

## Feeding guilds of birds in Trikuta Hills, Vaishno Devi hills, J&K.

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**Abstract:** Trikuta hills, popularly known as Vaishno Devi hills, constitute a part of outermost hills of Jammu Shivaliks. A total of 90 species of birds belonging to 39 families and 11 orders have been recorded from Trikuta hills. An effort to analyse the feeding habits of avifauna of trikuta hills has been made and it was found the birds in the study area belonged to different feeding guilds viz. Insectivore, Frugivore, Grainivore and Omnivore. The number of Insectivore species was highest (27 species) followed by the number of Carnivorous, Grainivore, Frugivore and Omnivore species representing 30%, 13%, 10% , 7% and 5% of the avifauna of the study area, respectively, where as rest of the 32 (35%) bird species in the present study area fed on more than one type of food items.

**Key words:** Feeding guilds; carnivorous, grainivore, frugivore; Omnivore; avifauna; Trikuta hills.

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### 1. Introduction

The study of avian feeding guilds is important for understanding the complexity of ecosystem and for providing update information about each type of habitat in the ecosystem. Different habitats having different community structure harbour different bird species and any change in the habitat due to anthropogenic activities changes the food web (Azman, *et al.* 2011). Food exploration by birds is central to the study of avian community organisation (Poulin *et al.* 1994). Change in the food item in a habitat may lead to the migration of the birds.

### 2. Materials and methods

The Present study was carried out in Trikuta hills, popularly known as Vaishno Devi hills, which constitute a part of outermost hills of Jammu Shivaliks. Trikuta hills are very famous because of Mata Vaishno Devi Ji. It lies at a distance of 48 km from Jammu city which is the winter capital of Jammu and Kashmir State. It lies between 32<sup>o</sup> 59' and 33<sup>o</sup> 10'N latitudes and 74<sup>o</sup> 55' and 75<sup>o</sup> 50'E longitudes. Trikuta hills are characterised by a highly mountainous terrain, the tract being quite rugged and cut into deep gorges and high ridges. The hills suddenly emerge from the Katra valley, situated at an altitude of 750m above mean sea level on north bank of Banganga river. They arise steeply up to Surajkund above Bhairon Ghatti (2167m amsl). The area drains into Chenab through two perennial streams namely Banganga and Pei Nallah.

In order to record the avian diversity, periodic surveys were undertaken in the study area by adopting systematic field procedures and techniques for survey and collection of different species. The nomenclature followed in the present work is in accordance with those given in the "Handbook of Birds of India and Pakistan" by Ali and Ripley (1968-74). The more popular English names in use within India have also been provided. For

identification and field diagnosis of birds, colourful plates of Ali and Ripley (1968-74), Ali (1996), Grimmett *et al.* (1998) and Grewal *et al.*

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(2002) have been used. Colours are usually the best indicators of identity of a species at a close range or through binoculars. For Inventorization of Aves, Line Transect Method and Point Transect Method (Verner, 1985) were used. The points transect method was more helpful in thick forest area. Surveys were conducted from 6:30 am to 9:30 am in morning and 4:30 pm to 6:30 pm in evening during summers and 7:30 am to 10:30 am in morning and 3:30 pm to 5:30 pm in evening during winters. In addition to these fixed timings of surveys, some irregular visits were also planned and made during other hours of the day.

The study area was divided into eight study stations, which are described as under:

**Station-1 (S1). Area: Magal Pangot. Habitat: Pinus Forest.**

It lies at an average altitude of 750m and is situated at a distance of 7 Km from Katra city on Katra- Jammu National Highway.

**Vegetation:** The station has medium to high density of *Pinus roxburghii*, under story vegetation includes sparse and unevenly scattered thorny bushes like *Zizyphus* sp., *Adhatoda*, *Carissa*, etc. Small open meadows were also present at this station.

