

Feeding Guild Structure of Water Birds at Gavier Lake, Surat, Gujarat

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ABSTRACT: The present study was conducted to record the diversity and feeding guilds of wetland birds of Gavier lake from January 2015 to December 2016. A total 46 species of water birds belonging to 14 families were recorded from the study area. Direct observation method was used to record the food habits of birds. According to the different ecological similarities, the recorded water bird species were classified into major four feeding guilds like herbivorous, carnivorous, insectivorous and omnivorous. Moreover, these four major feeding guilds were further classified into sub guilds depending upon the different foraging techniques used by individual species.

KEYWORDS: Water birds, Foraging, Carnivorous, Herbivorous, Omnivorous, Guild

I. INTRODUCTION

Foraging is the simple term used for gathering of food, either for temporary purpose or for the future consumption. Different birds collect food in different ways depending upon their diets and beak shape. Bird bills are highly evolved with different shapes and sizes for gathering preferred food. This allows each species to take advantage of unique foods within same habitat and range, without strong competition. On the bases of foraging behaviour, birds form different sub guilds depending upon their different feeding habits. As per Holmes & Recher (1986), the guild structure varies from site to site with particular features of the habitat and resource use. Members of guild often vary in their precise food requirement which reduce competition among birds when resources are limited. Use of foraging habitat and feeding methods are important factors involved in resource partitioning (Wiens, 1989 & Weller, 1999). This phenomenon is used to increase understanding about how water birds use their environment for the essential requirements of their survival. Moreover, it also provides stage to compare communities within and between different habitats.

II. STUDY AREA

Gavier lake is a perennial freshwater lake rich in aquatic vegetation. It is located about 17 kms from Surat railway station at the southern west part of city. It is situated on 21°07'38.07" N & 72°44'03.03" E and about 1 km circumference area is covered by lake. It receives rain water from surrounding village area.

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Fig: 1 Google satellite image of Gaviyer lake, Surat district, Gujarat



III. METHODOLOGY

The present study for foraging ecology was carried out from January 2015 to December 2016, a period of two years while recording their diversity and other parameters together. This study was also carried out at Gaviyer lake, Surat district. Direct observation method was used to study the food habits of different water bird species. Photographs were taken with the aid of Sony ILCA - 77M II camera fitted with 70-300 mm zoom lens. The avifauna thus, observed was identified with the help of pertinent literature: "Birds of the Indian Subcontinent"(Grimmet et al., 2014), "The Book of Indian Birds" (Ali, 2002). The recorded water birds were classified into four major feeding guilds depending upon their food ecological similarities among them viz. herbivores, carnivores, insectivores and omnivores. These four major categories were further grouped into 18 sub guilds depending upon the foraging technique and location. Birds use different foraging techniques like diving, dabbling, wading, probing, dipping, skimming etc. so that they have been categorised in sub guilds accordingly such as surface diving carnivores, aquatic diving carnivores, wadding insectivores, terrestrial insectivores, dabbling herbivores, surface skimming herbivores, wading omnivores etc.

IV. RESULT & DISCUSSION

During the present investigation, total 46 species of water birds belonging to 14 families were recorded from the study area. Depending upon the food materials and feeding techniques, the reported water bird species were grouped into four major guilds, viz carnivores, herbivores, omnivores and insectivores.

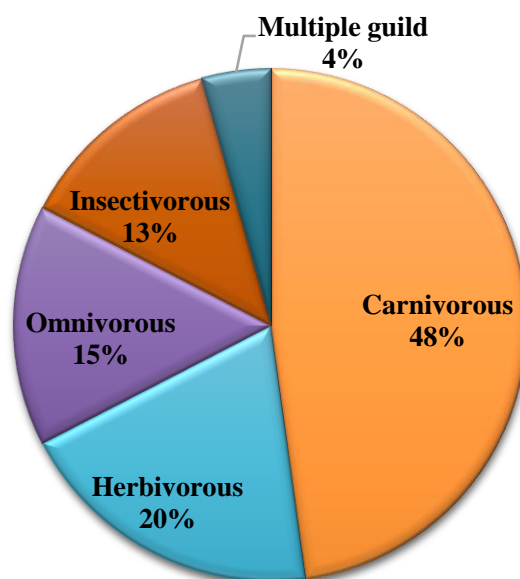
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Fig. 2. Percentage of feeding guild of water birds



