



Preferential nesting trees of some common birds of district Udhampur, Jammu & Kashmir (UT), India

Brinder Kumar^{1,2*}, Ruchika Saroa¹ and Sanjay Kotwal³

¹School of Bioscience, RIMT University, Mandi Gobindgarh, Punjab, India

²Department of Zoology, GGM Science College Jammu, J&K, India

³Zoology Department, Govt. Degree College Paloura, Jammu, J&K, India
bkgorka14@gmail.com

Available online at: www.isca.in, www.isca.me

Received 3rd November 2023, revised 24th December 2023, accepted 20th January 2024

Abstract

The present study was carried out to find the nesting preference of some common bird species in relation to the common trees at the study area. Nesting pattern of 29 different bird species was observed on 32 trees/plants species. Selection of nesting site, nest characteristics were monitored and studied. Total of 384 nests, maximum nests 73 on Bottlebrush plant, 34 on Fishtail Palm, 29 on Kainth tree, 27 on Mango tree, 23 each on Tooni tree and Kikar tree, 21 on Jamun tree, 17 on Sheesham tree, 13 on Banyan tree, 11 each on Simbal, Eucalyptus tree and Pulai tree and 10 on Mulberry were found. Out of 32 nesting tree *Mangifera indica*, *Toona ciliata*, *Ficus benghalensis*, *Pyrus pashia*, *Acacia catechu*, *Morus alba*, *Psidium guajava*, *Ficus religiosa*, *Bombax ceiba*, *Neolamarckia cadamba*, *Melia azedarach*, *Acacia modesta* were found to be the most preferred nesting site by different avifaunal species.

Keywords: Bird species, nesting trees, nesting birds, nest types, Udhampur.

Introduction

Avian group forms an essential component in an ecosystem. The numbers of avian species need to be conserved by protecting their habitats. The study of avian fauna and their richness in a particular area is a preliminary step for the conservation of avifaunal diversity^{1,2}. The distribution of avian fauna in a particular habitat depends upon various factors which generally include i.e. presence of proper food, perching area and nesting sites³. Different avian species used even a single ecosystem in distinct ways⁴. The variables such as foliage height, vegetation cover, connectivity, heterogeneity in a habitat can all have impact on abundance and diversity of avifauna^{5,6}. During breeding season, a nest is very important for birds specifically, to hold and incubate their eggs, and raise their nestlings^{7,8}.

A particular habitat selection by the birds mainly depends upon the availability of nesting sites in that habitat. The nesting site is significantly affected by food accessibility, presence of appropriate nesting materials, protection from predation and relevance of nesting area⁸. Avian diversity has been documented by various workers in J&K (UT)⁹⁻²¹. The breeding and nesting pattern of common terrestrial birds in Jammu region has not been reported in detail, and the information especially from district Udhampur (32.93°N 75.13°E) is found scattered. Few reports on nesting that exist are limited to individual species only²²⁻²⁵. In this paper we presented a brief account of our observation on nesting patterns of some terrestrial birds in district Udhampur of JK (UT).

Materials and Methods

Study Area: The present study was carried out in the suburban part of district Udhampur, J&K (UT), India. Udhampur district is located in the Shivalik range of Himalayas which is a part of the Northwest Lower Himalayas with generally hilly landscape (Figure-1). Udhampur city is located (32.93°N 75.13°E) in a comparatively semi plateau part of the district and at an altitude of 756m (amsl). The weather condition of the study area is sub-tropical and the temperature varies between 40°C to 2°C in summer and winter season, sometimes dips to zero with annual rainfall is 130cm generally in rainy season and winters due to Western disturbances. This suburban habitat of district Udhampur is surrounded by the scrubby forest, mixed deciduous forest, and coniferous forest hills.

The area is drain by particularly Tavi River and various streams in the form of nalas and khad. The UT has 39 forest types²⁶ and the district is home to different forest types that includes coniferous forest, mixed deciduous forest, scrubby forest, moist temperate, dry temperate, sub-tropical etc. This varied range provides a specific habitat to different flora and fauna. The dominant plant species include *Ficus benghalensis*, *F. religiosa*, *Toona ciliata*, *Grewia optiva*, *Morus alba*, *Mangifera indica*, *Psidium guajava*, *Ficus carica*, *Cedrus deodara*, *Pinus roxburghii*, *Pinus wallichiana*, *Cupressus*, *Pyrus malus*, *Pyrus pashia*, *Melia*. Shrubs include *Adhatoda vesica*, *Vitex negundo*, *Berberis lycium*, *Wood fordia*, *Carissa opaca*, *Colebrookea oppositifolia*, *Dodonaea viscosa*.

Material: To record the observations binocular (8x42 Nikon) was used and the photographs were taken with help of Nikon (D5300 with 70-300mm) zoom camera for easy and correct documentation of bird species. Ravi altimeter was used to study the height of nesting trees and nests.

Methods: Primary data was collected during the breeding season in summer from March-June 2023, when most land birds breed in the area. Documentation of the recorded avian species was done with help of published field guides, reference books and pertinent literature: Handbook of Birds of India and Pakistan²⁷, The Book of Indian Birds²⁸, A photographic guide to birds of India²⁹. Validation of the avian species was done with the help of Birds of Indian Subcontinent³⁰. Survey of breeding birds was done early in the morning and before sunset in the evening. Nests were sited and data on nest characteristics and nest-sites were collected using established methodologies³¹. The plant types on which nests were located were also identified and recorded with the help of Mobile apps for nature field guides³², The Sibley Guide to Trees³³.