**Station-2 (S2). Area: Banganga. Habitat: Riverine Habitat.**

The station S2 is located on the river Banganga at an altitude of 750m. It starts from Gulshan Kumar Hotel to the bridge on Reasi road on the river. It is a small river. The study area drains into it and its volume changes considerably during summer, spring, monsoon and winter. Katra city which is very populous due to the pilgrimage is situated on the left bank of the river.

**Vegetation:** vegetation includes herbs like *Micromeria biflora*, *Gallium* sp., *Verbascum thapsus*, *Tulipa stellata*, *Fumaria indica*, *Stellaria media*, *Achyranthes aspera*, *Cassia tora* and species of *Amaranthus*, and shrubs like *Lantana*, *Adhatoda vasica*, *Carissa opaca*, *Indigofera pulchella*, *Woodfordia fruticosa* and *Zizyphus* sp. which form a thicket on the banks besides bushes and few sparsely scattered tree species of *Mallotus philippensis*, *Rhus continus* and *Bauhinia variegata*.

**Station-3, (S3). Area: Katra City. Habitat: Urban.**

Katra Town lies at the foot of Trikuta Mountains which is 48 kms from Jammu. It has an average elevation of 754 metres (2,474 feet). It serves as the base camp for visiting the famous shrine of Shri Mata Vaishno Devi, which is approachable on foot along a 13 kms long well laid footpath. Every year, more 6 millions pilgrims pass through Katra on their way to the holy shrine.

**Vegetation:** Natural vegetation in the city has been destroyed; however there are some tree of *Populus alba*, *Bombax ceiba*, *Melia azadirach* besides some ornamental vegetation and few fruit plants.

**Station-4, (S4). Habitat: Scrubby Forest**

The station S4 lies at an altitude of 800m. It has gentle slope and is Kandi in characteristic i.e., there is scarcity of the water during pinch periods.

**Vegetation:** Vegetation cover is fairly dense and comprise admixture of herbs, shrubs and trees. *Micromeria biflora*, *Gallium* sp., *Verbascum thapsus*, *Tulipa stellata*, *Fumaria indica*, *Stellaria media*, *Achyranthes aspera*, *Cassia tora* and species of *Amaranthus*, *Chenopodium*, *Medicago*, *Diclipetra* and *Polygonum* are herbs, *Adhatoda vasica*, *Carissa opaca*, *Indigofera pulchella*, *Woodfordia fruticosa* and *Zizyphus* sp., followed by the dominance of *Rubus* sp., *Lespedeza eriocarpa*, *Lepidagathis cuspidata*, *Debregeasia salicifolia* and *Colebrookea oppositifolia* are common shrubs in this zone and *Mallotus philippensis*, *Rhus continus* and *Bauhinia variegata* are common plant species.

**Terminology used**

**Species richness/Species diversity:** The species richness is simply the number of species present in an ecosystem. **Species Evenness:** The species evenness is the relative abundance or proportion of individuals among the species. **Insectivore:** Feeding on insects. **Carnivore:** Feeding on animal matter like fishes, amphibians, reptiles, birds and small mammals. **Frugivore:** Feeding on fruits. **Omnivore:** Feeding on all types of food including vegetable matter, fruits, insects and other animal matter included in carnivore category.

### 3. Results and discussion

Feeding habits of the birds of Trikuta hills were analyzed and birds with the same feeding habits were put together in one feeding guild. Birds in the study area belonged to different feeding guilds viz. Insectivore, Frugivore, Grainivore and Omnivore. Present study reveals that the number of Insectivore species was highest (27 species) followed by the number of Carnivorous, Grainivore, Frugivore and Omnivore species, i.e. 12, 9, 6 and 4 species, respectively (Fig. 1), thus representing 30%, 13%, 10%, 7% and 5% of the avifauna of the study area, respectively, whereas rest of the 32 (35%) bird species in the present study area fed on more than one type of food items, which

