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Research Article

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FEEDING ECOLOGY OF AVIFAUNA IN SUB-TROPICAL AND TEMPERATE REGION OF MIDDLE HIMALAYAN CHAIN OF DODA, JAMMU AND KASHMIR

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Abstract: Feeding ecology of birds was studied in subtropical and temperate region of Doda which lies in middle Himalayan chain of Pir Panchal range of Jammu and Kashmir, India. In the present study, a total 71 species of birds was documented from the study area belonging to 9 orders, 27 families and 12 sub families. Out of 71, 26 species were insectivores (I), 17 omnivores (O), 12 carnivores (C), 4 frugivores (F), 4 grainivores (G) and rest of the 8 species share more than one feeding guilds. This study therefore showed a remarkable variation in feeding ecology of birds in the region surveyed.

Keywords: Avifauna, Doda, Feeding ecology, Pir Panchal, Himalayas.

INTRODUCTION

Birds are warm blooded animals which maintain constant body temperature. These are considered as master of air (feathered biped). This description is apt and precise and cannot apply to other animal groups. These being the master of air have been viewed as an indicator of environmental quality. The colour pattern of feathers is one of the important taxonomic diagnostic tools used for their identification. The good colour vision enables them to located food to recognize other members of the species and to distinguish sex of each individual.

The birds perform a variety of functions in a natural ecosystem. Some birds like owls are nocturnal as they remain active at night and sleep during the day. Some birds are migratory in nature such as siberian cranes while some ones are non-migratory such as sarus crane. The Sarus crane is the only resident breeding crane pair that for life long. The sarus crane pair is an eternal symbol of unconditional love, devotion and good fortune with high degree of marital fidelity (Verma, 2016; Verma and Prakash, 2017; Prakash and Verma, 2016, 2019) and prefer to live in and around wetlands in association with human (Verma, 2018). The vultures, kites and crows act as scavengers and efficiently dispose the animal carcasses, decaying matter and thus preventing epidemics.

In agriculture, the role of birds is complex yet it is interesting and varied. It depends upon number of factors like their feeding nature and the extent to which they depend on crops, their age and physical conditions. As aves appear to be a climax group at the height of their evolutionary history, they undergo extensive adoptions in terms of feeding habits such as some are carnivores, insectivores, grainivores and omnivores.

As far as the study of birds in Jammu division is concerned there is no such detailed systematic study except Omaston (1927), Whistler (1949), Sahi (1985), Sahi and Sharma (2006), Wani and Sahi (2005) and Balwan and Saba (2020).

Study Area:

The study area, district Doda of Jammu and Kashmir is extended between 32^0-53' and 34^0-21' north longitude and 75^0-1' and 76^0-47' east longitude with an elevation ranges between 900 m to 4200 m above sea level. The study stations of district Doda include seven tehsils *viz.,* Doda, Bhaderwah, Kishtwar, Ramban, Banihal, Thathri and Gandoh. It is located in Pir Panchal range of middle Himalayan Chain of North West Himalayas and is having a typical terrain. The lower parts of erstwhile district Doda experience a subtropical climatic condition which is characterized by hot and dry season, while upper reaches the Bhaderwah, Kalash Kund, Marmat, Padder, Marwah, Dachan etc. are comparatively cooler in summer with temperate type of climate. The mean maximum and minimum temperature during summer ranges between 36^0 C and 14^0C respectively whereas during winter ranges between 6^0 C and -2^0 C respectively.

The forest is of temperate type including predominant ever green tree species comprises of *Pinus roxburgii, Cedrus deodara* and *Quercus* spp. The predominant deciduous tree species comprises of *Alunus nitida, Aesculus indica, Ficus* spp. Besides large number of shrubs such as *Princepia utilis*, *Rhodendron arboreum*, *Puncia granatum*, *pyrus pashia* etc., and herbs species such as *Clematis bacbellata*, *Lepidium sativum, Desmodium triflorus*, *Allium graffithianum,* etc. were present in the area studied.