Out of 46 species of water birds, 22 (48%) belonged to carnivorous feeding guild. All the species were directly dependent on animals like invertebrates, fishes, frogs, reptiles and mammals for their food consumption. Further, this guild was classified into 5 sub guilds viz. Wading Carnivore (WC); Surface Diving Carnivore (SDC); Aquatic Diving Carnivore (ADC); Aquatic Terrestrial Carnivore (ATC) and Arboreal Aquatic Carnivore (AAqC). Looking to the species distribution, 14 were WC, 4 were SDC, 2 were ADC, AAqC was 1 and one species utilized two feeding guild ATC/AAqC.

Cormorants, Grebes were the species which mainly feed on fishes by diving in water. Waders were mostly observed to forage in shallow water. They captured small invertebrates and fishes from the water. Egrets, Herons and Storks showed this type of wading technique. They had well adapted long and sharp bill and long leg to capture the prey from the source. Small waders like Shanks, Sandpipers and Jacanas used their small and sharp bill for foraging at the water surface by probing and pricking technique. Terns usually showed aerial diving method to hunt the prey from water. Some of the water dependent birds like species of Kingfisher forage in aquatic as well as terrestrial habitat and likely to feed on insects, lizards rats etc.

The Herbivorous feeding guild included 09 species (20%) which were reported to feed chiefly on both aquatic and terrestrial vegetative matters like algae, young shoots, seeds, leaves, roots etc. This guild further classified into 03 sub guilds like Dabbling Herbivore (7 species; DbH), Aquatic Surface Herbivore (1 species; AqSH) and Aquatic Surface Diving Herbivore (1 species; AqSDH). Majority of the Ducks used to forage emergent and submerge vegetation by dabbling method. In this skill, ducks dip their head and half body part into the water by raising tail part upwards. Coots used to feed at water surface level.

The insectivorous feeding guild comprised of 06 species (13%) were reported to feed chiefly on aquatic as well as terrestrial insects. This guild further divided into 2 sub guilds which were Terrestrial Insectivore (TI)/ Shore Insect Plover (SIP) and Aerial Insectivorous (AI)/ Shore Insect Plover (SIP). TI/SIP represented by 4 species and AI/SIP included 2 species. Wagtails and Swallows exclusively fed on aquatic and terrestrial insects by using probing as well as picking skill at water edge.

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Table: 1. Feeding guild of water birds at Gavier lake, Surat, Gujarat

No.	Common Name	Scientific Name	Feeding Guild
A CARNIVORES			
1	Little Grebe	<i>Tachybaptus ruficollis</i>	SDC
2	Little Cormorant	<i>Phalacrocorax niger</i>	SDC
3	Great Cormorant	<i>Phalacrocorax carbo</i>	SDC
4	Indian Shag	<i>Phalacrocorax fuscicollis</i>	SDC
5	Black Crowned Night Heron	<i>Nycticorax nycticorax</i>	WC
6	Indian Pond Heron	<i>Ardeola grayii</i>	WC
7	Purple Heron	<i>Ardea purpurea</i>	WC
8	Little Egret	<i>Egretta garzetta</i>	WC
9	Intermediate Egret	<i>Mesophoyx intermedia</i>	WC
10	Large Egret	<i>Casmerodius albus</i>	WC
11	Yellow Bittern	<i>Ixobrychus sinensis</i>	WC
12	Painted Stork	<i>Mycteria leucocephala</i>	WC
13	Asian Open-Bill Stork	<i>Anastomus oscitans</i>	WC
14	Bronze Winged Jacana	<i>Metopidius indicus</i>	WC
15	Black Winged Stilt	<i>Himantopus himantopus</i>	WC
16	Common Sandpiper	<i>Actitis hypoleucos</i>	WC
17	Green Sandpiper	<i>Tringa ochropus</i>	WC
18	Wood Sandpiper	<i>Tringa glareola</i>	WC
19	Little Tern	<i>Sternula albifrons</i>	ADC
20	Whiskered Tern	<i>Chlidonias hybridus</i>	ADC
21	White Breasted Kingfisher	<i>Halcyon smyrnensis</i>	ATC/AAqC
22	Common Kingfisher	<i>Alcedo atthis</i>	AAqC
B HERBIVORES			
23	Common Coot	<i>Fulica atra</i>	AqSDH
24	Watercock	<i>Gallinula cinerea</i>	AqSH
25	Spot Billed Duck	<i>Anas poecilorhyncha</i>	DbH
26	Northern Pintail	<i>Anas acuta</i>	DbH
27	Eurasian Wigeon	<i>Anas Penelope</i>	DbH
28	Gadwall	<i>Anas strepera</i>	DbH
29	Common Teal	<i>Anas crecca</i>	DbH
30	Cotton Pygmy Goose	<i>Nettapus coromandelianus</i>	DbH