include those feeding on grains and insects i.e. G,I (12 species), fruits and insects i.e. F,I (7 species), grains, fruits and insects G,F,I (6 species), carnivore and insect C,I (3 species), Nectar and insect, N,I (2 species) and carnivore, insect and fruits, C,I,F (2 species), so these categories represent 13, 8, 7, 3, 2 and 2% of the avifauna in the study area, respectively (Fig. 2). Insectivore were further sub divided into aerial insectivore (AI), canopy insectivore (CI), bark/trunk feeder (T/BF), terrestrial insectivore (TI), understory insectivore (UI), and aquatic insectivore (AqI), whereas carnivore were subdivided into arboreal aquatic carnivore (AAqC), arboreal terrestrial carnivore (ATC), and wading carnivore (WC) (Annexure I).

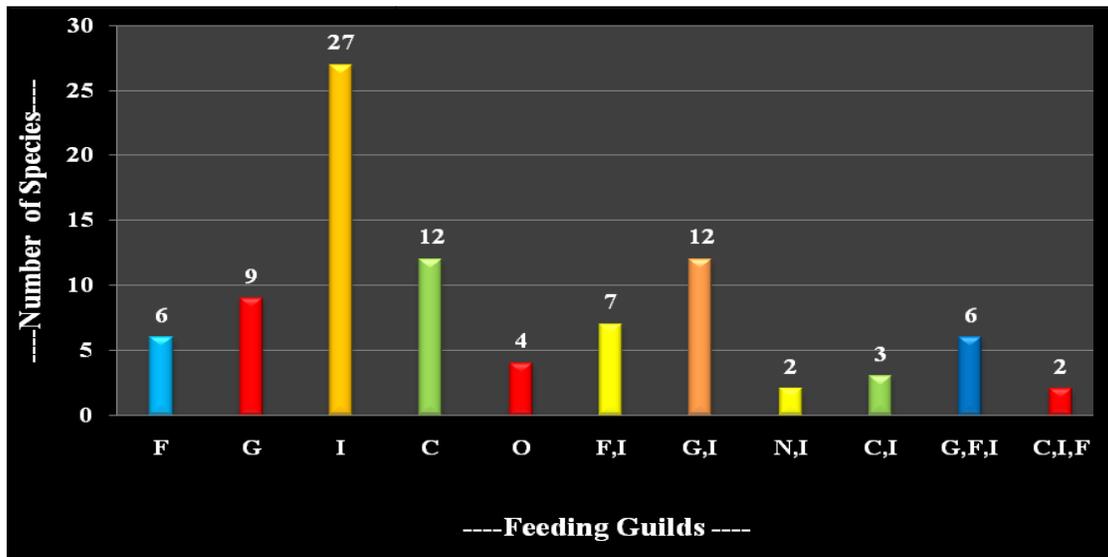


Fig. 1. Bar chart showing relative occurrence of different feeding guilds of birds of Trikuta hills

