

Feeding ecology of the large grey babbler *Turdoides malcolmi*

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Abstract. Studies on the feeding ecology of large grey babbler *Turdoides malcolmi* (Sykes) were carried out during August 1981 to July 1982 at Ludhiana. Observations on feeding behaviour and feeding associations with other bird species were recorded throughout the season. Gut contents of 125 adults and 20 nestlings revealed that this species is mainly insectivorous and annual percentage of animal matter in the diet was found to be 62 and 93 respectively.

Keywords. *Turdoides malcolmi*; feeding ecology; economic importance; large grey babbler; birds.

1. Introduction

Detailed analysis of food and feeding behaviour of different bird species of a region is the first and foremost requirement to assess their economic status and to initiate work on bird management in that region. Unfortunately, only limited information is available on the feeding ecology of Indian birds. As a sequel, the economic status of many bird species remains yet to be defined accurately. Large grey babbler *Turdoides malcolmi* (Sykes) is one of the common bird species of India. Ali and Ripley (1971) have stated this babbler to be an omnivorous species but detailed information on its feeding ecology is lacking. Therefore, the present studies were undertaken with an aim to determine its economic status in the agroecosystem of Punjab.

2. Material and methods

Studies were carried out during August 1981 to July 1982 in the field area of Punjab Agricultural University, Ludhiana (30°56'N, 75°52'E and *c.* 247 m above the mean sea level) and its surrounding areas. This area is intensively farmed, mainly having two crop seasons—*kharif* (June–August to September–December) and *rabi* (October–November to April–May). *Kharif* crops include rice, cotton, maize, pearl millet, groundnut, sugarcane, vegetables (cucurbits, okra, brinjal, tomato, chillies etc.) and pulses (*arhar*, *urd*). The *rabi* crops are wheat, *toria*, *raya*, sugarcane, pulses (lentil and gram), and vegetables (cauliflower, cabbage, knol khol, radish, turnip, carrot). Climate of the study area is a semi-arid monsoon type. Generally, 4 seasons are experienced in a year: summer or pre-monsoon (April–June), southwest monsoon (July–September), post-monsoon (October–November) and winter (December–March). The babblers were observed through 7 × 50 field binoculars periodically at different times of the day in different regions of the study area to record observations on their feeding behaviour, feeding sessions, size of flocks and feeding associations with other birds. Gut contents of 125 adults were studied gravimetrically. For this purpose babblers were shot periodically with a 0.22 air gun; either early in the morning

or late in the evening when they were feeding actively. Whenever it became too late to analyse the gut contents of babblers collected in the evening, their gizzards (there being no crop) were dissected out, labelled with price tags and put in 10% formaldehyde solution. On the subsequent day, gizzards were deformalised by keeping in water for about 15 min and then dissected out for analysing contents. After weighings of gut contents, plant matter was preserved dry, while animal matter was preserved in 70% alcohol for further identification. During the 1982 breeding season (May–September), 20 nestlings of the babbler were collected in the morning hours and their gut contents were analysed gravimetrically.

3. Results and discussion

3.1 Feeding behaviour

Large grey babblers are resident in the study area. They inhabit low vegetation and prefer gardens, orchards etc. Flock size varied in these birds from 2–12 members. The birds usually fed near the bushes and trees, hopping around here and there in low grass, picking up insects and plant matter. The babblers were also seen taking bites from the leaves of shisham *Dalbergia sissoo*, 'beri' *Zizyphus jujuba*, and mulberry *Morus* spp. trees and capture ants and other insects from tree branches with swift movements of their head. From August–October, both adult and immature babblers were observed to peel off the maize cobs and feed on the grains at different stages of maturity. They entered pearl millet fields only for insects. In November, when rice is harvested babblers were seen feeding on the fallen rice grains from the ground. During whole of the winter season the birds consumed large quantities of plant matter. At the sowing of wheat, they picked up superficially left seeds and during April–May fed on the wheat grains from the ground where they fall during crop harvest. In the monsoon season, babblers were observed devouring winged termites emerging from termite mounds. They often caught them in mid-air by taking swift take off in the black drongo *Dicrurus adsimilis* manner.

3.2 Feeding associations

Large grey babblers were observed foraging on the ground and nearby bushes frequently in the association of common myna *Acridotheres tristis*, pied myna *Sturnus contra*, hoopoe *Upupa epops* and Indian robin *Saxicoloides fulicata*. On 3 occasions these were seen feeding near grey partridge *Francolinus pondicerianus*. In the orchards and gardens, babblers were seen searching for food in association with the crow pheasant *Centropus sinensis*, hoopoe and pied crested cuckoo *Clamator jacobinus*. Sometimes, they were observed capturing ants from tree branches in association with the redvented bulbul *Pycnonotus cafer*, rufousbacked shrike *Lanius schach*, common myna and goldenbacked woodpecker *Dinopium benghalense*. In paddy and wheat fields the babblers fed near house sparrow *Passer domesticus* and weaverbirds *Ploceus* spp.

