CK, Rank DN. A Checklist of the Birds of Gujarat. Bird Conservation Society, Gujarat. 2004;1-26.
2. Mac Arthur RH, Mac Arthur JW. Population effects of natural selection. Amer. Nat.. 1961;95:195-219.
3. Sengupta S. Common baya (*Ploceus philippinus*)-a serious pest of agriculture. Current Science. 1974;43: 24–125.
4. Cody ML. Habitat selection in the Sylviine warblers of Western Europe and North Africa. In: Habitat selection in birds (Ed.: M.L. Cody). Academic Press, New York. 1985;86-129.
5. Johnson PN. Selection and use of nest sites by barn owls in Norfolk, England. Raptor Res. 1994;28:149-153.
6. Pandian M. Nesting habits of Baya Weaver *Ploceus philippinus* (Linnaeus, 1776) in rural Arakkonam Taluk, Vellore district, Tamil Nadu, India. Journal of the Bombay Natural History Society. 2021a;118:03–17.
7. Pandian M, Natarajan S. Studies on the habitats of Baya Weaver Bird, *Ploceus philippinus* (Linnaeus) (Aves: Passeriformes: Ploceidae) in an agrarian landscape in Vellore district, Tamil Nadu, India. Asia Pacific Journal of Research. 2018;87(1): 196–201.
8. Singh HS. Impact of management on Biodiversity of some of the protected areas in Gujarat State. Doctoral thesis, Saurashtra University, Rajkot, India; 2001.
9. Ganpule P. Sight records of 'fulvescens' morph Greater Spotted Eagle in Gujarat. Flamingo. 2016;14 (3): 11.
10. Narasimhacharya, AVRL, Kotak VC, Sharp PJ. Environmental and hormonal interactions in the regulation of seasonal breeding in free-living male Indian baya weaver birds (*Ploceus philippinus*). Journal of Zoology. 1988;215(2): 239-248.
11. Ambedkar VC. Notes on the Baya breeding season 1957. Journal of the Bombay Natural History Society. 1958; 55(1):100-106.
12. Kumar J, Malik S, Bhardwaj SK, Rani S. Bright light at night alters the perception of daylength in Indian weaver bird (*Ploceus philippinus*). Journal of Experimental Zoology Part A: Ecological and Integrative Physiology. 2018;329(8-9):488-496.
13. Pandian M. Nesting habits of the Baya Weaver *Ploceus philippinus* (Linnaeus, 1766) in the agricultural landscape of Tindivanam, Tamil Nadu, India. Journal of Threatened Taxa. 2022;14(5): 20970-20987.
14. Altman J. Observational study of behaviors: Sampling methods. Behaviour. 1974;49: 227-267. Available: <https://doi.org/10.1163/156853974X00534>
15. Ali S, Ripley SD. Handbook of the birds of India and Pakistan. Oxford University Press, Oxford. New York; 1983.
16. Ali S. The Book of Indian birds, Bombay natural history society, 13th edition, New Delhi: BNHS Oxford University Press. 2012;1-326.
17. Grimmett R, Inskipp C, Inskipp T. Birds of the Indian subcontinent. Oxford University Press. 2013;1-528.
18. Tryjanowski P. Effect of habitat diversity on breeding birds: comparison of farmland bird community in the region of Wielkopolski (W Poland) with relevant data from other European studies. Polish Journal of Ecology. 1999;47: 153–174.
19. Sanderson FJ, Kloch A, Sachanowicz K, Donald PF. Predicting the effects of agricultural change on farmland bird populations in Poland. Agriculture,

- Ecosystems & Environment. 2009;129: 37–42.
20. Bański J. Geography of Polish country side. Polish Economic Publishing House, Warsaw. 2006;220.
  21. Ali S, Ripley SD. Birds of India and Pakistan. Oxford University Press, New Delhi. 1987;737.
  22. Baker JR. The relation between latitude and breeding seasons in birds. Proceedings of the Zoological Society of London. 1938;108:557–582.
  23. Immelmann K. Ecological aspects of periodic reproduction. Avian biology. 1971;1: 341–389.
  24. Pandian M. Baya weaver bird: Nest colonies and abnormal nests of *Ploceus philippinus* in Tindivanam Taluk, Villupuram District, Tamil Nadu, India. Bird-o-soar 24, In: Zoo's Print. 2018;33(12): 15–27.
  25. Pandian M, Ahimaz P. Nesting behaviour of the Baya Weaver Bird, *Ploceus philippinus* (Linnaeus) (Passeriformes: Ploceidae) in rural Tamil Nadu, India. International Journal of Ecology and Environmental Sciences. 2018;44(1): 33–42.
  26. Ali S, Ambedkar VC. Further notes on Baya, *Ploceus philippinus* (Linn.). Journal of the Bombay Natural History Society. 1957;54 (3):491-502.
  27. Pandian M. Incidences of White-rumped Munia occupying the nest of Baya Weaver in Villupuram District, Tamil Nadu. Bird-o-soar 65, In: Zoo's Print. 2021b ;36(1): 07-09.
  28. Sidhu SK, Kler TK. Assessment of heavy metal contamination in excreta of baya weaver bird (*Ploceus philippinus*) from three districts of different zones of Punjab. Bulletin of Environmental Contamination and Toxicology. 2021;106(5): 799-804.
  29. Bird Life International. *Ploceus philippinus*. The IUCN Red List of Threatened Species; 2024. 2016: e.T22719005A94606190. Accessed on 10 June 2024.

**Disclaimer/Publisher's Note:** The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of the publisher and/or the editor(s). This publisher and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.

© Copyright (2024): Author(s). The licensee is the journal publisher. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:  
<https://prh.mbimph.com/review-history/3885>