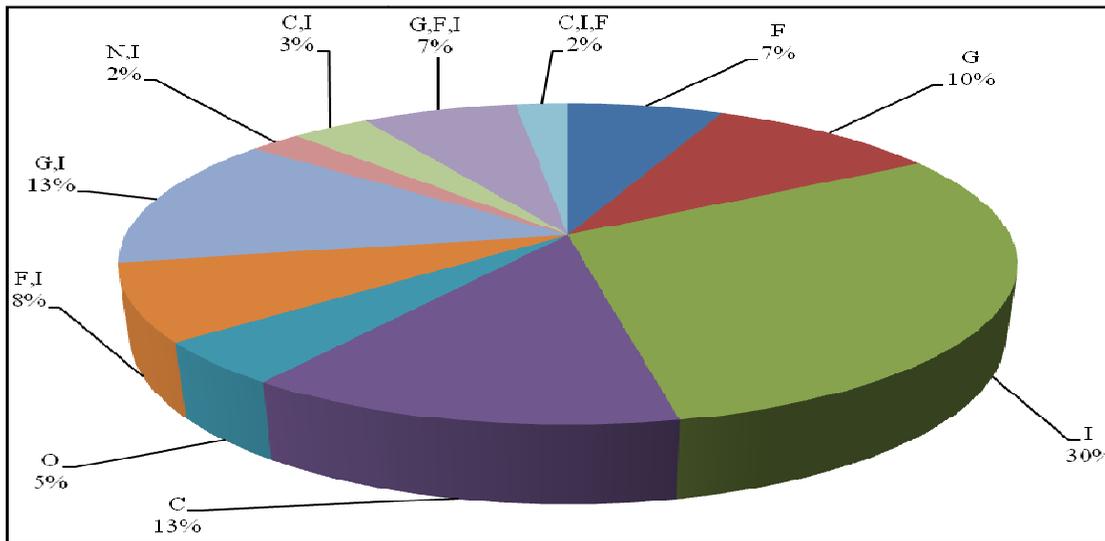


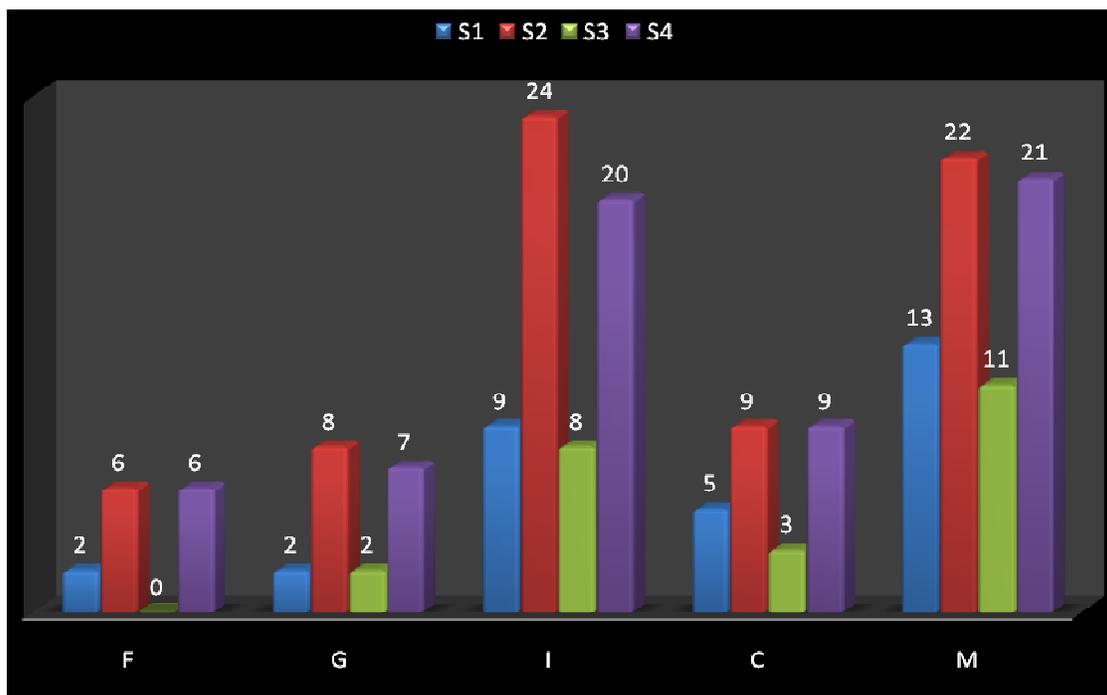
Fig. 2. Pie chart showing percentage occurrence of various feeding guilds of birds in Trikuta hills

In similar studies, Aggarwal *et al.* (2008) reported 23 insectivore species, 10 carnivore species, 6 granivorous species 3 omnivore, 6 frugivore species and rest of the 27 species used more than one feeding guilds in Nandini wildlife sanctuary. In both studies the number of insectivore species was highest as was reported by Ahmed (2004) and Kumar and Sahi (2006) in their respective study areas. Similar studies have also been carried by Grimmer *et al.* (1998), Alfred *et al.* (2001), Osmaston (1927), Sharma (2003) and Kumar and Sahi (2005 & 2006) in other areas of India. It was also found that the most of the species which fed on more than one type of food were common and thus abundant in the study area and those species which have restricted choice for their food i.e. feed on one type of food, are represented by fewer individuals in the study area thus tend to be uncommon and rare. So it was concluded that the distribution of bird species in an area is also determined by the distribution of food resources present in the study area.

