Open Acess
Jurnal Biota Vol. 9 No. 1 (2023) https://doi.org/10.19109/Biota.v9i1.11452

Research Article

A Study on Identification and Population Status of Birds in the Campus of Rani Anna Government College Tirunelveli India

Kumar Madhubala*, Pandiaraj Victoria Thangam
Department, Department of Zoology, Rani Anna Government College for women, Tiruneveli, Tamil Nadu, India
*Email: madhukumar3115@gmail.com

Received: 22/02/2022	Revised: 07/01/2023	Accepted: 08/01/2023

ABSTRACT
Birds are the important components of the food chain. Birds are vertebrate warm-blooded animals. Birds are ideal bio-indicators and useful models for studying a variety of environmental problems. As increasingly more attention is now being given to ecological studies, the methods employed in field ornithology warrant a closer examination. While in the developed world there has been extensive research on the standardization of bird-count techniques. Population density is the size of a population in relation to a definite unit of space. It is generally expressed as the number of individuals or the populations' biomass per unit area or volume in Campus of Rani Anna Government College, Tirunelveli India. There are a wide variety of field and statistical techniques for assessing animal abundance, which include complete counts, partial counts, and capture methods. The present study reports for 20 different bird species from 11 orders and 20 families were sighted from the selected sites in the hostel, ground and garden area in the college campus.

Key words: *Abundance; Birds; Bird Count techniques; Density; Population.*

Introduction

Living organisms are inseparably related with their physical and biological surroundings (Thompson, 2002). This inter-relationship of organisms with their physical and biotic environments is studied under a separate discipline of science as Ecology (Odum and Barrett, 2008). Ecological role of birds occupy many levels of tropic, from secondary consumers to top predators. Birds play a vital role in keeping the balance of nature. Birds are the important components of the food chain. (Rastogi and Jayaraj, 1987). Birds are vertebrate warm-blooded animals. (Salim, 2002) Birds, also known as Aves, are a group of endothermic vertebrates, characterized by feathers, toothless beakedjaws, the laying ofhard-shelledeggs, high metabolic rate, a four-chambered heart, and a strong yet light weight skeleton. Birds live worldwide and range in size from the 5 cm (2 inch) beehummingbird tothe 2.75 m (9 ft) ostrich. Birds are ideal bio-indicators and useful models for studying a variety of environmental problems. (Newton, 1995). As increasingly more attention is now being given to ecological studies, the methods employed in field ornithology warrant a closer examination. While in the developed world there has been extensive research on the standardization of bird-count techniques (Ralph & Scott 1981; Verner, 1985; Bibby et al., 2000), in the Indian context. However, it turnsout that most writings are fairly general in nature (Gaston, 1973; Verghese, 1995; Javed & Kaul, 2000; Urfi,

2004), leading one to suspect that scant attention has been paid to this subject. Birds migration is the regular seasonal movement, often north and south along a flyway between breeding and wintering grounds. Migration carries high costs in predation and mortality, including from hunting by humans, and is driven primarily by availability of food. Bird's communication consists not of speech as we know it, but of simple sounds and actions and enables birds. Several of these signals vocal, behavioral, or combinations of the two are understood not only by members of the same species but also by other birds generally (Salim, 2002).

Population density is the size of a population in relation to a definite unit of space. It is generally expressed as the number of individuals or the populations' biomass per unit area or volume. (Odum and Barrett, 2008). There are a wide variety of field and statistical techniques for assessing animal abundance, which include complete counts, partial counts, and capture methods (Seber, 1982; Lancia et al., 1994; Williams et al., 2002). Rarely it is possible to conduct complete counts as only portions of the area of interest can actually be counted and generally not all animals in the sample areas will be observed. Such counts require that data are collected in a manner that allows for the estimation of the fraction of the population that is sampled. The actual sampling approach used is generally species and/or habitat specific and may depend on the specific research question (Seber, 1982; Lancia et al.,1994).

