Scorpions and molluscs: Some new dietary records for Spotted Owlet *Athene brama* in India

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Introduction

Spotted Owlet *Athene brama* is a common resident raptor found all over India. Of the races *A. brama brama, A. b. indica* and *A. b. ultra*, the nominate form is known to occur south of 20^{0}N latitude (Ali and Ripley 1969). These owlets are largely crepuscular and nocturnal in habits and generally keep in pairs or family parties of three to four birds. They are known to feed chiefly on beetles, moths, locusts and other insects, as also on earthworms, lizards, mice and small birds (Ali and Ripley 1969). Not much work has been done on feeding behaviour of Spotted Owlets. Kumar (1985) studied their ecology, and Jain and Advani (1983) and, Jadhav and Parasharya (2003) their food habits. This paper records some new items in the dietary of the Spotted Owlet.

We studied a breeding pair of this owlet at Saswad (18^{0}20'09"N, 74^{0}00'73"E), in Pune district, Maharashtra, from 15 January to 28 February 2004. This semi-arid area receives very low rainfall. It has agricultural cropland of black soil. Severe drought has been prevalent in the region for the past two years.

Observations

The nest of our study pair was in a hole between the roof and wall of an abandoned building on the bank of the perennially dry Karha River. Its entrance was 6 inches wide and it was located 4m above the ground. A few dry twigs, feathers of birds like Asian Koel *Eudynamys scolopacea*, Common Myna *Acridotheres tristis* and House Sparrow *Passer domesticus*, and some loose soil were seen in the nest. In the non-breeding season the birds used this nest as one of their roosting sites besides the adjacent banyan *Ficus bengalensis* and mango *Mangifera indica* trees. The owlets were seen hawking winged insects for two hours from twilight, under an electric lamp outside the adjacent Siddheshwar temple. They were also seen dropping to the ground and taking prey, the identity of which was not ascertained.

Spotted owlets are known to regurgitate undigested food in the form of pellets. Such pellets were collected from beneath the study nest. 65 pellets were collected. 12 of these were completely intact and were measured in the field with a Vernier Calipers (0.01mm sensitivity). The average size of these intact pellets was 13.9mm x 9.7mm. These were then sterilized in a dry oven at 72^{0}C for 24 hours and subsequently broken with gloved fingers for further analysis. Hard chitinous insect parts, hair and bones were separated. Since crushed segments and partial appendages are the only residual parts of insects found in the pellets, identification of invertebrates beyond the Order level is usually not possible.

Results and discussion

Different types of food items are reported in the diet of Spotted Owlets (Table 1). They seem to feed on a variety of animals ranging from earthworms to birds and mice; but prefer a diet of beetles (Coleoptera). The pellets we collected contained remains of mammals (Insectivora and Rodentia) (Table 1). They also had remnants of insects, which were identified by one of the authors (PPK) as those of Orthoptera (crickets, grasshoppers, acridids, etc.), Hymenoptera (wasps, ants, bees, etc.) and Coleoptera (Table 1).

A few molluscan gastropod shells [Mollusca: Mesogastropoda and Stylommatophora (land snails, slugs, etc.)] were also identified among the pellet contents and we report for the first time, that these form a part of the dietary of Spotted Owlets in India (Table 1). It is likely that the owlets are ingesting the molluscs to aid the grinding of meat in the stomach. Hard root fragments of plants, seeds and grit were also present in the pellets and may have been consumed for the same purpose. *Eucalyptus* sp. seeds, small pebbles and lime particles are found in the fecal pellets of *Athene brama indica* (Jain and Advani 1983).

We would also like to record, for the first time, the presence of scorpion (Order: Scorpionida, Family: Buthidae) body parts as a constituent of the diet of the Spotted Owlet in India. Twentyfour entire scorpion stings along with 10 patellae[1] of pedipalps[2] were identified in the pellets. Two species, *Mesobuthus tamulus tamulus* (Fabr.) (5 entire stings and 2 palps) and *Mesobuthus pachyurus* (Pocock) (19 entire stings and 9 palps) were identified by one of the authors (DBB). The latter species is an inhabitant of the black cropland soil of the region. Two other species of scorpions also reported from this area are, *Orthochirus bicolor* (Pocock) (Family: Buthidae) and *Heterometrus xanthopus* (Pocock) (Family: Scorpionidae) (Tikader and Bastawade 1983). Parts of the latter were not found in the pellets. The poisonous parts of the arachnid, the scorpion sting exuviae[3], were intact in all the pellets. A few patellae of pedipalps and some partly digested tail segments were also found.

Swallowing prey with pointed appendages is known to cause injury to owls. Duncan (2003) records the death of an Eastern Screech Owl *Otus asio* chick, while swallowing a dead Red-breasted Nuthatch *Sitta canadensis*. The short pointed beak of the nuthatch pierced the owl's brain, through the roof of its mouth. In our observation, the owlets ingested the scorpions along with their pointed, hard stings. The stings were later expelled in the pellets and were not allowed to pass distally from the gizzard into the small intestine. Therefore, it is clear that these owlets swallow whole scorpions and de-sting them in their gizzard. The owlets seem to have evolved this unique method of safety, as a physiological adaptation against sharp and poisonous scorpion stings. This is in contrast with the behavior of shrikes (Laniidae) living in certain desert habitats, that de-sting scorpions with their beak, prior to eating (Paul and Gwinner 1967). Roadrunners *Geococcyx* sp. (Cuculidae) are also reported to attack venomous tail spikes of arachnids, rendering them defenseless, before swallowing the scorpions (Bent 1940). Scorpions are reported in the diet of some owls, but these reports are not from India (Cook 1997). Kumar (1985) has reported arachnids of Family: Scorpionidae as a chance food (less than 1% frequency) of the spotted owlets in Hyderabad, but has not specified the species.