3.3 Food of the adults

The data on relative percentage (dry weight) of various items in the diet of large grey

babblers during different months are presented in table 1. Animal matter constituted 62% of the total gut contents, as against 36.92% of plant matter and 1.07% grit. Among animal matter, insects (43.73%) formed major portion of diet, followed by lizards (7.39%). Small portions of snail shells (0.43%) and Arachnids (0.12%) were also recorded. The insect matter was represented by body parts of ants (Hymenoptera), beetles (Coleoptera), grasshoppers (Orthoptera), caterpillars (Lepidoptera), flies (Diptera), dragon flies (Odonata) and termites (Isoptera). Order Lepidoptera was the most abundant among insects which constituted 15.75% of total food and was recorded in 33 guts. At second place was Orthoptera (10.34%), which in turn was followed by Hymenoptera, Coleoptera, Isoptera, Odonata and Diptera.

The major portion (24.92%) of plant matter in the gut contents could not be identified. Wheat grains (5.55% of total contents) were found in 21 guts and were the most common food item in the identified portion of the plant matter. Maize grains ranked second and rice was found in only small quantities. Leafy material constituted 1.58% of total food and was recorded in only 3 guts. Weed seeds of wild 'senji' *Melilotus indica*, 'hulhul' *Cleome viscosa* and 'kaon makki' *Commelina benghalensis* collectively formed only 0.64% of total food.

During pre-monsoon and monsoon season (breeding season of babbler) large grey babblers consumed large quantities of animal matter. The bulk of this was constituted by insects of which grasshoppers, caterpillars, beetles and ants were taken in significant quantities. Increased insect consumption by adult babblers during their breeding season was probably owing to the increased availability of insects as well as the limited available foraging time due to high energy demands of the breeding activity. Hintz and Dyer (1970) also extended the same view while describing the food of red-winged black birds.

The frequency of occurrence of body parts of beetles and ants in the gut contents of babblers was more than any other insect group. It may not be true to consider that these are the preferred food items because these hard bodied insects are digested comparatively slowly and thus usually recovered in more guts. Coleopteran parts have been reported to remain for longer time in the gizzards of starling *Sturnus vulgaris* and their importance gets exaggerated (Kalmbach and Gabrielson 1921). Moeed (1980) has also supported this view.

Presence of snail shells (April–July) in the diet of babblers can be attributed to the increased calcium requirement for egg laying. Plant matter was represented by wheat, maize and leafy material in these seasons. Since grit was found in small quantities, hard body parts of insects (e.g., mandibles) may be performing the function of grit in the gizzards. Bird and Smith (1964) and Mott *et al* (1972) have also observed that in red-winged blackbird the least amount of grit was picked up when insects formed a large portion of the diet.

During winter season, percentage of animal matter consumed was less owing to the less availability of insects and spiders. However, the percentage of Lepidoptera in gut contents increased during these months showing that these babblers feed upon the hibernating larvae. Main identified portion of plant matter was represented by wheat and rice grains while weed seeds were found in traces.

3.4 Food of the young

Large bulk (93%) of gut contents of the young consisted of animal matter while plant matter accounted for 6.94% only (table 2). Presence of plastic pieces in the food

Table 1. Relative percentage (dry weight) of different food items in the guts of adult large grey babbler.