Bottlebrush plant, 34 on Fishtail Palm, 29 on Kainth tree, 27 on Mango tree, 23 each on Tooni tree and Kikar tree, 21 on Jamun tree, 17 on Sheesham tree, 13 on Banyan tree, 11 each on Simbal, Eucalyptus tree and Pulai tree and 10 on Mulberry were found. Colonies of Baya weavers consisting of 98 nests, recorded on Kainth tree (*Pyrus pashia*), Fishtail Palm (*Caryota urens*), Sheesham tree (*Dalbergia sissoo*), Tooni (*Toona ciliate*), Khadak (*Neolamarckia cadamba*), Jamun tree (*Syzygium cumini*), Eucalyptus (*Eucalyptus globulus*) with proximity to water. Mixed nesting colony of Cattle egret (67) & Pond heron (6) was recorded on a single Bottlebrush tree (*Callistemon spp.*). Scaly-breasted Munia consisting of 33 nests were recorded on Kikar tree (*Acacia nilotica*), Khair (*Acacia catechu*), Northern white cedar (*Thuja occidentalis*), Pulai tree (*Acacia modesta*). It was found that Scaly-breasted Munia usually preferred thorny tree for nesting to prevent their nestlings from predation. Red-vented bulbul consisting of 23 nests were recorded on diverse tree species, Mango tree (*Mangifera indica*), Kainth (*Pyrus pashia*), Tooni (*Toona ciliate*), Edible fig tree (*Ficus carica*), Mulberry tree (*Morus alba*), Guava tree (*Psidium guajava*), Banyan tree (*Ficus benghalensis*), Kala umbar (*Ficus hispida*), Orchid tree (*Bauhinia variegata*), Garnu tree (*Carissa spinarum*), Moth plant (*Araujia spp.*). 21 nests of Rose Ringed Parakeet were recorded on *Mangifera indica*, *Toona ciliate*, *Melia azedarach*, *Morus alba*, *Ficus religiosa*, *Ficus benghalensis*, *Alvizia lebbeck*. 17 nests of Indian Spotted Dove were observed on *Mangifera indica*, *Pyrus pashia*, *Grewia optiva*, *Psidium guajava*, *Carissa spinarum*, *Acacia modesta*, *Ziziphus mauritiana*. 11 nests of Black kite were recorded on *Ficus racemose*, *Ficus benghalensis*, *Eucalyptus globulus*, *Bombax ceiba*. 9 nests of Brown-headed barbet were found on *Mangifera indica*, *Ficus religiosa*, *Ficus benghalensis*, *Alvizia lebbeck*. 9 nests each of Jungle crow on *Bombax ceiba*, *Ficus benghalensis*, *Pinus roxburghii* and Indian Myna on *Melia azedarach*, *Ficus religiosa*, *Ficus benghalensis*, *Acacia modesta* were reported. 8 nests each of Paradise Flycatcher on *Pyrus pashia*, *Toona ciliate*, *Neolamarckia cadamba*, Blue-throated Barbet on *Melia azedarach*, *Morus alba*, *Ficus religiosa*, Indian Tailor Bird on *Morus alba*, *Psidium guajava*, *Mangifera indica* were found. 7 nests each of Jungle babbler on *Bauhinia variegata*, *Alvizia procera*, *Morus alba* and Oriental White-eye on *Neolamarckia cadamba*, *Psidium guajava* were reported. 6 nests each of Black Drongo on *Alstonia scholaris*, *Toona ciliate*, *Mangifera indica* and Indian Pond heron on a single tree *Callistemon spp.* were found. 5 nests each of Indian Golden Oriole on *Mangifera indica*, *Ficus benghalensis*, Lesser Golden Backed Woodpecker on *Mangifera indica*, *Toona ciliate*, *Acacia catechu*, Indian Grey hornbill on *Toona ciliate*, *Acacia catechu*, Coppersmith barbet on *Acacia catechu*, *Alvizia procera* were reported. 4 nests of Indian Shikra on *Toona ciliate*, *Neolamarckia cadamba*, 3 nests of Northern Spotted Owllet on *Ficus benghalensis*, 2 nests each of Brahminy Starling and Oriental Magpie Robin on *Mangifera indica*, House crow on *Bombax ceiba* Ashy prinia on *Morus alba* were reported. 1 nest each of Himalayan Bulbul and Purple Sunbird on *Aristolochia elagens* was found (Table 2).

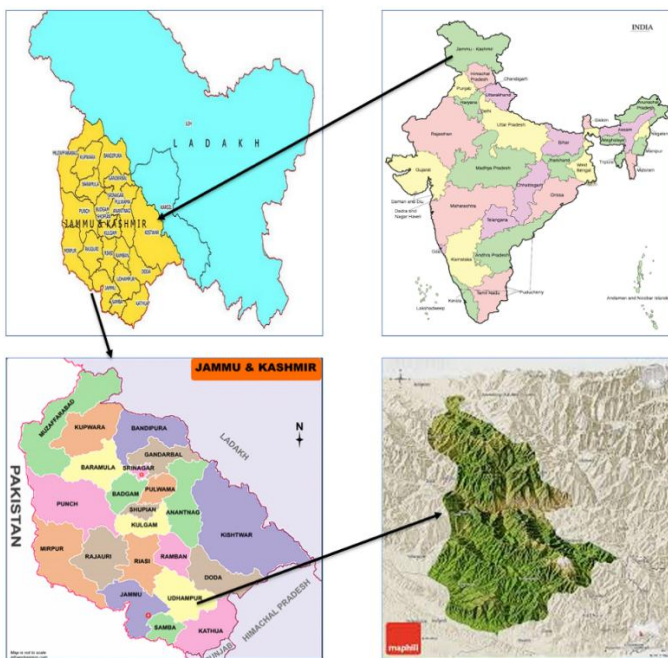


Figure-1: Map of Jammu & Kashmir (UT) and study area of district Udhampur.