MATERIALS AND METHODS

In order to record the feeding ecology of the birds; it is pertinent first to record the diversity of the bird. Author used following methods to record the diversity and feeding behavior of the birds:

1. **Line Transects Method:** This method is simple to use and offers greater flexibility. In this method the observer walks on the predetermined transects and records the birds which one sees or hears. All the birds sighted and calls of the birds which can be easily identified were recorded while sampling the birds. In the study area transects of 2 km were set at each station by keeping 50m width on each side. But this width sample varies at different places as birds are not visible due to foliage cover or because of terrain of the area. The general bird activities like feeding, flying, resting and nesting were recorded along with transect.

2. **Point Transect Method:** This method is used at zero speed for short duration of time (Verner, 1985). This method is useful in getting information regarding vegetation condition of area, height of occurrence of birds, number of individuals sighted, social association, species diversity, food habits and social behaviour.

3. **Identification of Birds:** Birds were identified with the help of colourful plates of Ali and Repley (1974), Ali (1996), Grimmett *et al*., (2011) and Grewal *et al*., (2003).

RESULTS AND DISCUSSION:

Keeping the feeding habits of the birds into consideration, an attempt has been made to categorize the birds into different feeding guilds as insectivores (feeds on insects), carnivores (feeds on animal matter like fishes, amphibians, reptiles etc.), frugivores (feeds on fruits), omnivores (feeds on all types of food including vegetable matter, insects and animal matter etc.) and granivores (feeds on grains). Out of 71, 26 species were insectivores, 17 species omnivores,

12 carnivores, 4 frugivores, 4 grainivores and rest of the 08 species share more than one feeding guilds (Fig.1).

Out of 26 insectivores birds (I) recorded, 6 species were represented by aerial insectivores (AI), 3 species were represented by terrestrial insectivores (TI), 3 species under story insectivores (UI), 5 trunk and bark feeders (T/BF), 4 species shore insect plover (SIP), 3 aquatic insectivores (AqI) while 2 species were represented by canopy insectivores (CI) (Fig 2).

Carnivores (C) feeding category is further sub divided into different categories and out of 12 carnivore species reported, 6 species were arboreal terrestrial carnivores (ATC), 3 terrestrial carnivores (TC) and 1 species serves both as ATC and arboreal aquatic carnivore (AAqC), 1 species was AAqC and diving carnivore (DC) includes 1 species (Fig.3).

Omnivores (O) bird species were represented by 17 species in the area studied whereas frugivores (F) and grainivores (G) were represented by 4 species each and 8 species share more than one feeding guilds.

S. No	Name of the Bird Species	Feeding guilds along with substrate preference
1.	Pariah Kite	Arboreal Terrestrial Carnivore (ATC)
2.	Himalayan Long Billed Vulture	Terrestrial Carnivore (TC)
3.	Himalayan Griffon Vulture	Terrestrial Carnivore (TC)
4.	White Backed Vulture	Terrestrial Carnivore (TC)
5.	Long Legged Buzzard	Arboreal Terrestrial Carnivore (ATC)
6.	Monal Pheasant	Omnivores (O)
7.	Cheer Pheasant	Omnivores (O)
8.	Kaleej Pheasant	Omnivores (O)
9.	The Chukar	Omnivores (O)
10.	Blue Rock Pigeon	Omnivores (O)
11.	Rufous Turtle Dove	Grainivore (G)
12.	Indian Spotted Dove	Grainivore (G)
13.	Indian Ring Dove	Grainivore (G)
14.	Black Drongo	Grainivore (G)
15.	Indian Golden Oriole	Omnivores (O)
16.	Rufous Backed Shrike	Arboreal Terrestrial Carnivore (ATC)
17.	Great Grey Shrike	Arboreal Terrestrial Carnivore (ATC)
18.	Rose Ringed Parakeet	Frugivore (F)
19.	Blossom Headed Parakeet	Frugivore (F)
20.	Lorikeet	Frugivores (F)
21.	Northern Spotted Owlet	Arboreal Terrestrial Carnivore (ATC)
22.	Barred Jungle Owlet	Arboreal Terrestrial Carnivore (ATC)
23.	Himalayan Pied Kingfisher	Arboreal and Aquatic Carnivore (AAqC)
24.	White Breasted Kingfisher	Arboreal and Aquatic Carnivore (AAqC)
25.	European Hoopoe	Omnivores (O)
26.	Himalayan Great Barbet	Frugivores (F)
27.	Mahratta Woodpecker	Trunk and Bark Feeder (T/BF)