Food items	Aug n = 11	Sept n = 12	Oct n = 12	Nov n = 9	Dec n = 11	Jan n = 10	Feb n = 9	Mar n = 10	Apr n = 11	May n = 9	Jun n = 10	Jul n = 11	Annual average n = 125
Animal matter													
Phylum chordata													
Class Reptilia (lizards)	—	50.70 (2)	—	—	—	—	—	—	—	—	—	—	7.39 (2)
Phylum Mollusca (snails)													
Class Insecta	—	—	—	—	—	—	—	—	2.43 (3)	5.71 (3)	0.12 (1)	0.55 (1)	0.43 (8)
Phylum Arthropoda													
Class Insecta	5.48 (2)	3.23 (6)	7.39 (3)	0.32 (1)	0.35 (1)	—	—	15.63 (9)	7.91 (6)	12.78 (6)	10.04 (8)	7.90 (5)	5.36 (47)
Coleoptera	28.36 (4)	8.81 (3)	26.47 (3)	—	—	—	—	—	17.17 (3)	8.67 (2)	8.92 (3)	22.37 (4)	10.34 (22)
Orthoptera	4.74 (1)	1.02 (1)	2.24 (1)	23.47 (3)	32.27 (3)	39.47 (4)	23.38 (2)	4.63 (3)	14.64 (5)	28.19 (4)	18.60 (3)	9.59 (3)	15.75 (33)
Lepidoptera	—	—	—	—	—	—	—	1.54 (2)	0.75 (2)	1.37 (3)	0.44 (1)	0.29 (1)	0.26 (9)
Diptera	—	—	—	—	—	—	—	—	—	5.82 (2)	1.32 (1)	—	0.36 (3)
Odonata	—	—	—	—	—	—	—	—	—	—	—	—	—
Hymenoptera	26.0 (6)	13.07 (7)	12.83 (5)	2.03 (2)	0.71 (2)	12.17 (6)	10.42 (3)	14.73 (8)	8.47 (6)	10.62 (6)	3.09 (4)	5.95 (7)	11.20 (62)
Isoptera	—	—	—	—	—	—	—	—	—	4.51 (5)	1.43 (3)	2.05 (3)	0.46 (11)
Total insects	64.58 (1)	26.13 T	48.93	25.82	33.33	51.64	33.80	36.53	48.94	71.96	43.84	48.15	43.73
Class Arachnida (spiders)	0.17 (1)	—	—	—	—	—	—	0.75 (2)	0.27 (1)	0.51 (1)	—	—	0.12 (6)

Animal matter (unidentified)	16.03 (5)	2.06 (1)	23.33 (3)	5.83 (1)	11.93 (3)	2.07 (1)	15.56 (2)	1.99 (1)	11.83 (3)	4.74 (1)	8.89 (3)	19.15 (4)	10.33 (28)
Total animal matter	80.78	78.79	72.26	31.65	45.26	53.71	49.36	39.27	63.49	82.92	52.85	67.85	62.00
Plant matter													
Maize	9.13 (2)	12.75 (4)	3.46 (1)	—	—	—	—	—	—	—	—	—	3.41 (7)
Wheat	—	—	—	10.40 (1)	0.81 (1)	0.67 (1)	7.63 (2)	17.52 (2)	12.22 (6)	1.54 (1)	21.93 (4)	2.96 (3)	5.55 (21)
Rice	—	—	—	0.64 (1)	1.45 (2)	—	—	—	—	—	—	—	0.14 (3)
Weed seeds	0.98 (1)	0.53 (2)	2.84 (2)	—	1.98 (1)	—	—	—	—	1.26 (1)	—	—	0.64 (7)
Crushed seeds (unidentified)	—	—	—	—	—	9.69 (2)	9.53 (1)	—	—	—	—	—	1.58 (3)
Leafy material	—	—	—	—	—	—	—	3.96 (3)	3.12 (1)	—	1.40 (1)	1.69 (3)	0.68 (8)
Plant matter (unidentified)	9.10 (5)	7.76 (8)	21.44 (9)	57.31 (9)	50.49 (6)	35.92 (9)	33.48 (7)	38.43 (5)	21.16 (3)	7.71 (3)	19.10 (5)	22.99 (6)	24.92 (74)
Total plant matter	19.21	21.04	27.74	68.35	54.73	46.28	50.64	59.91	36.50	10.51	42.43	27.64	36.92
Grit	—	—	—	—	—	—	0.79 (1)	—	6.56 (5)	4.69 (4)	4.49 (2)	—	1.07 (12)

n, Number of guts analysed; T, traces (<0.1%).

Figures in parentheses indicate frequency of occurrence of food items.

Table 2. Food of the young of large grey babbler *T. malcolmi*.

Food item	Mean percentage (wet weight) of food items in the guts		
	Nestlings <i>n</i> = 11	Fledgelings <i>n</i> = 9	Nestlings and fledgelings <i>n</i> = 20
Animal matter			
Molluscs (snails)	1.71 (8)	0.92 (4)	1.25 (12)
Insects			
Orthoptera (grasshoppers)	32.15 (7)	1.32 (1)	14.19 (8)
Coleoptera (beetles)	5.33 (8)	1.43 (5)	3.06 (13)
Lepidoptera (caterpillars)	46.86 (7)	83.19 (9)	68.03 (16)
Hymenoptera (ants)	1.44 (4)	—	0.6 (4)
Total insects	85.78	85.94	85.88
Arachnida (spiders)	0.82 (1)	—	0.34 (1)
Unidentified animal matter	3.49 (1)	6.99 (3)	5.53 (4)
Total animal matter	91.80	93.85	93.00
Plant matter	8.06 (9)	6.15 (5)	6.94 (14)
Plastic pieces	0.15 (1)	—	T (1)

n, Number of guts analysed; T, traces (<0.1%).