Results and Discussion

In the present study a total of 29 bird species were reported to use thirty-two preferred tree species for nesting. Table-2 shows that total 384 nests were recorded during the study period. Baya Weavers found to be made highest (98) number of nests followed by Cattle egret (67), Scaly-breasted Munia (33), Red-vented Bulbul (23), Rose-ringed Parakeet (21), Indian Spotted dove (17) and Black kite (11) as shown in Table-2. Table-1 represents that out of 384 nests maximum nests 73 on

Figure-2 shows that Mango tree (*Mangifera indica*), Tooni (*Toona ciliata*), Banyan tree (*Ficus benghalensis*), Kainth (*Pyrus pashia*), Khair (*Acacia catechu*), Mulberry tree (*Morus alba*), Guava tree (*Psidium guajava*), Peepal tree (*Ficus religiosa*), Simbal tree (*Bombax ceiba*), Pulai tree (*Acacia modesta*), Khadak (*Neolamarckia cadamba*) and Drank tree (*Melia azedarach*) were mostly preferred by different avian species for nesting. It was found during the study that maximum nests were of cup shaped nest (10), cavity nest (10) and followed by Platform nest (6), dome shaped nest (1), purse shaped nest (1) and pendant shaped nest (1) used by the nesting birds as shown in Figure-3 and Figure-4. Chi-square test revealed that there is a significant relation between the nest height and tree height at 0.05 degree of freedom. Figure-5 shows that correlation coefficient, $r=0.74$ and $r^2=0.548$. Figure-6 shows that the avian species like Black kite, Jungle crow, House crow, Black Drongo, Cattle egret, Indian Pond heron and

Indian shikra mostly preferred to builds nests towards the top of nesting trees. Baya weavers also prefers to build nests on tall trees at the maximum height. Indian golden oriole, Brahminy starling, Red-vented bulbul, Oriental magpie robin, Brown headed barbet, Indian spotted dove, Rose-ringed parakeet, Lesser Golden backed woodpecker, Indian grey hornbill, Indian Myna, blue-throated barbet, Northern spotted owl, Jungle babbler, Himalayan bulbul and purple sunbirds build their nests in the middle of the nesting trees. Paradise flycatchers, Oriental white eye, Scaly-breasted munia, Indian Tailored bird and Ashy Prinia usually build their nests towards ground on the nesting trees. Overall, the nesting behaviour of the birds in the study area of district Udhampur indicates that most of the terrestrial birds either prefer thorny branches or the large canopy trees perhaps to protect its nest and nestlings from predation by the predatory birds and animals.

Table-1: Observations on the selected tree species and nesting bird species.

Tree species	No of Bird species	No of nest found	Bird species nesting
Mango tree (<i>Mangifera indica</i>)	10	27	Indian Golden Oriole, Black Drongo, Brahminy Starling, Red- vented Bulbul, Oriental Magpie Robin, Brown-headed barbet, Indian Spotted Dove, Rose Ringed Parakeet, Lesser Golden Backed Woodpecker, Indian Tailor Bird
Simbal tree (<i>Bombax ceiba</i>)	3	11	Black Kite, Jungle crow, House crow
Kainth (<i>Pyrus pashia</i>)	4	29	Paradise Flycatcher, Baya Weaver, Indian Spotted Dove, Red- vented Bulbul
Fishtail Palm (<i>Caryota urens</i>)	1	34	Baya Weaver
Sheesham tree (<i>Dalbergia sissoo</i>)	1	17	Baya Weaver
Tooni (<i>Toona ciliata</i>)	8	23	Black Drongo, Baya Weaver, Red- vented Bulbul, Paradise Flycatcher, Indian Grey hornbill, Lesser Golden Backed Woodpecker, Indian Shikra, Rose Ringed Parakeet, Fulvous-breasted woodpecker
Khadak (<i>Neolamarckia cadamba</i>)	3	7	Baya Weaver, Paradise Flycatcher, Indian Shikra, Oriental White-eye
Drank tree (<i>Melia azedarach</i>)	3	9	Indian Myna, Rose Ringed Parakeet, Blue-throated Barbet
Khair (<i>Acacia catechu</i>)	4	8	Scaly-breasted Munia, Coppersmith barbet, Indian Grey hornbill, Lesser Golden Backed Woodpecker
Tamman (<i>Grewia optiva</i>)	1	2	Indian Spotted Dove
Jamun tree (<i>Syzygium cumini</i>)	1	21	Baya Weaver
Rumbel (<i>Ficus racemose</i>)	1	3	Black kite
Edible fig tree (<i>Ficus carica</i>)	1	2	Red- vented Bulbul
Mulberry tree (<i>Morus alba</i>)	4	10	Red- vented Bulbul, Blue-throated Barbet, Indian Tailor Bird, Rose Ringed Parakeet, Ashy prinia
Guava tree (<i>Psidium guajava</i>)	4	7	Red- vented Bulbul, Indian Spotted Dove, Oriental White-eye, Indian Tailor Bird
Peepal tree	4	9	Blue-throated Barbet, Brown-headed barbet, Rose Ringed Parakeet,

(<i>Ficus religiosa</i>)			Common Myna
Banyan tree (<i>Ficus benghalensis</i>)	8	13	Brown-headed barbet, Rose Ringed Parakeet, Common Myna, Indian Golden Oriole, Black kite, Northern Spotted Owlet, Red-vented Bulbul, Jungle crow
Kala umbar (<i>Ficus hispida</i>)	1	4	Red-vented Bulbul
Eucalyptus (<i>Eucalyptus globulus</i>)	2	11	Black kite, Baya Weaver
Pine tree (<i>Pinus roxburghii</i>)	1	3	Jungle crow
Bottlebrush tree (<i>Callistemon spp.</i>)	2	73	Cattle egret, Indian Pond heron
Orchid tree (<i>Bauhinia variegata</i>)	2	4	Red-vented Bulbul, Jungle babbler
Kala sree (<i>Alvizia lebeck</i>)	2	3	Rose Ringed Parakeet, Brown-headed barbet
Karoi tree (<i>Alvizia procera</i>)	2	4	Coppersmith barbet, Jungle Babbler
Scholar tree (<i>Alstonia scholaris</i>)	1	2	Black Drongo
Garnu tree (<i>Carissa spinarum</i>)	2	3	Indian Spotted Dove, Red-vented Bulbul
Pulai tree (<i>Acacia modesta</i>)	3	11	Indian Spotted Dove, Indian common Myna, Scaly-breasted munia
Kikar tree (<i>Acacia nilotica</i>)	1	23	Scaly-breasted munia
Ber tree (<i>Ziziphus mauritiana</i>)	1	3	Indian Spotted Dove
Northern white cedar (<i>Thuja occidentalis</i>)	1	4	Scaly-breasted munia
(Moth plant) <i>Araujia spp.</i>	1	1	Red-vented Bulbul
Elegant Dutchman's pipe (<i>Aristolochia elagens</i>)	2	3	Himalayan Bulbul, Purple sunbird

Table-2: Observations on the nesting of bird species on selected tree species.