Kumar (1985), and Jadhav and Parasharya (2003), report amphibians, for the first time, particularly toads (Bufonidae), in the diet of the Spotted Owlet. It is said that the presence of poison glands on the toad's skin help to distract predators, however it seems that the same is not effective against Spotted Owlet (Jadhav and Parasharya 2003).

Lizards, geckos, snakes (Reptilia) and bats (Mammalia) were also recorded (Kumar 1985; Jadhav 2003) in the diet of Spotted Owlets. Thus, these spotted owlets seem to be resorting to euryphagy[4] (Cook 1997) with a significant intake of scorpions as well. This may be an adaptive response to the perennial drought-like situation in this arid scrub habitat where no single prey species is plentiful at any given time.

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Notes

[1] Patella = Kneecap.

[2] Pedipalp = One of the second pair of appendages near the mouth of a spider or other arachnid that are modified for various reproductive, predatory, or sensory functions.

[3] Exuviae = The cast-off skins or coverings of various organisms, such as the shells of crabs or the external coverings of the larvae and nymphs of insects.

[4] Euryphagous = feeding on a wide variety of foods.

Table 1.

Food Item	Ali & Ripley	Jain & Advani	Jadhav & Parasharya	Authors
Invertebrata				
ANNELIDA				
Earthworms	R	-	-	-
MOLLUSCA				
Ord: Megagastropoda				
Fam: Thiaridae				
Thiara scabra (Muller)	-	-	-	First Report
Ord: Stylommatophora				
Subulinidae				
Lamellaxis gracilis (Hutton)	-	-	-	First Report
ARTHROPODA				
Class: Arachnida				
Ord: Scorpionida				
Fam: Buthidae				
Mesobuthos tamulus tamulus (Fabr.)	-	-	-	First Report
Mesobuthos pachyurus (Pocock)	-	-	-	First Report
Fam: Solifugae				
Galeodes indicus (Pocock)	-	-	-	First Report
INSECTA				
Ord: Coleoptera: Beetles	R	-	-	-
Fam: Meloidae: Blister Beetle	-	-	-	R
Fam: Coccinellidae: Ladybird Beetle	-	-	-	R
Fam: Elateridae:				

Click Beetle *Drasterius* sp.	-	-	R	R
Fam: Cerambycidae	-	-	-	R
Fam: Carabidae: Ground Beetle	-	R	-	R
Fam: Scarabaeidae:				
Dung Roller Beetle	R	R	-	R
Rhino Beetle *Heliocopris bucephalus*	-	-	R	-
Melanothidae:				
White Grub Beetle *Holotrichae* sp.	-	-	R	-
Fam: Tenebrionidae	-	R	-	-
Ord: Orthoptera				
Fam: Acrididae: Grasshopper	R	-	-	R
Ord: Mantodea: Mantid				
Ord: Hymenoptera	-	R	-	-
Fam: Formicidae: Ants	-	-	-	R
Ord: Hemiptera	-	R	-	-
Ord: Odonata:				
Dragonfly *Agrionine* sp.	-	-	R	-
Ord: Lepidoptera: Butterfly, Moth	R	-	R	-
Fam: Sphingidae: Moth				
Ord: Dictyoptera:				
Cockroach *Periplaneta americana*	-	-	R	-
Vertebrata				
AMPHIBIA				
Ord: Anura				
Fam: Bufonidae:				
Marbled Toad *Bufo stomaticus*	-	-	R	-
REPTILIA				
Brahminy Worm Snake				
Ramphotyphlops braminus	-	-	R	-
Lacertilia: Lizard	R	-	-	-
AVES: Small birds	R	-	-	-
MAMMALIA				
Ord: Insectivora				
Fam: Soricidae				
SubFam: Crocidurinae				
Suncus etruscus (Savi)	-	-	-	First Report
Suncus stoliczkanus (Anderson)	-	-	-	First Report
Suncus Sp.	-	-	-	First Report
Ord: Rodentia	-	R	-	-
Fam: Muridae				
SubFam: Gerbillinae				
Tatera indica (Hardwicke)	-	-	-	R
SubFam: Murinae				
Mus musculus (Linnaeus)	-	-	R	R
House mouse				
Golunda ellioti (Gray)	-	-	-	R
Mus sp., *Rattus* sp.	-	-	-	R
Mice	R	-	-	-
Ord: Microchiroptera: Bats	-	-	R	-
	Plant Matter			
Eucalyptus seeds	-	R	-	R
Plant rootlets	-	-	-	R
Pebbles	-	R	-	R
Lime particles				

Key to abbreviations: Ord=Order, Fam=Family, R=Reported earlier.