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Research Article

SEASONAL VARIATION IN THE DIET OF SPOTTED OWLET FROM MELGHAT TIGER RESERVE, MAHARASHTRA, INDIA

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ABSTRACT

The diet of Spotted Owlet *Athene brama* was studied to find out the differences in food habits in two seasons. The study was carried out in Melghat Tiger Reserve from Maharashtra, India, during 2013 - 2014. Regurgitated pellets were analyzed to understand their dietary composition. The diversity indices from both the seasons were found to be similar.

INTRODUCTION

The spotted owlet *Athene brama* is a common nocturnal raptor (Ali and Ripley, 1969). This species is found in Bangladesh, Bhutan, Cambodia, Iran, Lao, Myanmar, Nepal, Pakistan, Thailand and Vietnam ranging across wide habitats from forest to savanna, shrub land, grassland and desert (Sridhar, 1981). It is a carnivorous raptor and its food consists of rodents, birds, reptiles, amphibians, and arthropods (Mason & Lefroy, 1912). It survives in all possible types of biotopes, adapts to the changing environment both natural and man made and usually is absent on high mountains (Rasmussen, 1998).

In general, owls swallow their prey as a whole or at times the head alone based on the size of the prey; the fleshy portions of the prey eaten are digested, and undigested fur and bones are regurgitated as pellets (Welty, 1982). Strigidae (typical owls) prey mainly upon small rodents or insects. Their ability to digest bone is poor and pellets contain a good skeletal record of the small mammals consumed. Owl pellet analysis is a nondestructive means of diet determination. Obtained diet information can include prey species eaten (Jones and K, 1952; Reed, 1957; Rickart, 1972; Marti, 1973; Marti, 1974; Czaplewski, 1976; Epperson, 1976; Dinsmore, 1991), preferences of prey species (Fisher, 1941; Hedrick, 1989; Gubayni, 1992) and estimates of contributions of prey biomass. Owl pellet analysis also is a useful method for gaining additional insight into small mammal communities and distribution (Long, 1963; Chaote, 1971; Jain, 1983).

A review of literature from Indian Subcontinent indicated that there are handful studies done about the food preferences from the urban and agricultural areas (Patki *et al*., 2014, Vanitha, 2014) of the most common resident owlet Athene brama (Ali and Ripley, 1983; Neelanarayanan, 1998). However no attempts were made to study the seasonal variation in diet composition of the spotted owlet from the forest habitat.

MATERIALS AND METHODS

Forest Habitat-Melghat Tiger Reserve (MTR), Vidarbha, Maharashtra which lies between 21°29’96”N and 077°12’33.8” is located at the southern offshoot of Satpuda hill range in Central India also known as the Gawilgarh hill range in Maharashtra. The forest area of MTR is tropical dry deciduous, dominated with teak plantations (*Tectona grandis*).

The roosting site which was on the Teak tree(*Tectona grandis*) at the height of about 11 feet, was situated at the geographical location 21°32’00.8" N 77°00'12.3" E. A total of 32 pellets were collected from this site, of which 13 were collected in winter (December 2013) and 19 were collected in Summer (May 2014).

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Pellets were collected, bagged and kept in an oven at 70° for 24 h in order to kill infesting insects and then stored. Later, the pellets were subjected to NaOH treatment and the osteous and chitinous pellet contents were separated and then washed for further identification (Hibbert-Ware 1938). Different food remnants like bones, hairs and insect remains were cleaned under a dissecting microscope from a disentangled mass of owl pellets.

The cranial bones were used to identify the small mammals upto the species level (Talmale and Pradhan, 2009). The Insect identification relied on chitinous remains, feathers viz. elytra, appendages, wings (Carpenter,1928., Borror *et al.*, 1955). Prey Biomass - The importance of each prey species is more realistically expressed by bulk rather than by number (Buckley and Goldsmith., 1975). The average body weight of each of the mammalian prey was taken into account. (Santhankrishnan *et al.*, 2011; Muhammad mahmood *et al.,* 2007).

Magurran (1988) was followed to assess and compare the diversity in the diet of two owl species by using species richness (S), Shannon's index (H) and Evenness index (E).