Bird species	Nesting Tree	Types of Nests	No of nesting trees	No of nest found	Average nest height from ground (in feet)	Average tree height
Indian Golden Oriole (<i>Oriolus Oriolus Kundoo</i>)	<i>Mangifera indica, Ficus benghalensis</i>	Cup nest	2	5	11.25	48.75
Black Drongo (<i>Dicrurus Adsimilus</i>)	<i>Alstonia scholaris, Toona ciliate, Mangifera indica</i>	Cup nest	3	6	15.6	24.8
Brahminy Starling (<i>Sturnus pagodarum</i>)	<i>Mangifera indica</i>	Cavity nest	1	2	10	22.5
Red-vented Bulbul (<i>Pycnonotus Cafer Cafer</i>)	<i>Mangifera indica, Pyrus pashia, Toona ciliate, Ficus carica, Morus alba, Psidium guajava, Ficus benghalensis, Ficus hispida, Bauhinia variegata, Carissa spinarum, Araujia spp.</i>	Cup nest	11	23	9	17.5

Oriental Magpie Robin (<i>Copsychus saularis</i>)	<i>Mangifera indica</i>	Cavity nest	1	2	9	20
Brown-headed barbet (<i>Psilopogon zeylanicus</i>)	<i>Mangifera indica, Ficus religiosa, Ficus benghalensis, Alvezia lebeck</i>	Cavity nest	4	9	9.5	29.75
Indian Spotted Dove (<i>Streptopelia chinensis</i>)	<i>Mangifera indica, Pyrus pashia, Grewia optiva, Psidium guajava, Carissa spinarum, Acacia modesta, Ziziphus mauritiana</i>	Cup nest	7	17	8.7	14
Rose Ringed Parakeet (<i>Psittacula krameri Manillensis</i>)	<i>Mangifera indica, Toona ciliate, Melia azedarach, Morus alba, Ficus religiosa, Ficus benghalensis, Alvezia lebeck</i>	Cavity nest	7	21	15.7	31
Lesser Golden Backed Woodpecker (<i>Dinopium benghalense benghalense</i>)	<i>Mangifera indica, Toona ciliate, Acacia catechu</i>	Cavity nest	3	5	25.6	48
Black Kite (<i>Milvus migrans</i>)	<i>Ficus racemose, Ficus benghalensis, Eucalyptus globulus, Bombax ceiba</i>	Platform nest	4	11	29	47.75
Jungle crow (<i>Corvus macrorhynchos culminates</i>)	<i>Bombax ceiba, Ficus benghalensis, Pinus roxburghii</i>	Platform nest	3	9	36.3	51.6
House crow (<i>Corvus splendens splendens</i>)	<i>Bombax ceiba</i>	Platform nest	1	2	27	45
Paradise Flycatcher (<i>Terpsiphone paradise paradise</i>)	<i>Pyrus pashia, Toona ciliate, Neolamarckia cadamba</i>	Cup nest	3	8	10	37.3
Baya Weaver (<i>Ploceus Phillipinus</i>)	<i>Pyrus pashia, Caryota urens, Dalbergia sissoo, Toona ciliate, Neolamarckia cadamba, Syzygium cumini, Eucalyptus globulus</i>	Pendant nests	7	98	18	29.57
Indian Grey hornbill (<i>Ocyzeros Birostris</i>)	<i>Toona ciliate, Acacia catechu,</i>	Cavity nest	2	5	15.5	46.5
Indian Shikra (<i>Accipiter badius dussumieri</i>)	<i>Toona ciliate, Neolamarckia cadamba</i>	Platform nest	2	4	32.5	43
Oriental White-eye (<i>Zosterops Palpebrosus</i>)	<i>Neolamarckia cadamba, Psidium guajava</i>	Cup nest	2	7	6.5	19
Indian Myna (<i>Acridotheres tristis tristis</i>)	<i>Melia azedarach, Ficus religiosa, Ficus benghalensis, Acacia modesta</i>	Cavity/ open nest	4	9	18.25	49
Blue-throated Barbet (<i>Megalaima asiatica</i>)	<i>Melia azedarach, Morus alba, Ficus religiosa</i>	Cavity nest	3	8	14.6	33
Scaly-breasted Munia (<i>Lunchura punctulate</i>)	<i>Acacia catechu, Acacia nilotica, Thuja occidentalis, Acacia modesta</i>	Dome-shaped nest	4	33	10.25	22.5
Coppersmith barbet (<i>Psilopogon haemacephalu</i>)	<i>Acacia catechu, Alvezia procera</i>	Cavity nest	2	5	9.5	35.5
Indian Tailor Bird (<i>Orthotomus Sutorius Guzurus</i>)	<i>Morus alba, Psidium guajava, Mangifera indica</i>	Cup nest	3	8	3.3	14