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Vol. 8, Issue 8, August 2019

31	Knob Billed Duck	<i>Sarkidiornis melanotos</i>	DbH
C INSECTIVORES			
32	Wire Tailed Swallow	<i>Hirundo smithii</i>	AI/SIP
33	Common Swallow	<i>Hirundo rustica</i>	AI/SIP
34	White Wagtail	<i>Motacilla alba</i>	TI/SIP
35	Grey Wagtail	<i>Motacilla cinerea</i>	TI/SIP
36	Yellow Wagtail	<i>Motacilla flava</i>	TI/SIP
37	Citrine Wagtail	<i>Motacilla citreola</i>	TI/SIP
D OMNIVORES			
38	Lesser Whistling Duck	<i>Dendrocygna javanica</i>	DbO/AqTO
39	Ruddy Shelduck	<i>Tadorna ferruginea</i>	DbO/AqTO
40	Garganey	<i>Anas querquedula</i>	DbO
41	Northern Shoveler	<i>Anas clypeata</i>	DbO
42	Common Moorhen	<i>Gallinule cholorus</i>	AqTO
43	Purple Moorhen	<i>Porphyrio porphyrio</i>	AqTO
44	White Breasted Waterhen	<i>Amaurornis phoenicurus</i>	AqTO
E MULTIPLE GUILDS			
45	Cattle Egret	<i>Bubulcus ibis</i>	WC/TI
46	Red Wattled Lapwing	<i>Vanellus indicus</i>	WC/TI

WC - Wading Carnivore, **ADC** – Aquatic Diving Carnivore, **ATC** - Aquatic Terrestrial Carnivore, **AAqC** - Arboreal Aquatic Carnivore, **AqSDH** - Aquatic Surface Diving Herbivore, **AqSH** - Aquatic Surface Herbivore, **DbH** – Dabbling Herbivore, **AI** – Aquatic Insectivore, **TI** – Terrestrial Insectivore, **SIP** – Surface Insect Plover, **DbO** – Dabbling Omnivore, **AqTO** – Aquatic Terrestrial Omnivore.

The omnivorous feeding guild comprised of those species which were observed to feed on all type of food including plant as well as animal matters. It included 07 species (15%) which further sorted into 3 sub guild. Out of 7 species, 3 were Aquatic Terrestrial Omnivore (AqTO), 2 were Dabbling Omnivore (DbO) and 2 species utilized these both sub guilds together. Lesser Whistling Duck, Northern Shoveler, Garganey and Ruddy Shelduck were recorded as omnivorous duck species forage in deep water by dabbling technique. Moorhens and Watercock found to utilize both aquatic as well as terrestrial habitat for food.

It was remarkably noted that 2 species i.e. Cattle Egret and Red-wattled Lapwing were recorded to utilize more than one feeding guild (4%). They were found to shift between terrestrial and aquatic habitats. The Red-wattled Lapwing was recorded to feed on terrestrial and aquatic insects, earthworms and small molluscs while Cattle Egrets were observed to feed on insects like grasshoppers, flies as well as on frogs, tadpoles and earthworms. Such shifts between habitats are correlated with relative availability of prey and the ability of birds to use it.

V. CONCLUSION

It can be concluded that the diverse fresh water habitat of present study provides a wide range of food resources from planktons to higher level organisms for the water birds. The particular water bird species have their own feeding guilds and technique so all the niches of habitat were utilized more perfectly. So it is urgent need to protect every habitat of environment for the maintenance of ecosystem.

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