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PREY COMPOSITION OF MOTTLED WOOD OWL *STRIX OCELLATA* LESSON, 1839 IN TIRUCHIRAPPALLI DISTRICT, TAMIL NADU, INDIA

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ABSTRACT: The food composition of Mottled Wood owl was studied between September 2016 and August 2017 from two different places of Tiruchirappalli District. Analysis of 158 regurgitated pellets yielded 254 prey items. The mean percentage of prey composition of Mottled Wood owl was to the tune of 30.7% for Insects, 25.6 % for *Calotes sp.,* 19.3 % for Birds, 2.75 % for Insectivorous mammal (*Suncus murinus),* 1.96 % for Amphibians, 1.96 % for Scorpion and 1.18 % for Bats. The diet constituted 83.46 % of both invertebrate and vertebrate animals and the remaining 16.54 % consisted of rodent prey. Of the 16.54 % of rodent prey, the owl ingested *Millardia meltada*, *Bandicota bengalensis, Mus booduga*, *Tatera indica, Rattus rattus,* and unidentified rodent species to the tune of 8.27 %, 1.18 %, 1.57 %, 0.40 %, 0.79 %, and 4.33 %, respectively. The results of the present study indicated that the Mottled Wood owl are opportunistic nocturnal predators for controlling of both rodent and insect pests.

KEYWORDS: Mottled Wood owl, Pellet analysis, *Millardia meltada*, Rodent pests, Prey composition

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1. INTRODUCTION

The Mottled Wood owl (*Strix ocellata*) is a nocturnal bird distributed in the Indian Subcontinent (Fig.1). Owls have evolved with many adaptations to occupy the top of the food chain in the ecological niche. It is a medium-sized owl with a rounded head, yellowish-red colour and no ear-tufts. This owl species is also one of the least studied owls in the India. The owl species was identified by Lesson in 1839 and after it was separated in three different sub species based on their wing length and colour [1], [2], [3], [4]. It can easily be identified from other owls based on its elliptical facial disc and white background abdomen along with black horizontal concentric rings [5]. They are found in thin deciduous forest adjacent to dry thorn forests or some agricultural areas of plantation of indigenous trees like banyan, tamarind, mango and other large trees. Their presence in a place can be easily detected by their distinctive calls both at dawn and dusk. According to the references [5], [6], [7], [8], [9], [10], [11], [12], [13], [14] this species is widely distributed in India, however, published information on various aspects is very much limited. The bird has been classified as a ‘‘Species of Least Concern’’ [15]. Regurgitated pellets of owls have undigested body parts of prey like bones and fur of vertebrate animals and exoskeleton of invertebrate animals. These undigested food materials are formed in oval shape and dropped in the nesting and roosting/perching sites of owls. Regurgitated pellets are analyzed to understand and document the prey composition of Mottled Wood owls and to find out the variations in their food habit over a period of time. The pellet analysis serves two primary purposes *viz.,* non-destructive means of diet determination [16], [17] and diet information on prey species eaten, prey preferences and estimates of contributions of prey biomass. Recently Mottled Wood owl breeding biology were reported [14] from West-central India along with prey species composition. Further, according to (BirdLife International 2018 – web 1; owl pages 2008 – web 2) this owl species is one of the least studied owls in India and hence the present study was undertaken to fill up the existing lacuna of prey composition.

2. MATERIALS AND METHODS

The Study Area

The present study was carried out in two different places of *Thiruvallarai* (10°57'44.84"N 78°38'41.66"E) and *Puthanampatti* (11°4'6.60"N 78°41'27.66"E) villages of Tiruchirappalli District, Tamil Nadu. Earlier, reports [18], [19] and [20] suggested indirect signs such as regurgitated pellets, milky white droppings and prey remains of barn owls for the identification of their roosting/nesting sites. The same indirect signs were utilized in the present study for the identification of Mottled Wood owls. Besides, the information given by the local residents were also useful in locating the roosting/nesting sites of Mottled Wood owls. In *Thiruvallarai* village, the owl’s roosting habitat consisted of Coconut plantation (*Cocos nucifera*) while in *Puthanampatti, Tamarindus indicus* is the roosting habitat. In both the places, the habitat was surrounded by agricultural crop fields chiefly belonged to rain fed crops. The pellets of Mottled Wood owls were collected from roosting/perching

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sites between September 2016 and August 2017. Mottled wood owls' regurgitated pellets could be collected only during September 2016, October 2016, February 2017, June 2017 and August 2017 from *Thiruvellarai;* and April 2017, June 2017 and July 2017 from *Puthanampatti*. In toto, 158 pellets were collected from *Tiruvallarai* (90 pellets) and *Puthanampatti* (68 pellets) during the study period.