28.	Lesser Golden Backed Woodpecker	Trunk and Bark Feeder (T/BF)
29.	Streak Throated Woodpecker	Trunk and Bark Feeder (T/BF)
30.	Grey Headed Woodpecker	Trunk and Bark Feeder (T/BF)
31.	Common Myna	Omnivores (O)
32.	Jungle Crow	Omnivores (O)
33.	North Western Tree Pie	Omnivores (O)
34.	Yellow Billed Blue Magpie	Omnivores (O)
35.	Long Tailed Minivet	Canopy Insectivores (CI)
36.	Red Rumped Swallow	Aerial Insectivores (AI)
37.	Wire Tailed Swallow	Aerial Insectivores (AI)
38.	White Wagtail	Shore Insect Plover/Terrestrial Insectivores (SIP/TI)
39.	Indian Pied Wagtail	Shore Insect Plover/Terrestrial Insectivores (SIP/TI)
40.	Yellow Wagtail	Shore Insect Plover/Terrestrial Insectivores (SIP/TI)
41.	Grey Wagtail	Shore Insect Plover/Terrestrial Insectivores (SIP/TI)
42.	Indian White Eye	Canopy Insectivores (CI)
43.	Purple Sunbird	Canopy Insectivores (CI)
44.	House Sparrow	Omnivores (O)
45.	Baya Weaver	Omnivores (O)
46.	Spotted Munia	Omnivores (O)
47.	Grey Tit	Canopy Insectivores (CI)
48.	Black Throated Tit	Canopy Insectivores (CI)
49.	Himalayan Brown Dipper	Aquatic Insectivores/Diving Carnivores (AqI/DC)
50.	Himalayan Tree Creeper	Trunk /Bark Feeder (T/BF)
51.	Jungle Babbler	Understory Insectivores (UI)
52.	Paradise Flycatcher	Aerial Insectivores (AI)
53.	Veriditor Flycatcher	Aerial Insectivores (AI)
54.	Himalayan Whistling Thrush	Omnivores (O)
55.	Grey Bush Chat	Frugivores Insectivores (FI)
56.	Indian Magpie Robin	Frugivores Insectivores (FI)
57.	White Capped Redstart	Aquatic Insectivores (AqI)
58.	Plumbeous Water Redstart	Aquatic Insectivores (AqI)
59.	Blue Fronted Redstart	Aquatic Insectivores/Terrestrial Insectivores (AqI/TI)
60.	Spotted Fork Tail	Aquatic Insectivores (AqI)
61.	Blue Throat	Understory Insectivores (UI)
62.	White Cheeked Bulbul	Frugivores, Insectivores (FI)
63.	Black Bulbul	Frugivores, Insectivores (FI)
64.	Blue Capped Rock Thrush	Understory Insectivores (UI)
65.	Asian Brown Flycatcher	Aerial Insectivores (AI)
66.	Himalayan Cinnamon Tree Sparrow	Omnivores (O)

67.	Rufous Sibia	Insectivores Frugivores (IF)
68.	Rock Bunting	Omnivores (O)
69.	Green Backed Tit	Canopy Insectivore (CI)
70.	Great Cormorant	Aquatic Carnivore (AqC)
71.	Common Wood Shrike	Terrestrial Insectivore (TI)