Ashy prinia (<i>Prinia socialis</i>)	<i>Morus alba</i>	Cup nest	1	2	2	4
Northern Spotted Owlet (<i>Athene brama indica</i>)	<i>Ficus benghalensis</i>	Cavity nest	1	3	19	48
Cattle egret (<i>Bubulcus ibis</i>)	<i>Callistemon spp.</i>	Platform nest	1	67	15.5	19
Indian Pond heron (<i>Ardeola Grayii Grayii</i>)	<i>Callistemon spp.</i>	Platform nest	1	6	15.5	19
Jungle babbler (<i>Turdoides striatus somervillei</i>)	<i>Bauhinia variegata, Alvizia procera, Morus alba</i>	Cup nest	3	7	11.5	19.3
Himalayan Bulbul P. (<i>Leucogenys leucogenys</i>)	<i>Aristolochia elagens</i>	Cup nest	1	1	6.6	11
Purple Sunbird (<i>Nectarinia Asciatica asiatica</i>)	<i>Aristolochia elagens</i>	Purse nest	1	1	6	9

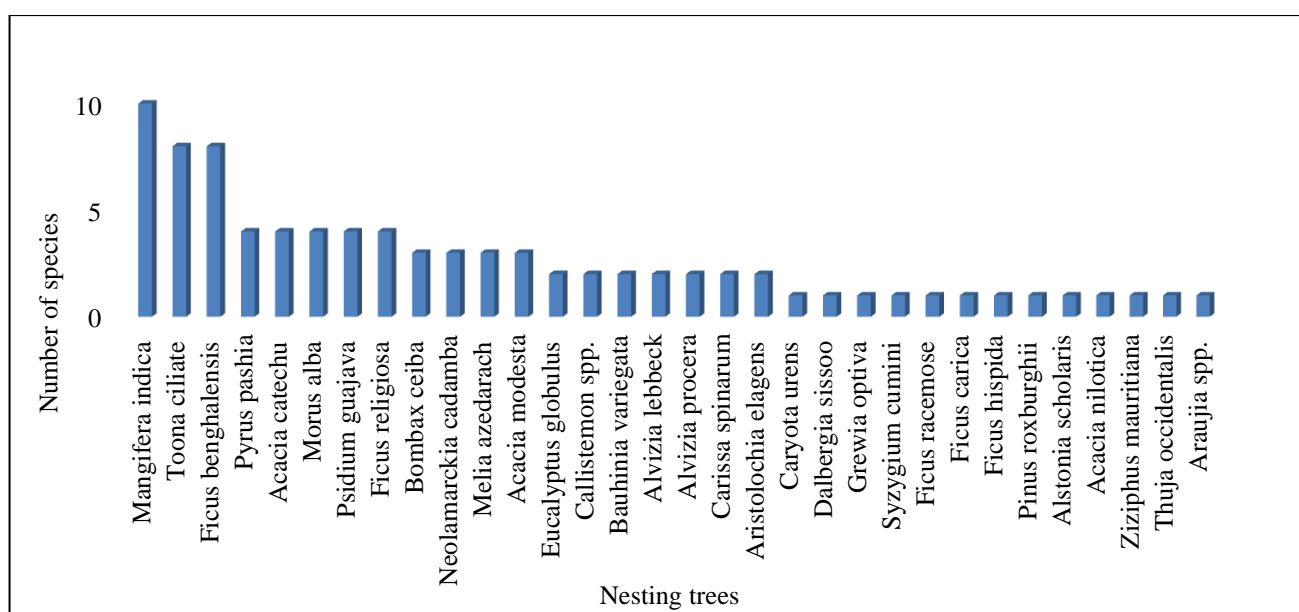


Figure-2: Bar chart representing the numbers of bird species nesting on individual tree.

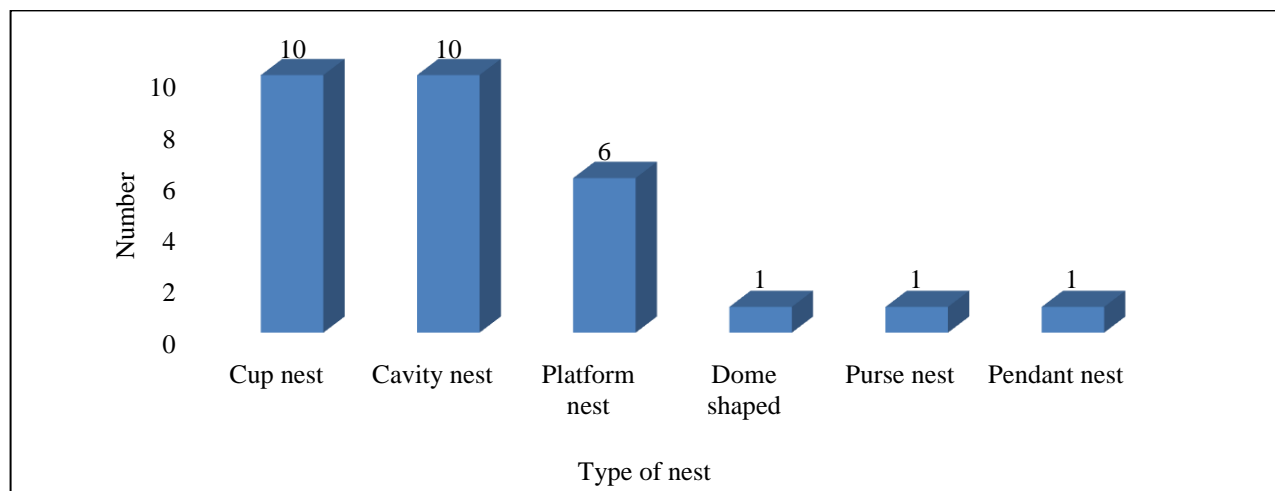


Figure-3: Bar chart showing the types of nest observed at study area.

