

# A Preliminary Survey on the Diet Selection and Feeding Strategies Employed by Cattle Egrets (*Bubulcus ibis coromandus*) in Jammu (J&K), India

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## ABSTRACT

This documentation reports an analysis of the diet selection along with the diverse feeding strategies being utilised by Cattle Egrets (*Bubulcus ibis coromandus*) from Jammu. In the study area, Cattle Egrets were recorded to be strictly insectivorous with the preference of grasshoppers, flies, house crickets, mole crickets and earthworms in the grassland ecosystem and beetles, backswimmers, molluscs, orthoptera larvae, fishes and frogs in aquatic ecosystem. Moreover, the behavioural methods, like walking steadily in shallow waters, running with stabs usually on land, standing and waiting and capturing flying prey from a standing position were registered to be the main feeding techniques exploited by Cattle Egrets during the study period.

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## INTRODUCTION

Organisms do not forage in patches independent of the risks of predation<sup>1-4</sup>. Moreover, they do not select habitat independent of the kinds and quality of food resources in different places. Thus, the knowledge of food and feeding habits is a pre-requisite for the effective management of birds, thereby rendering advantageous clues on the subject of habitat use, physiology and behaviour. Cattle egrets (*Bubulcus ibis coromandus*), belonging to the family Ardeidae are commonly referred to as terrestrial foragers as they pick disturbed insects alongside grazing livestock without causing any inconveniences or

disturbances to the livestock<sup>5</sup>. We present here the results of the first preliminary study pertaining to the feeding strategies and feeding preferences of Cattle Egrets as virtually nothing has been reported on these aspects of Cattle Egrets from the study area.

## MATERIALS AND METHODS

### Study area

Nestled against the backdrop of the snow-capped Pir-Panjaj mountains, the region of Jammu constitutes the southernmost unit of the state of Jammu

and Kashmir (Figure 1). The geographical area of the district is 3097 sq.km.

Geographically, it lies between  $32^{\circ} 27'$  and  $33^{\circ} 50''$  North latitudes and  $74^{\circ} 19''$  and  $75^{\circ} 20''$  East longitudes. Altitudinally, it extends from 250 meters to 410 meters above the mean sea level. The climatic conditions in and around the study area are dry sub-humid to arid with four well marked seasons in a year namely winter, summer, monsoon and autumn. The study was carried out at the following stations representing varied habitats from December, 2007 to November, 2008.

#### St. I: Tirlokpur, Gho Manhasa

The station is positioned at a latitude of  $32^{\circ} 43'27.79''$ N and a longitude of  $74^{\circ}44'21.12''$  E with an elevation of 265 meters from mean sea level. It falls in Jammu tehsil and is about 12 km from Jammu city. At this station, the main source of water is Gho Manhasa Stream.

#### St. II: Pounichak, Gho Manhasa

This station is situated between the latitude and longitude of  $32^{\circ}44'20.28''$ N and  $74^{\circ}47'58.49''$ E respectively. Its elevation from the mean sea level is 281 meters. It is at a distance of 14 km from Jammu city and falls in Jammu tehsil. Gho Manhasa stream is the main source of water at this station too.

#### St. III: Gharana Wetland, R. S. Pura

It is situated between the  $32^{\circ}36'51.52''$  N latitudes and  $74^{\circ}38'58.15''$  E longitudes. It is located at an elevation of 251 meters from the mean sea level. This station is at a distance of 35 km from the Jammu city in Ranbir Singh Pura tehsil. At this station, the main source of water is Ranbir Canal.

#### St. IV: Army Cantonment, Nagrota

This station is positioned at a latitude and longitude of  $32^{\circ}46'33.86''$  N and  $74^{\circ}54'16.20''$  E respectively. Its height from the mean sea level is 351 meters. It is situated at a distance of 12 km from Jammu city.