Pellet Analysis

The pellets were collected once in a month and bagged in separate polybags and labelled and were brought to the laboratory for analysis. Before analysis, the pellets were kept in an oven at 70ºC for 24 hrs to kill the associated invertebrate parasites [20], [21]. The pellets were then analysed, individually by using 8% NaOH as suggested [22]. The regurgitated pellets were placed in the prepared 8% (by weight) sodium hydroxide solution, individually, in separate washing cups. Hair and other debris were dissolved by 8% NaOH solution leaving only the osteous and chitinous remains of vertebrates and invertebrates, respectively. The solution was then carefully decanted by using a filter and the osteous and chitinous remains were collected, oven dried at 60°C, labelled, bagged and preserved for prey species identification. The standardized method for Indian small mammalian identification keys based on the bone materials (Skull & Mandible) found in the pellets of owls and the same was used in the present study[22], [23]. Different vertebrate prey items were identified on the basis of lower jaws, skull, limb bones and pectoral and pelvic girdles. Depending upon the number of skulls or lower jaws or fore and hind limb bones found in each pellet, number of particular type of prey individual consumed per pellet was determined. One set of lower jaws (left and right) (Figs. 2 and 3) or one skull or one pair of fore and hind limb bones were counted as remains of one prey item. In the absence of mandibles, other bones like skulls, limb bones, pectoral and pelvic girdles and synsacra (in the case of birds) were useful, especially for identifying and quantifying the mammalian, avian and amphibian prey [24]. Insect prey items were identified up to order level on the basis of undigested pieces such as chitinous exoskeleton, heads, wings, legs, stings etc. A hand lens or low power binocular microscope was employed to identify insect exoskeleton [24], [25]. In order to know the contribution of each prey species in the Mottled Wood Owl's diet, they were converted into proportions and presented in tables.

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Fig 1: Mottled Wood owl observed in the Roosting site of Puthanamapatti village

Fig 2: A pair of Insectivorous mammal (*Suncus murinus*) lower jaw observed during pellet analysis

Fig 3: A Pair of *Bandicota bengalensis* lower jaw observed during pellet analysis

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3. RESULTS AND DISCUSSION

In the present investigation, these owls were usually seen in pairs. Although, intensive search was made during the one year study period, nest sites of this owl could not be observed. In our observations, the pellets were found intact only when these owls would have consumed rodent prey. The intactness of the pellets must be due to the hair present in the rodent prey. If these owls consume non rodent prey, the fallen pellets are often found broken and scattered. The extent of prey constituents of Mottled Wood owls in terms of both frequency and proportion observed during September 2016 to August 2017 is presented in Table 1. Analysis of 158 regurgitated pellets produced 254 prey items.

Table. 1. The magnitude of prey Composition of Mottled wood owls revealed from Pellet analysis

Place	***Thiruvallarai***					***Puthanampatti***			**Total**	**Proportion**	**Proportion of Rodents, Insects & Other prey**
Month and Year	**September 2016**	**October 2016**	**February 2017**	**June 2017**	**August 2017**	**April 2017**	**June 2017**	**July 2017**			
Prey Species/ Total Number of Pellets collected	23	21	24	14	8	43	15	10	158	100	
Bandicota bengalensis	-	-	1	-	-	2	-	-	3	1.18	
Millardia meltada	-	1	8	4	-	2	6	-	21	8.27	
Mus booduga	-	-	1	1	-	-	1	1	4	1.57	16.54
Tatera indica	-	-	1	-	-	-	-	-	1	0.40	
Rattus rattus	-	1	-	-	-	1	-	-	2	0.79	
Unidentified Rodents	-	-	-	1	-	6	2	2	11	4.33	
Insects	20	6	14	11	2	15	9	1	78	30.7	
Scorpion	-	-	1	-	1	-	-	3	5	1.96	
Amphibians	-	-	-	-	3	1	-	1	5	1.96	
Calotes sp.	21	16	4	11	1	4	7	1	65	25.6	83.46
Birds	3	2	3	5	6	19	5	6	49	19.3	
Bats	-	-	-	1	-	1	1	-	3	1.18	
Suncus murinus	-	2	3	-	-	2	-	-	7	2.75	
Grand Total	**44**	**28**	**36**	**34**	**13**	**53**	**31**	**15**	**254**	**100**	**100**