RESULTS

Winter season – The average pellet length was found to be 2.31 ± 0.79 cm and width 1.2 ± 0.3. The average dry weight of the pellet was found to be 0.493±0.1093 gm. The regurgitated pellet consisted of hair, small pieces of vertebrate bones, pieces of insect integuments, insect appendages etc. The following taxa of small mammals viz. *Suncus murinus, Suncus etruscus, Mus booduga gray, Millardia meltada, Mus species* could be recorded from the pellets. The remnants of insects in the pellets of the owl comprised wings, legs, antennae and head. On the basis of these remnants, insects belonging to the orders Orthoptera (Grasshoppers), Coleoptera (Beetles) were recorded from the pellets. (Table 1)

Summer season - The average pellet length was found to be 2.60 ± 0.29 cm and width 1.1 ± 0.2. The average dry weight of the pellet was found to be 0.560±0.089 gm. The regurgitated pellet consisted of hair, small pieces of vertebrate bones, pieces of insect integuments, insect appendages etc. The following taxa of small mammals viz. *Suncus murinus, Mus booduga gray, Gollunda ellioti gray, Suncus species, Mus species, Muridae species* could be recorded from the pellets. The remnants of insects in the pellets of the owl comprised wings, legs, antennae and head. On the basis of these remnants, insects belonging to the orders Coleoptera (Beetles) was recorded from the pellets. (Table 1, Figure 1- 4)

Table 1 Comparative Picture of Prey Frequencies (%) and biomass (%) consumed by Spotted owlets in two different season.

Prey Items	Winter season		Summer season	
	% Relative Abundance	% Biomass	% Relative Abundance	% Biomass
Suncus murinus	7.69	32.61	5.26	18.09
Mus booduga gray	38.46	35.67	31.57	23.74
Suncus etruscus	15.38	1.95	-	-
Suncus species	-	-	15.78	1.6
Mus species	7.69	7.33	26.31	20.35
Millardia meltada	7.69	22.42	-	-
Muridae family	-	-	5.26	9.04
Gollunda ellioti gray	-	-	10.52	27.13
Coleoptera	92.30	-	100	-
Orthoptera	7.69	-	-	-

The Diversity indices (Figure 5) showed little variability in the food habits in two distinct seasons, Shannon's index in summer season was found to be slightly more (1.40) than the winter season (1.37).