#### Flora

The aforementioned stations(Sts. I to III) fall under the category of areas of open cultivation and were noticed to be well irrigated with the plantations of *Oryza sativa* (Rice), *Triticum aestivum* (Wheat), *Acacia nilotica* (Babul), *Acacia modesta* (Kramishatrav), *Dalbergia sisoo* (Sheesham), *Morus alba* (Shahtoot), *Eucalyptus tereticornis* (Safeda), *Mangifera indica* (Aam), *Melia azadirachta* (Vakayan), *Ficus bengalensis* (Barghad), *Lantana camara* (Kattu hingu), *Zizyphus spp.* (Ber) etc. On the other hand, St IV falls in the category of Kandi Area or Semi Hilly. *Triticum aestivum* (Wheat) and *Zea mays* (Maize) are the main crops in the small patches of cultivation. Vegetation included *Pinus roxburghii* (Chir) at higher altitudes. Other vegetation includes; *Grewia optiva* (Dhamin), *Emblica officinalis* (Amla), *Vitex negundo* (Nishigandha), *Cassia fistula* (Amaltaas), *Butea monosperma*, *Zizyphus sp.*, *Carissa opaca*, *Lantana camara*, *Dedonea viscosa* etc.

#### Methodology

The data was collected during a continuous period of one year from December, 2007 to November, 2008. Periodic surveys were performed in the area under inquisition from 0630 to 1200 h in the morning and 1300 to 1900 h in evening during summer and 0730 to 1200 h in morning and 1400 to 1830 h in evening during winter. In addition to it, several erratic excursions were also conducted during different hours of the day, before

sunrise to sunset. The birds were observed with naked eye and through binoculars (Bushnell 7 X 50 U. S. A. made) whenever found necessary to record the data from quite a long distance in order to avoid any interference to birds due to the presence of observers. Photographic evidence was collected with the aid of Canon EOS camera fitted with 300 mm zoom lens, Digital Camera (Sony) fitted with 14.1 megapixel lens with an optical zoom of 4X. Besides, videos recordings were done with the aid of 800 X Digital 200M/Optical 20 X video camera.

The observations were taken on their foraging behaviour using “Focal Animal Sampling” technique<sup>6</sup>. To identify the food items, samples were collected from the study site besides analysing the gut contents of accidentally killed specimens in the field. The collected dead adult birds were dissected and their crops and gizzards were taken out and opened to ascertain the diverse food contents. The contents were put in screen sieves, washed and placed on a blotting paper and dried for 10-15 minutes depending upon room humidity at room temperature. Different food items were then sorted out and identified. Prey was identified visually whenever possible. In case, where prey was not identified, food items were collected from the study site using Sweep Nets. Prey was categorized into 2 size classes. The first size class (< 3 cm in length) consisted of invertebrates and the second class (3-6cm) of small fish and frogs.

## RESULTS AND DISCUSSION

### Feeding techniques

During the study period, Cattle Egrets were observed to forage for insect-preys in different types of habitats, such as farm-lands, grasslands, along the roads and when moving along side grazing livestock, thereby, picking various species of insects disturbed by these animals. The feeding

techniques utilized by the Cattle Egrets for procuring their food in different habitats were found to depend upon the type of the food, depth at which the food was available and the habitat. In the different study sites, Cattle Egrets were discerned to display distinguishable feeding strategies like walking steadily interspersed with stabs in shallow water and on land, running with stabs usually on land, standing and waiting and capturing flying prey in a standing position. Cattle Egrets also depicted the crouched or leaned posture with the neck extended. However<sup>7</sup>, also recorded the “Stand and Wait” strategy followed by Cattle Egrets in the study area. “Stand and Wait” strategy was viewed to be the most preferred strategy to feed. This conclusion is in accordance with the one made by<sup>8</sup> but antithetical to the observation of<sup>9</sup>. The probable explanation for the adoption of such a strategy by Cattle Egrets may be the superiority of the method for finding hidden or cryptic prey. Same justifications have been propounded by<sup>10-12</sup>.