The interest in estimating birds' abundance is that it is commonly used as a measure of population health by ornithologists and other biologists (Lack, 1954). Abundance estimates over successive years can provide information on population trends, which can be suggestive of population health (Ralph et al., 1995; Williams et al, 2002). Besides comparing abundance estimates between years it is also possible to compare between spatially distinct areas, which can provide information on habitat relationships or differences associated with management practices (Ralph et al., 1995). Comparisons that may be of interest are between unmanaged areas, such as National Parks, and actively managed areas, such as National Forests or state owned lands.

These comparisons can be important tools in adaptive management (Walters & Hilborn 1978), and for understanding changes that occur in animal populations. (Kabir, 2022). Birds-count programmes have been undertaken in a number of terrestrial habitats. (Raman & Mudappa 2003; Raman 2003; Robin and Sukumar 2002; Jayson & Mathew 2002; Robin & Davidar 2002). Most bird-count methods fall into the categories of 'total counts' and 'sampling estimates'. Population estimation exercises have been undertaken for a variety of birds such as the *Eudynamys scolopaceus*, Black drongo, Blue tailed bee-eater, Common myna, Common golden back wood pecker, Greater coucal, House crow, Indian peafowl, Indian roller, Indian treepie, Purple rumped sunbird, Red vented bulbul, rose ringed parakeet, Short toed snake-eagle, Spotted dove, Spotted owlet, White breasted king fisher, White headed babbler, White breasted water hen, Yellow bittern (Urfi et al., 2005).

The goal and objective of the present study was to collect the field data obtained from point count method during eight months periods at different locations of the college campus. In order to evaluate the situation of the birds' population found in our college campus, the numbers of birds found were recorded and reported using point countmethod. Counting of each individual bird can be a challenge, but it can also be valuable information for scientific research.

Materials and Methods

1. Counting Method - Point CountMethod

Point counts are used extensively as indices of spatial and temporal differences in bird abundance, and to assess habitat relationships, responses to environmental change or management, and species diversity (Ralph et al., 1995; Thompson, 2002). They are used across a spectrum of scales from long term continental-scale surveys such as the Breeding Bird Survey (Robbins et al., 1986; Sauer et al., 1997;

Sauer et al., 2003) to short term site specific studies (Ralph et al., 1995). The method adopted for the present study was short term sitespecific.

2. Studysite

The radius of the study area should be as large as possible to maximize information gathering, but not so large that birds cannot be seen throughout the survey area. For the present study, the selected areas are Hostel, Ground, and Garden inside the campus of Rani Anna Government College for Women, Tirunelveli- Tamil Nadu, South India. The college is located along the right side of Tirunelveli to Shenkottai 8 km away from Tirunelveli Junction. The total area of the campus is approximately 417 m. Three sites inside the campus were selected for the present task. Of the total area, the observed area covered in Hostel was about 110 m; in Ground was about 165 m, and in Garden was about 142 m. The birds were recorded that are seen within the normal 20 m radius. At the sametime, recorded bird sareseen with in a selected distance outs ide this 20 m radius. The birds counted within the 20 m radius would be marked in the "Number of Birds" column of the datasheet. This is a more difficult survey because one is counting birds within two different areas at once. One is counting birds within a 20 m radius and also within a circular band outside this 20 m radius. The purpose of surveying birds in this manner is that it allows one to compare across sites. A 20 m radius count that contains birds seen within 20 m radius can be compared to other 20 meter counts.