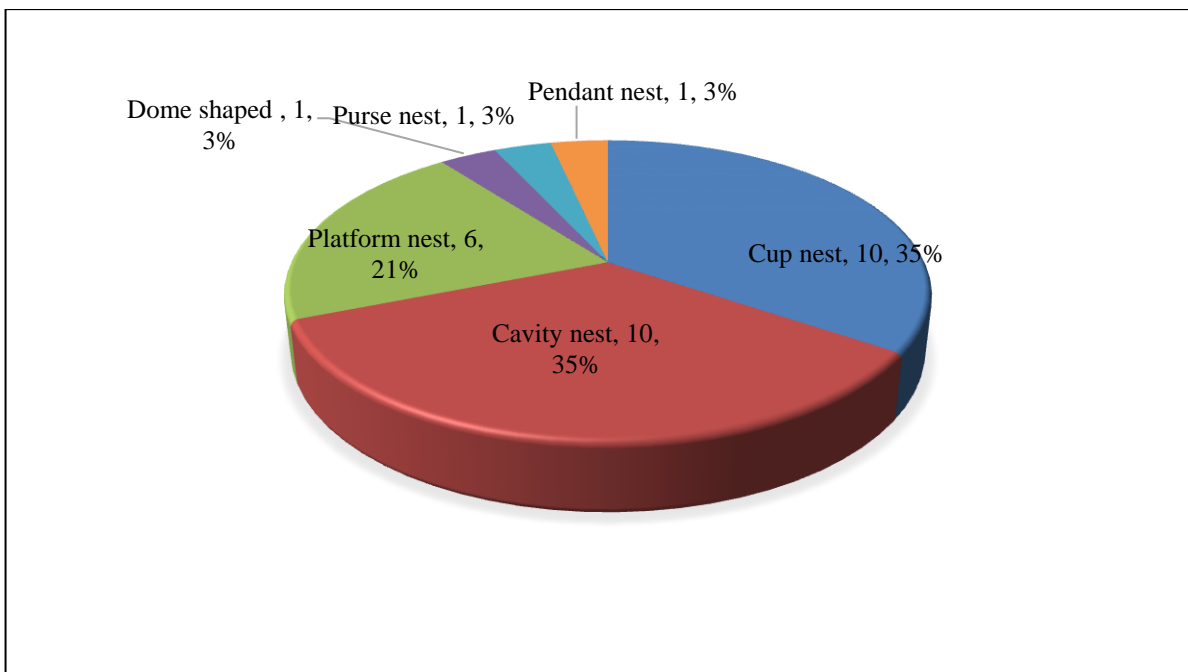


Figure-4: Pie chart showing the % of nest types observed at study area.

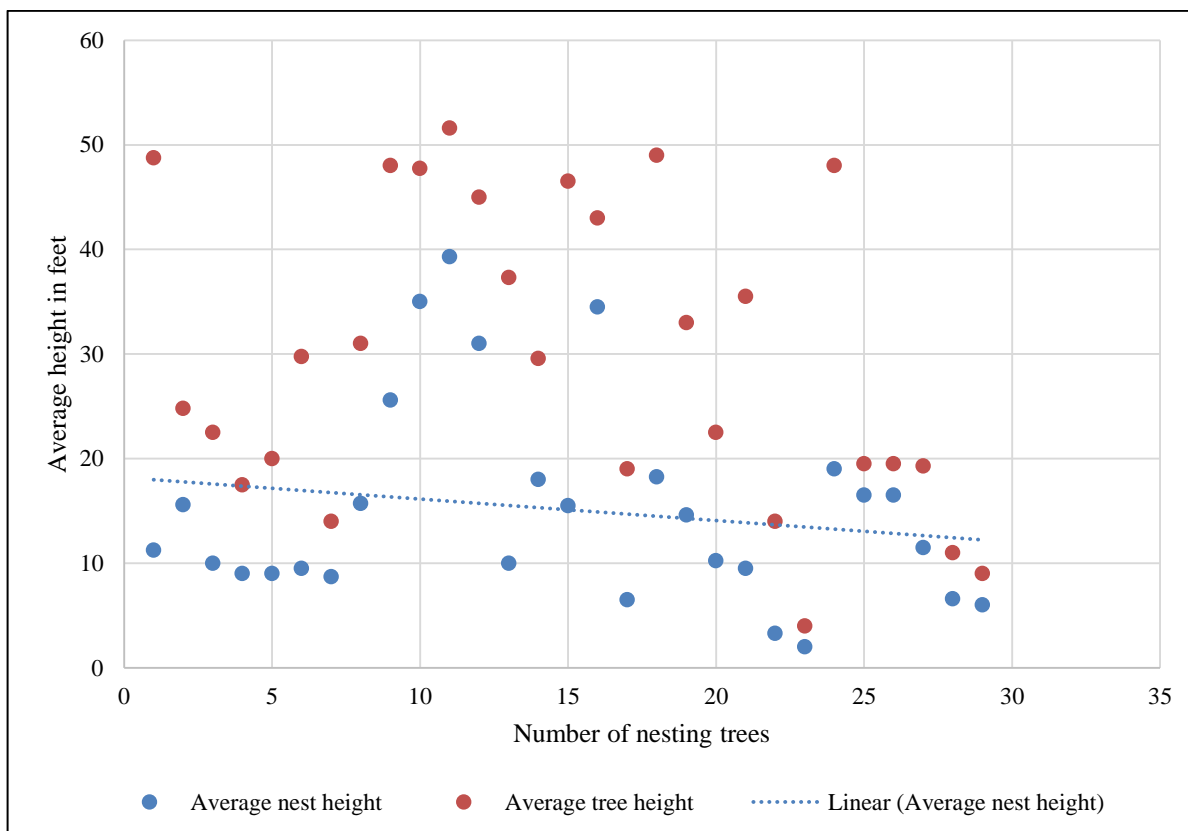


Figure-5: Scatter chart showing the relation between average nest height and tree height (Correlation coefficient, $r=0.74$ and $r^2=0.548$).