### Feeding preferences

On the basis of the collection of available food items in the study area, it was concluded that the probable food items consumed by Cattle Egrets were chiefly insects like grasshoppers, flies, house crickets and mole crickets in case of grassland ecosystem and fishes, beetles, backswimmers and orthoptera larvae in case of aquatic ecosystem. These observations were also authenticated by the analysis of guts (n=5) of accidentally dead specimens of Cattle Egrets. Cattle Egrets were also discerned occasionally to cater on larvae of insects exposed after watering of *Trifolium* fields. Sometimes frogs like *Haplobatrachus tigerinus*, tadpoles and fishes were also considered as a nutriment by Cattle Egrets in the study area. While feeding in association with the different herds of cattle, Cattle

Egrets were noticed to prey upon ticks and leeches. Besides, a typical 'probing behaviour' though shallowly was showed by Cattle Egrets during rainy season, for the procurement of earthworms which were abundantly present in the study sites<sup>13</sup>. also attributed the flexibility of the birds of the Family Ardeidae to their option of apposite feeding strategy keeping in view the habitat characteristics and food availability. During rainy season, the observation of the display of a typical 'probing behaviour' for the procurement of earthworms by Cattle Egrets is in full agreement with the one contributed by<sup>8</sup> who stated that earthworms (60% by weight) were the predominant food item in rainy season and justified this behaviour as an adaptation that has developed in response to a food item which is locally abundant. In addition to it, Cattle Egrets were noted to victimize molluscs like *Gyraulus* and *Lymnea* also.

It is pertinent to mention here that Cattle Egrets catch any available prey (as listed in Table 1) which comes across their ways depending upon the seasonality during the course of foraging activities in the study area thereby ruling out any specific food preferences. However, the intake of a particular food item in large quantities clearly reflects the seasonal abundance of that food item e.g. earthworms in the rainy season. Other than this, the Cattle Egrets were found to pluck insects from the garbage and were noted to be very flexible concerning their feeding tactics and this may be advantageous to them because they can select the appropriate method depending upon the habitat characteristics and prey or food availability<sup>14</sup>. Had reported the diet of the Cattle Egret in the south-western Cape Province, South Africa as grasshoppers, caterpillars and earthworms with a wide range of other organisms belonging to the order dictyoptera, odonata etc. which is same as found during the study period.

Grasshoppers have been reported to be the predominant food item of Cattle Egrets by<sup>15-18</sup>.

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**Table 1.** List of food items collected from the feeding sites of cattle egrets in the study area

Group	Phylum	Class	Order	Family	Name of species
Vertebrata	Chordata	Pisces	Cypriniiformes	Cyprinidae	<i>Puntius ticto</i> , <i>P. stigma</i> , <i>Labeo boga</i> <i>Barillius vagra</i> , <i>Esomus dandricus</i> , <i>Danio revario</i> , <i>Osteobrama cotio</i> , <i>Chela atpar</i> (Jayaram, 2002)
			Channiformes	Channidae	<i>Channa punctatus</i> , (Jayaram, 2002)
			Siluriformes	Bagridae	<i>Mystus seenghla</i> (Jayaram, 2002)
				Siluridae	<i>Ompok bimaculatus</i> (Jayaram, 2002)
		Perciformes	Belontidae	<i>Trichogaster fasciatus</i> (Jayaram, 2002)	
	Amphibia	Anura		<i>Haplobatrachus tigerinus</i>	
Invertebrata	Arthropoda	Insecta	Orthoptera		Grasshoppers, Crickets
			Odonata	Coenagriidae	<i>Enallagma larva</i>
			Hemiptera	Notonectidae	<i>Notonecta</i> sp.
			Coleoptera		Beetles
		Arachnida	Acarina		<i>Boophilus</i> sp.
					<i>Dermacenter</i> sp.
	Annelida	Oligochaeta	Ophisthopora		<i>Pheritima posthuma</i>
		Hirudinea	Gnathobdellida	Hirudinidae	<i>Hirudinaria granulosa</i>
	Mollusca	Gastropoda		Planorbidae	<i>Gyraulus</i> sp.
				Lymnidae	<i>Lymnea</i>