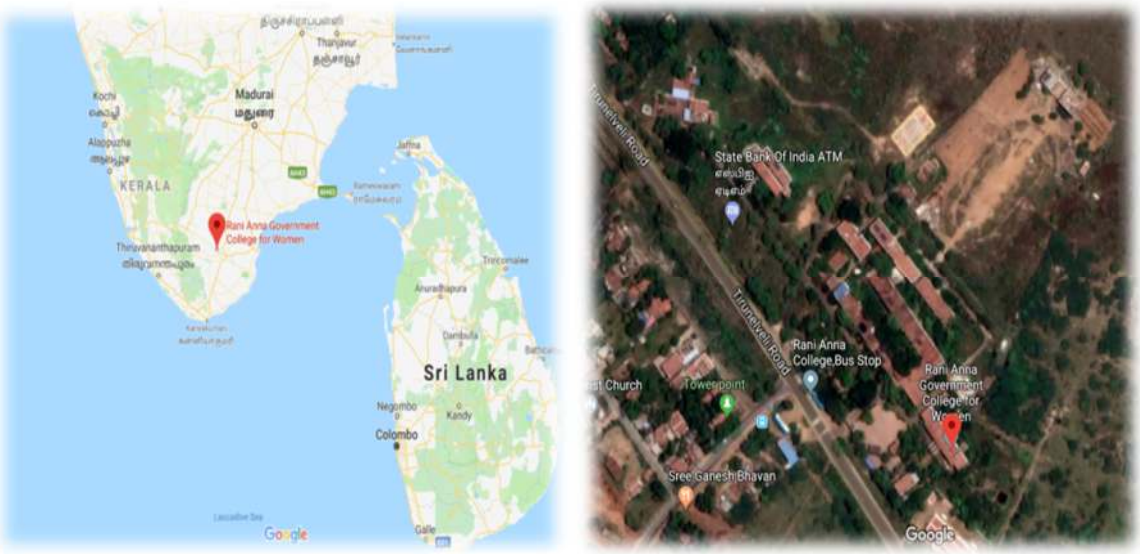

Figure 1. Site Map and Satelite Picture of Location of Study Area Campus Rani Anna Government College.

3. Time and Period of Counts

Point count survey was carried out for the duration of 10 minutes ona clear day in the first three hours (6.30 am-9.30 am) after sunrise and also from 5.30-6.30 pm before sunset (Ralph et al., 1995; Raman & Sukumar 2002; Raman 2003). As with the survey area, the time devoted to point counts must be consistent. The point counts will last for 10 minutes, 1-3 counts conducted per month, for eight consecutive months from July 2018 to February 2019. Birds are most active within three hours after sunrise. During point counts, record all birds seen and heard within the survey area.

4. Method of Counting the Birds

Intensive counting was adopted for point count, daily at specific time and sites with the aim of tracking the population change over time. Each day count is a sample of the birds resting in or passing through or over specified count area with a totals 24-hrs period. Once the survey has

started, all birds that were seen within the point count were recorded. Own codes were used to mark down the birds during the survey. Later the codes were transcribed to their full common name.

5. Population Status

The status of the sighted birds ares presented with frequency (number counted), probability of occurrence, relative percentage and relative abundance. The birds are also categorized as common and familiar birds, occasionally seen, seen often and rare birds. The relative frequency of occurrence and probability of occurrence of each bird counted on every month were calculated from the average of total counts in the observed period. The abundance was calculated using the given formula.

$$RA = \frac{\text{Total number of each species counted}}{\text{Total number of all species counted}}$$

RA: Relative Abundance

Results and Discussion

The present study reports for 20 different bird species from 11 orders and 20 families were sighted from the selected sites in the hostel, ground and garden area in the college campus (Table 1).

Population Status of the Observed Birds

Population statuses of the identified birds were reported in frequency, probability of occurrence, relative percentage and relative abundance for the observed period from July 2018 to February 2019. The relative abundance is same as the probability.