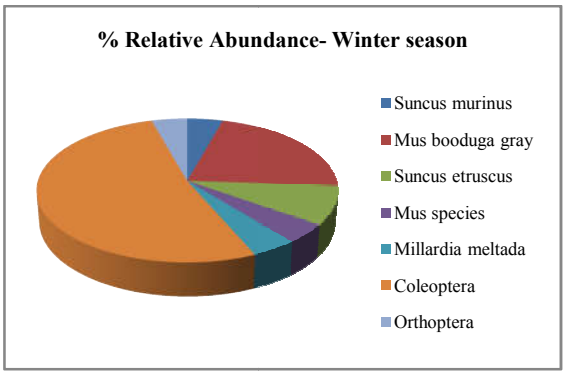


Figure 1

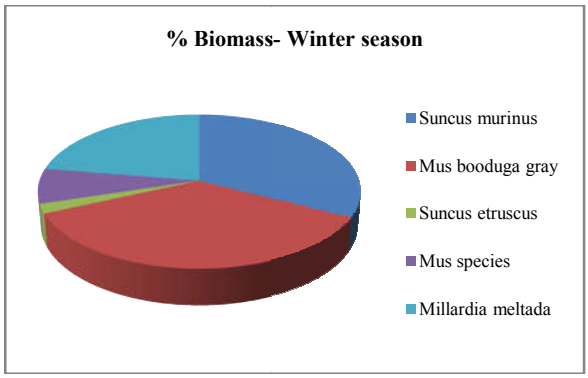


Figure 2

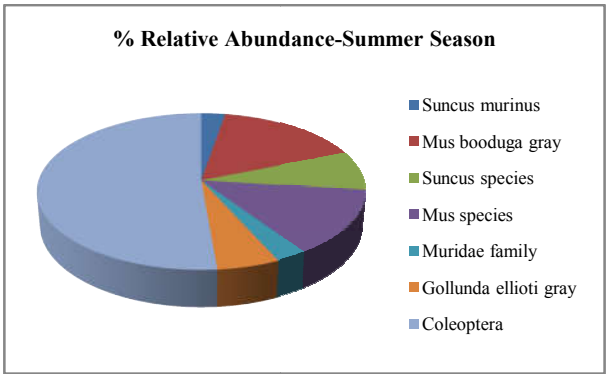


Figure 3

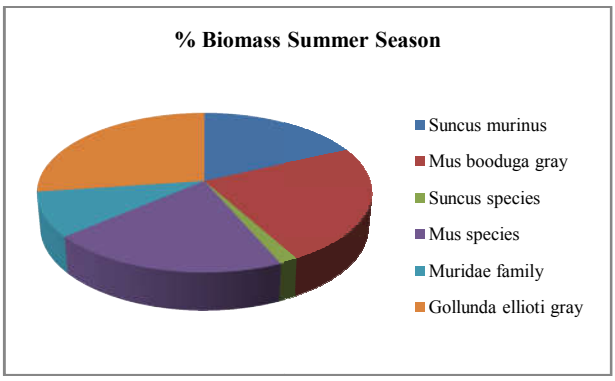
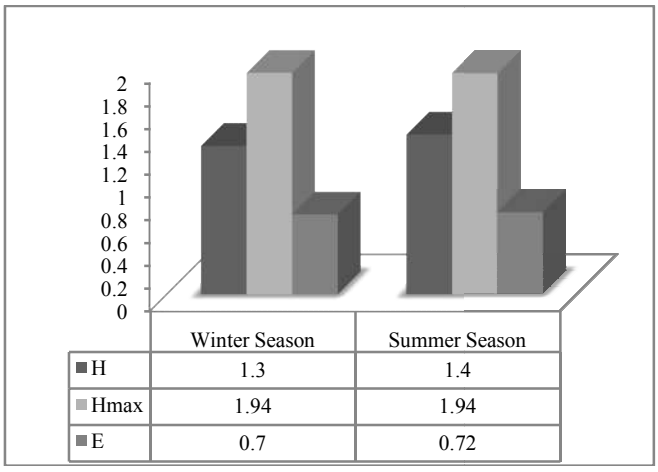


Figure 4



	Winter Season	Summer Season
H	1.3	1.4
Hmax	1.94	1.94
E	0.7	0.72

Fig 5 Comparative prey diversity and evenness.

(H –Shannon's Index, Hmax - Maximum diversity possible, E - Evenness.)

DISCUSSION

In the present work the average length and width of the pellets of Spotted owlet were similar to those reported by Patki *et al* (2014) [1].

According to Beg and Mushtaq ul Hassan (1990) Spotted owlet diet depended mainly on insects and mammals for their food, wherein insects predominated in the winter and summer season, this is in corroboration with the present study. However in the present study we found number of small mammals captured as a prey was more in the summer season (6 Species) as compared to the winter season (4 species), this temporal rise and fall of a given group of prey in the diet of the owlet can be related to more visibility in the summer season and hence availability of the prey species.

A less preferred prey species may become the main item of the diet of a predator if the preferred species, for some reason, becomes scarce and difficult to capture (Klopfer, 1964) which is also observed in the present study, Here *Mus Species* which is least captured in the winter season is second most captured species in the summer season. It is also possible that a potentially suitable prey may be present in the habitat in relatively large numbers but it may elude the predator by virtue of its particular mode of life.

We recorded huge number of appendages, elytra, mandibles and head of various species of beetles (Coleoptera) in the pellets, we could only identify upto the order level due to the unavailability of proper methods and key characters for identification. Several previous studies have also confirmed the presence of Coleopteran insects as one of the important food resources of the Spotted Owlet (Jain and Advani, 1983; Kumar 1985; Jadhav and Parasharya 2003; Pande *et al.* 2004).

The proportion of the of mammals in Spotted Owlet diet differed in two seasons, of which three species viz. *Mus booduga gray, Suncus murinus and Mus species* were common. *Mus budooga* was found to be the most frequent in the forest habitat in both seasons. However in a study carried out by Zade *et al.* (2011) *Mus musculus* was found to be the most common species in urban habitats also. Three prey species viz. *Muridae family, Gollunda ellioti gray, Suncus species* were exclusively found in the diet of owlets in the summer season, whereas *Suncus etruscus, Millardia meltada* were observed only in the winter diet.

Shannon's index for both the seasons were similar i.e. 1.37 in winter and 1.40 in summer which is low, indicating specialized food habits, but the mammal preys captured in summer season were more in numbers than the winter season, this may be because of more visibility in the summer season than in winter.

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