The analyzed pellets revealed that the small mammals *viz*., *Bandicota bengalensis, Millardia*

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meltada, *Mus booduga, Tatera indica, Rattus rattus* (Rodent pests), *Suncus murinus* (an insectivorous mammal); Insects, Scorpion, Amphibians, *Calotes* sp., Birds and Bats were the constituents of the diet of Mottled Wood owls. Of these, 254 prey items the rodents constitute 42 prey items and the remaining 212 for other prey species like Insects, Scorpion, Amphibians, *Calotes* sp., Birds, Bats and *Suncus murinus*. Of the rodent prey, the *B. bengalensis* (3 nos.) *M. meltada*, (21 nos.) *M. booduga*, (4 nos.) *T. indica*, (1 no.) *R. rattus* (2 nos.) and unidentified species of rodents (11 nos.) were found to be consumed by the Mottled Wood owls. The occurrence of the other prey groups were to the tune of 78 for Insects, 5 for Scorpion, 5 for Amphibians, 65 for *Calotes sp.,* 49 for Birds, 3 for Bats and 7 for *S. murinus* in the food of Mottled Wood owls. It is obvious from the results that the Insects, *Calotes* sp. and Birds were enumerated in more numbers. In toto, the prey spectrum consisted of 13 prey species during the present investigation (Table 1). The mean percentage of prey composition of Mottled Wood owl's diet were observed to be 1.18% for *B. bengalensis,* 8.27% for *M. meltada*, 1.57% for *M. booduga,* 4.33% for unidentified rodents, 0.40% for *T. indica* and 0.79% for *R. rattus.* Among the total prey items, the rodents of agricultural importance accounted for 16.54 % of total prey consumption during the study period. It is apparent from these findings that the Mottled Wood owls are opportunistic hunters in the study area. The remaining prey species accounted for Insects (30.7 %), Scorpion (1.96 %), Amphibians (1.96 %), *Calotes sp.,* (25.6 %), Birds (19.3 %), Bats (1.18 %) and *S. murinus* (2.75 %) (Table 1). Earlier, Pande *et al*. (2018) [14], reported *B. bengalensis, M. booduga, T. indica and Golunda ellioti* as the constituents of Mottled Wood owl's diet in terms of both frequency and proportion. According to them, the proportion of rodents was only 10.4% in the food of Mottled Wood owl in central-western Maharashtra. Further, they reported the main prey for Mottled wood owls were Insects (39.2%), followed by Shrews (21%), Birds (11%), Reptiles (9.4%) and others. For the diet comparison the same sized owl like Indian Eagle owl also studied in India. In the Indian Eagle owl diet earlier studies, [25], [26] reported *B. bengalensis, B. indica, M. meltada, R. rattus*, *T. indica, M. musculus* and *Golunda ellioti* as the constituents of Indian Eagle owls' diet in terms of frequency, proportion and biomass. According to reports [16], [27], [28] the prey composition of Indian Eagle owls were *R. rattus, M. meltada, M. booduga, S. murinus, T. indica, B. bengalensis*, *Berytelphusa* sp., *G. ellioti*, Birds, Snakes and Coleoptera from two different habitats of Maharashtra and Tamil Nadu. The results of the present study are in accordance with these earlier observations. It is obvious from the results of the present investigation that these owls hunt both commensal and field rodent pests and insects from agricultural crop fields around their nesting/roosting habitats. Bats were also the prey items of owls, not surprisingly considering that both these animal groups are nocturnal [29]. The present study suggested that the Mottled Wood owls are opportunistic hunters and they take their food based on the availability of prey items in the foraging grounds. Both short term and long term studies on this owl on various aspects need to be initiated by researchers as the published available

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information is wanting.

4. CONCLUSION

In conclusion, the results of the present study revealed that the Mottled Wood owls are opportunistic hunters of both rodents, insects and other group of animals. As the Mottled Wood owls feed on Insects and rodents, they can be used as one of the biological agents for controlling them in the crop fields as well as in fallow lands. These owls are victims of superstitious beliefs and being hunted for demand in black magic. Theyare trapped for illicit trade till date. Steps should be initiated to protect and conserve Mottled Wood owls in their natural habitats to increase their population and make use of their services in managing the pest populations in the cropping ecosystems.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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