Table 1, different 20 species were identified. They belong to 11 orders and 20 families. The systematic classification of the identified birds where given for *Eudynamys scolopaceus*, Black drongo, Blue tailed bee-eater, Common myna, Common golden back wood pecker, Greater coucal, House crow, Indian peafowl, Indian roller, Indian treepie, Purple rumped sunbird, Red vented bulbul, rose ringed parakeet, Short toed snake-eagle, Spotted dove, Spotted owlet, White breasted king fisher, White headed babbler, White breasted water hen and Yellow bittern (Table.1). The birds counted on July 2018 showed maximum relative percentage of occurrence and abundance as 66%; 0.66 respectively in both the morning and evening of the observation hours in the selected locations for White headed babblers, other species were reported with least frequency. Birds count made in the month of August 2018, it shows 16 different types of birds were presentin the selectedsites. The percentage of occurrence and relative abundance was high for White headed babbler (58%; 0.58) and House crow (36%; 0.36). Black drongo, Spotted dove, Spotted owlet and White breasted king fisher were in least frequencies. The number birds deducted in the month of September 2018 were presented. The total count of all birds sighted were 522 in the morning and 271 in the evening. The highest relative percentage and abundance proportion was reported for White headed babbler (54%; 0.54) and House crow (43%; 0.43) followed by Indian peafowl (9%; 0.09), Purple rumped sunbird (8%; 0.08) and Rose ringed parakeet and *Eudynamys scolopaceus* (5%; 0.05). Two numbers of White breasted water hen were reported as a new deduction in the hostel area in this month. The bird's count recorded in the month of October was 471 birds in morning and 224 in evening. 18 different types of birds were reported from three sites. Higher frequency percentage and relative abundance was recorded for the familiar birds like White headed babbler (65%; 0.65).

Common golden back wood pecker was reported from all the three sites as a new and rare one. The bird's count in November was presented. Since rainfall occurred frequently in most of the days the birds' total count was declined compared to the other observation periods. The total frequency and the relative abundance of recorded birds were sharply reduced. Only 178 birds in the morning hours and 61 birds in the evening hours. Higher frequency percentage and relative abundance was recorded for the familiar birds like White headed babbler (43%;0.43). The counted birds belong to 13 species. The results of birds' count for December 2018.

Table 1. Birds count on July 2018-February 2019

No	Birds Name	Relative Percentage / Probability							
		July	August	September	October	November	December	January	February
1.	Eudynamys scolopaceus	200.20	10.10	80.08	100.10	100.10	90.09	80.08	70.07
2.	Black drongo	70.07	50.05	80.08	100.10	140.14	40.04	60.06	20.02
3.	Blue tailed bee-eater	-	-	20.02	50.05	10.01	110.11	10.01	20.02
4.	Common myna	310.31	340.34	310.31	300.30	230.23	280.28	330.33	500.50
5.	Commongolden back wood pecker	-	10.01	-	50.05	-	-	-	10.01
6.	Greater coucal	10.01	20.02	10.01	10.01	-	-	10.01	20.02
7.	House crow	100.10	360.36	430.43	280.28	520.52	230.23	350.35	330.33
8.	Indian peafowl	190.19	330.33	220.22	170.17	280.28	170.17	270.27	250.25
9.	Indian treepie	-	10.01	30.03	30.03	10.01	20.02	10.01	20.02
10.	Indian roller	-	-	10.01	10.01	-	10.01	20.02	-
11.	Purple rumped sunbird	70.07	80.08	130.13	80.08	110.11	170.17	260.26	200.20
12.	Red vented bulbul	-	-	10.01	10.01	-	10.01	10.01	20.02
13.	Rose ringed parakeet	280.28	90.09	90.09	100.10	90.09	100.10	30.03	70.07
14.	Short toed snake eagle	-	20.02	-	-	-	-	-	-
15.	Spotted dove	-	20.02	10.01	30.03	20.02	20.02	-	50.05
16.	Spotted owlet	-	10.01	40.04	30.03	30.03	40.04	30.03	30.03
17.	White breasted king fisher	10.01	20.02	-	20.02	-	-	-	10.01
18.	White breasted water hen	-	-	20.02	-	-	-	-	-
19.	White headed babbler	660.66	580.58	540.54	650.65	430.43	610.61	440.44	410.41
20.	Yellow bittern	-	20.02	10.01	-	100.10	30.03	50.05	30.03

The total number of birds' count has been increased to 331 in morning hours and 254 in the evening hours. Higher frequency percentage and relative abundance was recorded for the familiar birds like White headed babbler (61%;0.61). The bird count made in January is shown. The population status of the deducted species shows considerable variations among the counted birds. The relative abundance of familiar bird was White headed babbler (44%; 0.44). The relative abundance (13%; 0.13) of Purple rumped sunbird in both morning and evening hours were same. The attempt of bird's count in February is recorded. The onset of fall season is indicated by the more number of deductions of birds. 17 different types of birds were reported and tabulated. Higher frequency percentage and relative abundance was recorded for the familiar birds like Common myna (50%;0.50) and White headed babbler (41%;0.41). Thus the results of the present study emphasize the importance of birds count even in the residential area. The bird watching is an art and a kind of entertainment for mind relaxation.