Figures in parentheses indicate frequency of occurrence of particular food items.

consumed was unusual. Major part (85.88%) of the animal matter was constituted by insects. Molluscs formed 1.25% and Arachnids only 0.34%. Among insects, caterpillars were the main food item in the consumed food while grasshoppers, beetles and ants were the other preferred insects in the descending order. Most of the young birds are often given soft bodied invertebrates and that too of large size (Coleman 1977). Since the growth in young is very fast they need large quantities of proteinous food and perhaps because of this, it is not worthwhile for adults to make flights to the nest with small food items when they can find larger ones in the same area. Our observations also suggest the same because grasshoppers and caterpillars, which were fed in large quantities to the young ones, are comparatively large animals. The diet of nestlings and fledgelings was apparently the same (table 2).

3.5 *Economic status*

The adult babblers are omnivorous i.e., they feed on a wide variety of food items viz insects, arachnids, molluscs, wheat, maize, rice, weed seeds and leafy material. Among

Table 3. Animals identified from the gut contents of large grey babbler.

Animal	Adults	Young	Remarks
Phylum Chordata			
Class Reptilia			A common lizard; body parts of young lizards recovered from guts
Order Squamata			
Family Agamidae			
<i>Calotes</i> sp.	+	-	
Phylum Mollusca			
Class Gastropoda			Aquatic snail; host of a stomach fluke (<i>Orthrocoelium streptocoelium</i>) which causes Paramphistomiasis disease of livestock
Order Basommatophora			
Family Planorbidae			
<i>Bulimus tentaculatus</i>	+	+	
Order Monotocardia			
Family Melaniidae			
<i>Melanoides tuberculatus</i>	+	+	
Phylum Arthropoda			
Class Insecta			Phytophagous weevils; damage stored grains; stem borers and leaf feeders
Order Coleoptera			
Family Curculionidae			
<i>Sipalus</i> sp.	+	-	
<i>Myllocerus</i> sp.	+	-	
<i>Astycus</i> sp.	+	+	
<i>Episomus</i> sp.	-	+	
Family Chrysomelidae			
<i>Aulacophora faveicollis</i>	+	-	Serious pests of cucurbits
Family Bupenstidae			
<i>Rhizopertha dominica</i>	-	+	Stored grain pest
Family Carabidae			
Family Elateridae	+	+	
Family Cantharidae	-	+	Body parts found; adults damage flowering plants
Order Hemiptera			
Family Pentatomidae	+	-	Mutilated body parts found; members suck sap of plants resulting into their wilting
Order Diptera			
Family Calliphoridae			
<i>Calliphora</i> sp.	+	-	Saprophagous fly
Order Hymenoptera			
Family Formicidae			
<i>Cataglyphus bicolor</i>	+	+	
<i>Componotus</i> sp.	+	-	
Order Orthoptera			
Family Acrididae			
<i>Colemania</i> sp.	+	+	
<i>Acrida</i> sp.	+	+	Polyphagous hopper; feeds on leaves of rice, grass, millets
<i>Aiolopus</i> sp.	-	+	

Table 3. (Contd.)

Animal	Adults	Young	Remarks
Class Arachnida			
Order Aranae	+	+	Spiders generally are predators of insect pests and thus useful animals
Family Linyphidae			
<i>Linyphia</i> sp.	+	-	
Family Argiopidae			
<i>Argiope</i> sp.	+	-	
Family Salticidae			
<i>Marpissa luhianaensis</i>	+	+	
Family Oxyptidae			
<i>Oxyopes</i> sp.	+	-	
Family Lycosidae			
<i>Pardosa bhatnagari</i>	-	+	

+, Present; -, absent.

animal matter major portion of their food is formed by insects out of which most are harmful viz curculionids (pests of stored grains), chrysomelids (pests of cucurbits), pentatomids (pests of many plants; they generally suck sap resulting in the wilting and dying away of plants), bupenstids (mostly stored grain pests), carabids (called white grubs; very destructive to groundnut and sugarcane crops during immature stages) and Orthopterans (mostly phytophagous hoppers). The snails consumed by babblers are known to be the vectors of infectious diseases of live stock (table 3).

During the post-monsoon season, babblers feed on maize but the percentage of this food item is very less. Wheat and rice grains are taken in small quantities and those too from the ground, where they fall as a result of damage caused by other birds to the standing crops. Weed seeds are also consumed by the adult babblers but in very small quantities and, therefore, there is not much significance of these babblers as dispersing agents of the weeds. The young ones are fed mainly on those insects which are in no way useful to the humans. The only useful animals fed to the young are spiders but they make only up to 0.61% of the total food.

Our studies, therefore, tend to conclude that the large grey babbler on the whole is a useful species to mankind.

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