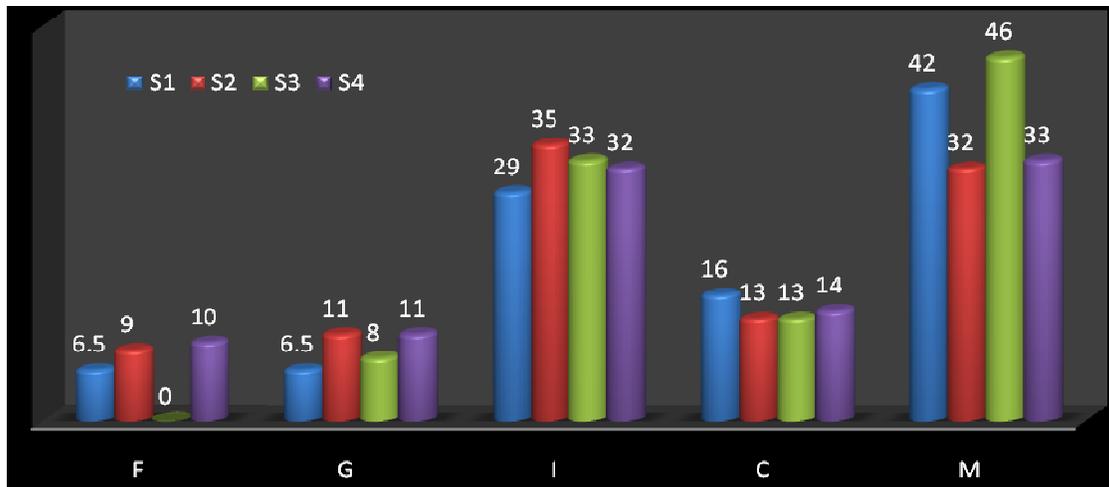
During different seasons the food composition changes and so does the composition of the birds in an area. Wani *et al.* (2008) had also reported similar results. Wiens (1989) reported that the bird composition of bird associations and guilds changed periodically and

the availability of the food resource appeared to be very influential factor controlling seasonal fluctuations of bird communities. Percentage contribution of different feeding guilds to the avifauna of different habitats in the study area was calculated (Fig. 3 & 4) and comparison showed that the composition of the birds belonging to different feeding guilds was almost same in different habitats, however exact data of percentage contribution revealed that birds feeding on more than one type of food (represented by “M” guild) contributed most to the avifauna of S1, S3 and S4 habitats and was followed by insectivorous and carnivorous while insectivorous guild had highest percentage contribution in S2 habitat. Frugivorous birds were not found in the S3 habitat where as grainivorous and insectivorous were least in S1 habitat attributing to less abundance of grains and insects in this habitat.

Percentage contribution of carnivorous was highest in S1 while that of grainivorous was highest in S2 and S4; on the other hand Percentage contribution of frugivorous was highest in S4. The reasons may be perching sites at heights in S1 habitat, faecal matter of horses containing numerous grains and weeds in S2 and heterogenous vegetation in S4.



**Fig. 3.** Contribution of bird species of different feeding guilds to the avian fauna of different habitats in the study site



**Fig. 4.** Percentage contribution of bird species of different feeding guilds to the avian fauna of different habitats in the study site

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**Annexure 1.** Showing feeding habits of avifauna of Trikuta Hills (Vashno Devi Hills) J&K.