Estimation and monitoring the population status of birds in the college campus revealed the availability of common and familiar resident birds, birds seen often, occasional Visitors and rare birds. The relative frequency and abundance indicate the population status of the deducted avian fauna. As the populations of birds change, those fluctuations may indicate shifts in pollution levels, climate change, habitat loss, migration timing, and more anthropogenic disturbances. It is high time of every one to take pledge as not to indulge in any kind of destructive activity against the birds, the glorious flyers with beautiful, colorful and adorable plumage. The role of birds in the trophic level of the ecosystem is seldom replaceable. So conserve and protect bird population is needed urgently. Creating awareness among public and students, Habitat development, tree plantation, watch tower establishment, providing nesting and breeding ground, enough foraging area are must to be initiated and implemented immediately.

Conclusion

Thus the results of the present study emphasize the importance of birds count even in the residential area. The bird watching is an art and a kind of entertainment for mind relaxation. Estimation and monitoring the population status of birds in the college campus revealed the availability of common and familiar resident birds, birds seen often, occasional visitors and rare birds. The relative frequency and abundance indicate the population status of the deducted avian fauna. The role of birds in the trophic level of the ecosystem is seldom replaceable. So conserve and protect bird population is needed urgently. Creating awareness among public and students, Habbit development, tree plantation, watch tower establishment, providing nesting and breeding ground, enough foraging area are must to be implemented immediately, conserve and protect bird population is needed urgently.

References

Bibby, C., Burgess, N. D. and Hill, D. A., 2000. Bird Census Techniques, Academic Press, London.

Gaston, A. J., Methods for estimating bird populations. J. Bombay Nat. Hist. Soc., 1973, 72, 271–283.

Javed, S. and Kaul, R., 2000. Field methods for bird surveys, Bombay Natural History Society, Department of Wildlife Science, Aligarh Muslim University, Indian Bird Conservation Network, World Pheasant Association.

Jayson, E. A. and Mathew, D. N., 2002. Structure and composition of two bird communities in the southern Western Ghats. J. Bombay Nat. Hist. Soc., 99, 8–25.

Kabir, A. (2022). Characteristics and Productivity of Some Pigeon Breeds in Bangladesh (Aves: Columbidae). *Jurnal Biota*, *8*(2), 66-70. https://doi.org/https://doi.org/10.19109/Biota.v8i2.11528

Lack, D., 1954. The Natural Regulation of Animal Numbers. Oxford University Press, London.

Lancia, R.A., Nichols, J.D. and Pollock, K.H. 1994. Estimating the number of animals in wildlife populations. Pages 215-253 in Research and management techniques for wildlife and habitats (T. Bookhout, Ed.). The Wildlife Society, Bethesda, Maryland.

Newton, I., 1995. The contribution of some recent research on birds to ecological understanding. J*ournal of Animal Ecology 64(*6*):675.* https://doi.org/10.2307/5848

Odum, E.P., and Barrett, G.W., 2008. Fundamentals of Ecology, Fifth edition,Cengage learning India Private Limited, Printed in India by Akash Press.224-226.

Ralph, C. J. and Scott, M. J. (eds), 1981. Studies in Avian Biology: Estimating Numbers of Terrestrial Birds, Cooper Ornithological Society, Kansas, USA, vol. 6, pp. 1–630. https://sora.unm.edu/sites/default/files/journals/sab/sab_006.pdf

Ralph, J.C., Droege, S., and Sauer, J.R., 1995. Managing and monitoring birds using point counts: Standards and applications. Pages 161-168 in Monitoring bird populations by point counts (J.C. Ralph, J.R. Sauer, and S. Droege (Eds.)). United States Forest Service General Technical Report PSW-GTR-149. https://www.fs.usda.gov/research/treesearch/31755

Raman, T. R. S. and Mudappa, D., 2003. Correlates of hornbill distribution and abundance in rainforest fragments in the southern Western Ghat, India. Bird Conserv. Int., 13, 199–212.