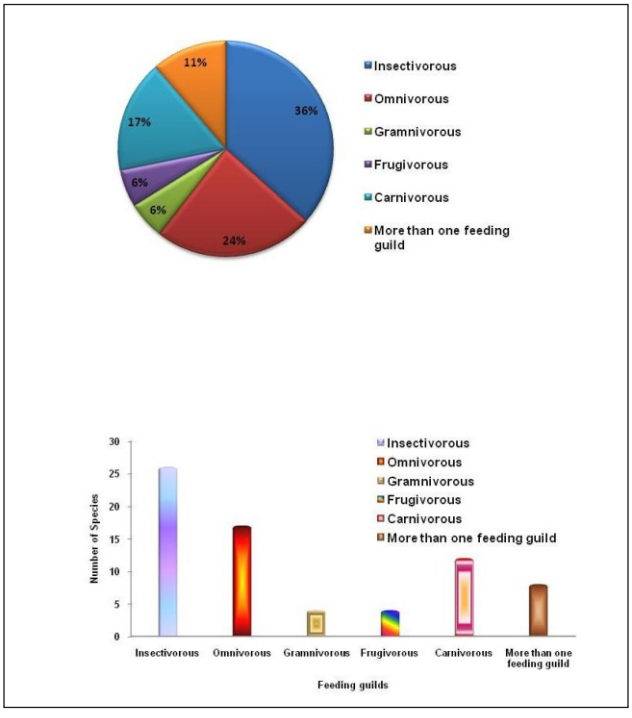

Fig. 1: Percentage of bird species showing different feeding guilds.

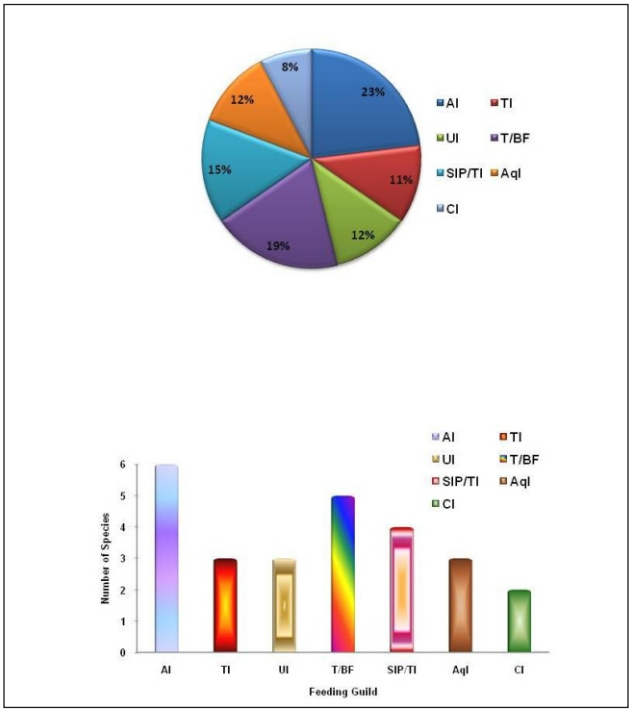

Fig. 2: Relative proportion of different feeding guilds shown by insectivorous birds.

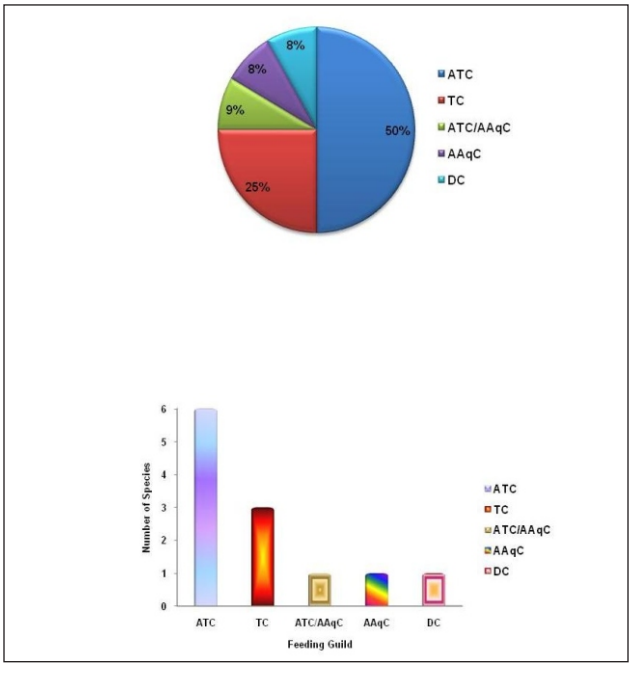

Fig. 3: Relative proportion of different feeding guilds shown by carnivorous birds.

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