<b>Name of Species</b>	<b>Feeding Guild</b>
Indian Pond Heron	WC
Cattle Egret	WC/UI
Little Egret	WC
Pariah Kite	ATC
Indian Shikra	ATC
Indian Long Billed Vulture	TC
Himalayan Griffon Vulture	TC
Red Wattled Lapwing	SIP/TI
Indian Red Jungle Fowl	G, I
Grey Partridge	G, I
Black Partridge	G, I
Kalij Pheasant	G, I
Cheer Pheasant	G, I
Indian Peafowl	G, I
Indian Blue Rock Pigeon	G
Indian Ring Dove	G
Indian Spotted Dove	G
Little Brown Dove	G
Rufous Turtle Dove	G
Large Indian Parakeet	F
Rose Ringed Parakeet	F
Blossom Headed Parakeet	F
Indian Koel	F, I
Pied Crested Cuckoo	AI/TI
Northern Spotted Owlet	ATC
Great Horned Owl	ATC
White Breasted Kingfisher	ATC/AAqC
Pied Kingfisher	AAqC
Indian Small Green Bee-Eater	AI
Blue Jay	ATC
European Hoopoe	G/UI
Large Green Barbet	F
Copper Smith	F
Himalayan Great Barbet	F
Lesser Golden-Backed Woodpecker	T/BF
Brown Fronted Woodpecker	T/BF
Rufous-Backed Shrike	ATC
Indian Golden Oriole	F, I
Black Drongo	AI
Indian Myna	G, F, I
Bank Myna	G, F, I
Northern Jungle Myna	G, F, I
Brahminy Myna	G, F, I
Starling	G, F, I
House Crow	O
Himalayan Jungle Crow	O
Northwestern Tree Pie	O
North Indian Scarlet Minivet	CI

Red Vented Bulbul	F, I
White-Cheeked Bulbul	F, I
Black Bulbul	F, I
Jungle Babbler	UI
Common Babbler	UI
Paradise Flycatcher	AI
Verditer Flycatcher	AI
Indian Tailor Bird	CI/TI
Himalayan Whistling Thrush	O/UI
Blue Rock Thrush	UI
Indian Magpie Robin	TI
Indian Robin	TI
White Caped Redstart	AqI
Plumbeous Redstart	AqI
Kashmir Black Redstart	AqI
Pied Bush Chat	TI
Collared Bush Chat	TI
Brown Rock Chat	TI
Indian White Wagtail	SIP/TI
Grey Wagtail	SIP/TI
Indian Pied Wagtail	SIP/TI
Blue Headed Yellow Wagtail	SIP/TI
Purple Sunbird	NI
Yellow-Backed Sunbird	NI
Indian White Eye	C,I
Indian House Sparrow	G,I
Himalayan Cinnamon Tree Sparrow	G,I
Indian Baya	G
Spotted Munia	G
Red Munia	G
Great Tit	C, I, F
Green Backed Tit	C, I, F
Himalayan Tree creeper	T/BF
Himalayan Rock Bunting	G, I
Crested Bunting	G, I
Red Rumped Swallow	A I
Himalayan Brown Dipper	AqI/DC
Pink Browed Rosefinch (NR)	G
Streaked Laughing Thrush (NR)	TI,G
Chestnut Thrush (NR)	I, F
Grey Winged Blackbird (NR)	I, F
Himalayan/Altai Accentor (NR)	G,F,I

**Feeding Guilds:** **AI** – Aerial Insectivore; **AqI** – Aquatic Insectivore; **CI** – Canopy Insectivore; **UI** – Under storey Insectivore; **TI** – Terrestrial Insectivore; **T/BF** – Trunk or Bark Feeder; **SIP** – Shore Insect Plover; **ATC** – Arboreal Terrestrial Carnivore; **TC** – Terrestrial Carnivore; **AAqC** – Arboreal Aquatic Carnivore; **DC** – Diving Carnivore; **WC** – Wading Carnivore; **F** – Frugivore; **O** – Omnivore; **G** – Grainivore; **N** – Nectarivore; **I** – Insectivore; **NR**- New Record to Jammu Province.