Raman, T. R. S., and Sukumar. R, 2002. Responses of tropical rainforest birds to abandoned plantations, edges and logged forest in the Western Ghats, India. Animal conservation 5(3): 201-216.

Raman, T. R. S., 2003. Assessment of census techniques for interspecific comparisons of tropical rainforest bird densities: a field evaluation in the Western Ghats, India. *Ibis*, 165 (1). 145, 9–21. https://doi.org/10.1046/j.1474-919X.2003.00105.x

Rastogi, V.B., and Jayaraj, M.S., 1987. Animal Ecology and Distribution of Animals, Eigth revised Edition, Kedarnath Ramnath, Meerut, Delhi. Page No.3-156.

Robin, V. V. and Davidar, P., 2002. The Vertical stratification of birds in mixed species flocks at Parambikulam, South India: A comparison between two habitats. *J. Bombay Nat. Hist. Soc*., 99. 389– 399. https://www.biodiversitylibrary.org/page/48604297#page/417/mode/1up

Robin, V., & Sukumar, R. (2002). Status and habitat preference of White-bellied Shortwing Brachypteryx major in the Western Ghats (Kerala and Tamilnadu), India. *Bird Conservation International, 12*(4), 335-351. https://doi.org/10.1017/S0959270902002216

Robbins, C.S., D. Bystrak, and P.H. Geissler. 1986. The breeding Bird Survey: its first fifteen years, 1965-1979. United States Fish and Wildlife Service Resources Publication No.157. https://apps.dtic.mil/sti/pdfs/ADA323126.pdf

Salim Ali, 2002. The Book of Indian Birds, thirteenth Edition, Revised., Bombay Natural History Society, Oxford., University Press. Page No. 65-289.

Sauer, J.R., Hines, J.E.,Gough, G.,Thomas, I., and Peterjohn, B.G., 1997. The North American Breeding Bird Survey results and analysis. Version 96.4. Patuxent Wildlife Research Center, Laurel, MD.

Sauer, J.R., J.E. Hines, and J.Fallon. 2003. The North American Breeding Bird

Survey, results and analysis 1966-2002. Version 2003.1, USGS Patuxent Wildlife Research Center, Laurel, MD.

Seber, G.A.F.,1982. The Estimation of Animal Abundance and Related Parameters (2nd ed.). Edward Arnold, London.

Thompson, W.L. 2002. Towards reliable bird surveys: accounting for individuals present but not detected. Auk. *BioOne Complate. 119* (1).:18-25. https://doi.org/10.1642/0004-8038(2002)119[0018:TRBSAF]2.0.CO;2

Urfi, A. J., 2004. Birds Beyond Watching, Universities Press, Hyderabad.

Urfi, A. J., Sen, M., Kalam, A., & Meganathan, T. (2005). Counting birds in India: Methodologies and trends. *Current Science*, *89*(12), 1997–2003. http://www.jstor.org/stable/24111060

Verghese, A., 1995. In Bird Diversity and Conservation Strategies for Nineties and Beyond: Estimating Bird Numbers, Ornithological Society of India, Bangalore, pp. 77–84.

Verner, J., 1985. In Current Ornithology: Assessment of Counting Techniques (ed. Johnston, R. F.), Plenum Press, vol. 2, pp. 247–302.

Walters, C.J. and Hilborn, R. 1978. Ecological optimization and adaptive management. *Annual Review of Ecology and Systematics 9*. 157-188. https://doi.org/10.1146/annurev.es.09.110178.001105

Williams, B.K., Nichols, J.D., and Conroy,M.J., 2002. Analysis and Management of Animal Populations. Academic Press. San Diego, CA. https://pubs.er.usgs.gov/publication/5200256