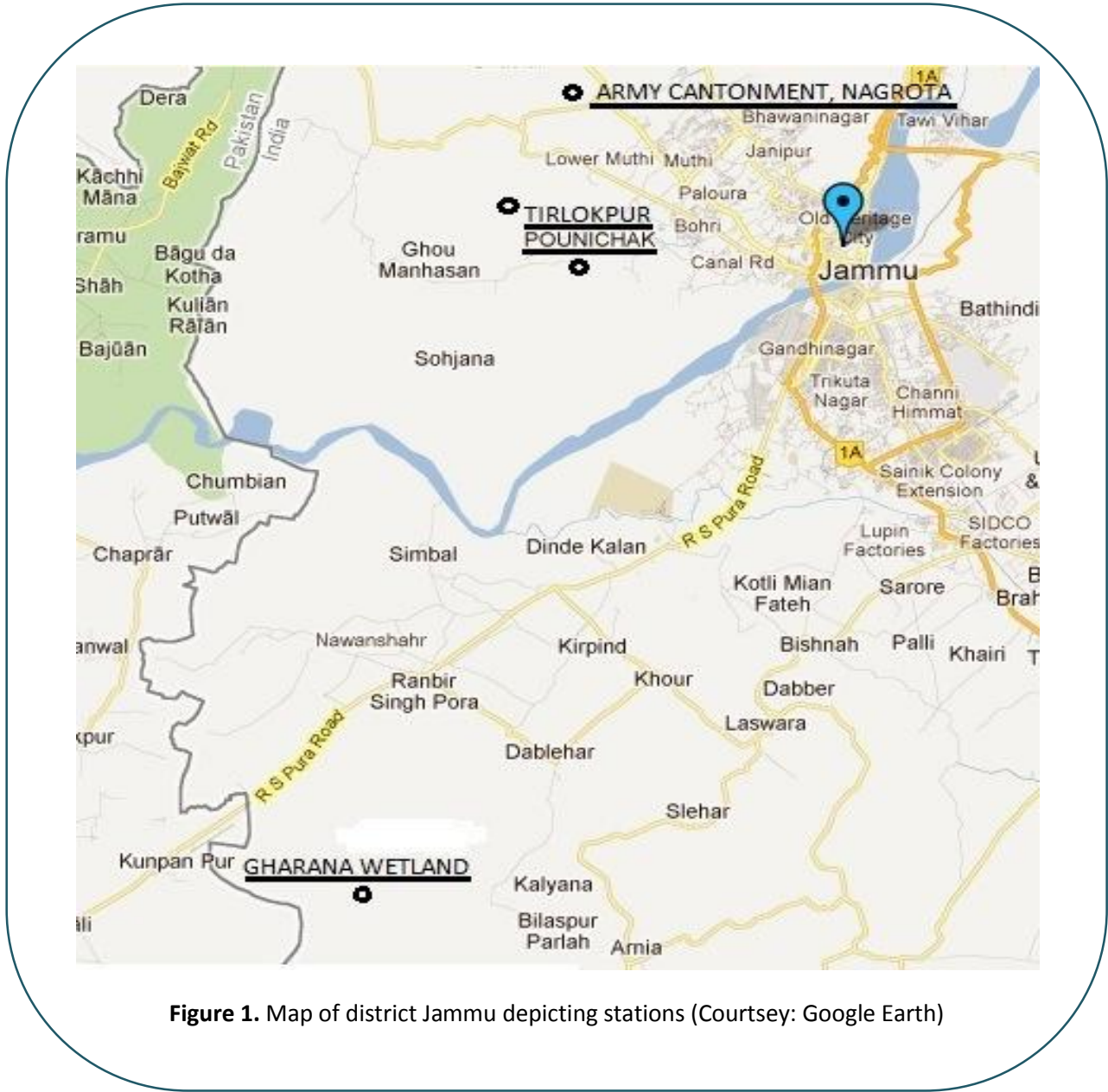


Figure 1. Map of district Jammu depicting stations (Courtsey: Google Earth)