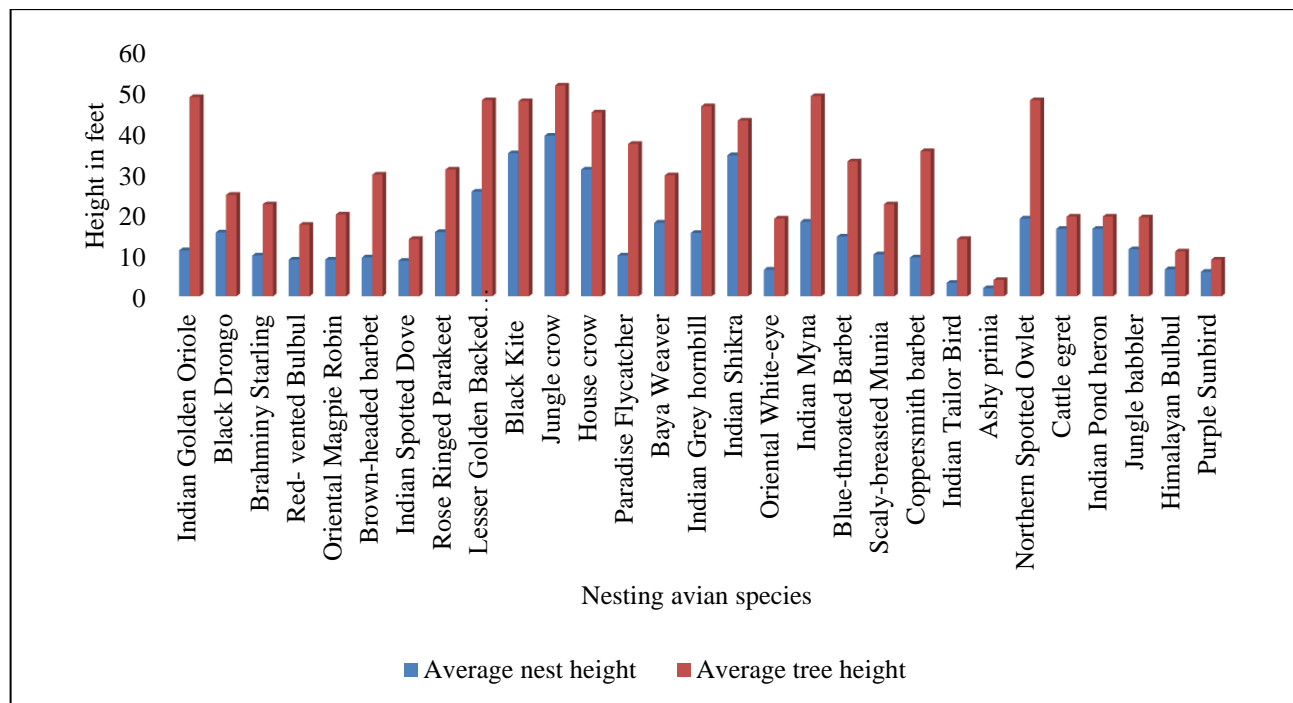


Figure-6: Relative bar chart representing the average nest height and tree height.

Conclusion

To conclude a total of 29 avian species were reported to make nest on 32 tree species. Total of 384 nests, maximum nests 73 on Bottlebrush plant, 34 on Fishtail Palm, 29 on Kainth tree, 27 on Mango tree, 23 each on Tooni tree and Kikar tree, 21 on Jamun tree, 17 on Sheesham tree, 13 on Banyan tree, 11 each on Simbal, Eucalyptus tree and Pulai tree and 10 on Mulberry were found. Out of 32 nesting tree *Mangifera indica*, *Toona ciliata*, *Ficus benghalensis*, *Pyrus pashia*, *Acacia catechu*, *Morus alba*, *Psidium guajava*, *Ficus religiosa*, *Bombax ceiba*, *Neolamarckia cadamba*, *Melia azedarach*, *Acacia modesta* were found to be the most preferred nesting site by different avifaunal species. It was found during the study that maximum nests were of cup shaped nest (10), cavity nest (10) and followed by Platform nest (6), dome shaped nest (1), purse shaped nest (1) and pendant shaped nest (1) used by the nesting birds. It was found that the avian species like Black kite, Jungle crow, House crow, Black Drongo, Cattle egret, Indian Pond heron and Indian shikra mostly preferred to builds nests towards the top of nesting trees. Baya weavers also prefers to build nests on tall trees at the maximum height. Indian golden oriole, Brahminy starling, Red-vented bulbul, Oriental magpie robin, Brown headed barbet, Indian spotted dove, Rose-ringed parakeet, Lesser Golden backed woodpecker, Indian grey hornbill, Indian Myna, blue-throated barbet, Northern spotted owllet, Jungle babbler, Himalayan bulbul and purple sunbirds build their nests in the middle of the nesting trees. Paradise flycatchers, Oriental white eye, Scaly-breasted munia, Indian Tailored bird and Ashy Prinia usually build their nests towards ground on the nesting trees. Depletion of nesting trees due to deforestation and urbanisation

directly affects the abundance and diversity of avian fauna. Old trees provide the preferable nesting sites for the cavity nesters and the native trees provides an important nesting area in the form of dense canopy for small birds. Afforestation and reforestation efforts must be promoted to conserve the nesting trees and the habitat of nesting birds.

References

- Raman, T.R.S., Joshi, N.V. and Sukumar, R. (2005). Tropical Rainforest bird community structure in relation to altitude, tree species composition, and null models in the Western Ghats, India. *J. Bombay Nat. Hist. Soc.*, (102), 145-57.
- Sultana, A., Hussain, M.S. and Khan, J.A. (2007). Bird communities of the proposed Naina and Pindari Wildlife Sanctuaries in the Kumaon Himalaya, Uttarakhan, India. *J. Bombay Nat. Hist. Soc.*, (104), 19-29.
- Aggarwal, S., Sahi, D.N. and Wani, A.A. (2008). Feeding guilds of avifauna of Nandini Wildlife Sanctuary, Jammu. *The Ecoscan*, (2):157-60.
- Cintra, R. and Naka, L.N. (2012). Spatial variation in bird community composition in relation to topographic gradient and forest heterogeneity in a central Amazonian rainforest. *Int. Ecol.*, 34-36. <http://dx.doi.org/10.1155/2012/435671>.
- Gabbe, A.P., Robinson, S.K. and Brawn, J.D. (2002). Tree species preferences for foraging insectivorous birds: implication for floodplain forest restoration. *Conserv. Biol*, (16), 462-470.

6. Goetz, S., Steinberg, D., Dubayah, R., & Blair, B. (2007). Laser remote sensing of canopy habitat heterogeneity as a predictor of bird species richness in an eastern temperate forest, USA. *Remote Sensing of Environment*, 108(3), 254-263.
7. Ali, S. (1996). *The book of Indian birds*. (No Title).
8. Collias, N. E., & Collias, E. C. (2014). *Nest building and bird behavior* (Vol. 857). Princeton University Press.
9. Osmoston, B.B. (1927). Notes on birds of Kashmir, part-1, *J. Bomb. Nat. Hist. Soc.*, (31), 975-999.
10. Choudhary, V. (2002). *Studies on Avian Diversity of Jammu District of J&K State* (Doctoral dissertation, Ph. D. Thesis. University of Jammu, Jammu).
11. Sharma, B. (2003). *Faunal diversity of Ramnagar Wildlife Sanctuary, Jammu* (Doctoral dissertation, M. Phil. Dissertation, University of Jammu, Jammu).
12. Ahmed, A. (2004). *Diversity and Community structure of the birds of Tehsil Doda, Jammu*. M. Phil.
13. Kumar, S. (2006). *Diversity of avifauna of District Kathua, J&K* (Doctoral dissertation, Ph. D. Thesis. University of Jammu, Jammu).
14. Kumar, S., & Sahi, D. N. (2006). *Diversity and status of avifauna of Jasrota Wildlife Sanctuary, Kathua (J&K state)*. *J. Himalayan. Ecol. Sustain. Dev*, 1, 95-104.
15. Kait, R. (2011). *Studies on avian and mammalian diversity of Trikuta hills* (Doctoral dissertation, Ph. D Thesis, University of Jammu, Jammu).
16. Aggarwal, S. (2011). *Ecological Studies of Bird communities of Ramnagar and Nandini Wildlife sanctuaries, Jammu*. Ph.D. Thesis, University of Jammu, Jammu.
17. Kotwal, D. (2012). *Studies on Vertebrate Diversity of Surinsar Mansar Wildlife Sanctuary*.
18. Sharma, N., & Sharma, S. (2017). A recent record of Rooks *Corvus frugilegus* from the Jammu plains, north-western India. *Indian BIRDS*, 13(2), 51-52.
19. Sohil, A., & Sharma, N. (2019). A preliminary survey of bird communities around Jammu, (Jammu & Kashmir). In *Biol Forum* (Vol. 11, pp. 27-49).
20. Wani, I. N., Fazili, M. F., Bhat, B. A., Dar, J. A., & Sheikh, M. M. (2021). Waterbird Density and Habitat Utilisation Pattern in Wular Lake, Kashmir, India. *Indian Journal of Science and Technology*, 14(19), 1545-1553.
21. Kumar, B. and Kaur, R. (2023). Avifaunal Assemblages in Suburban Habitat of District Udhampur, J&K (UT), India. *Int. J. Adv. Res. Biol. Sci.*, 10(2), 132-145.
22. Kumari. M., Sahi, D. N., Langer, S. (2018). Nest Characteristics and Nesting Success of the Indian Pied Myna (*Gracupica contra*) in Jammu Region (J&K). *International Journal of Advanced Research (IJAR)* *Int. J. Adv. Res.* 6(2), 903-909 ISSN 2320-5407.
23. Ahmed, T., Chandan, P., & Khan, A. (2019). Observations on some nesting birds of the Tso-Kar Basin, Ladakh. *Indian BIRDS*, 15(1), 13-16.
24. Kumar, B. (2020). Nestling Growth and Development of an Endemic Avian Species, The Brown Rock Chat (*Cercomulafusca*), in Udhampur District, J&K, India. *J New Biol Rep.*, 9(2), 240-245.
25. Kumar, B. and Kumar, K. (2021). Nestling Growth and Development of Himalayan bulbul, (*Pycnonotus leucogenys*) in Udhampur District, Jammu and Kashmir (UT), India. *J New Biol Rep.*, 10 (1), 51 – 56.
26. Champion, H. G., & Seth, S. K. (1968). *A revised survey of the forest types of India*. Manager of publications.
27. Ali, S. and Repley, S.D. (1983). *Handbook of Birds of India and Pakistan, Compact Edition*, Oxford University Press, Bombay, (4), 99-113.
28. Ali, S. (1996). *The Book of Indian Birds* (12th enlarged centenary edition), *J. Bomb. Nat. Hist. Soc.*, Oxford Univ. Press, New Delhi.
29. Grewal, B., Harvey, B. and Pfister, O. (2002). *A photographic guide to the Birds of India*, Periplus Edition (HK) Ltd., Singapore.
30. Grimmett, R., Inskipp, C. and Inskipp, T. (1998). *Birds of Indian Subcontinent*, Oxford University Press, Delhi.
31. Soni, V. C., Sharma, P., Dave, S. M., Bhalodia, K., & Vijaykumar, V. (2004). Nesting ecology of some terrestrial birds in Rajkot city (Gujarat). *Journal of Current Bioscience*, 2(1), 97-104.
32. Shrode, F. (2012). Mobile apps for nature field guides. *Reference Reviews*, 26(7), 4-6.
33. Leverett, R. T. (2010). *The Sibley Guide to Trees: An illustrated guide to tree identification*. *The Journal of the Torrey Botanical Society*, 137(1), 131-132.