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FOOD HABITS OF OWLS IN THE PUNJAB

Nasim Akhtar and Mirza Azhar Beg*

Pellets of four species of owls, collected from three districts of the Punjab (Faisalabad, D. G. Khan and Leiah), were analysed to know their food habits. Eighty-eight to 100% of the pellets contained remanents of small mammals, particularly those of the rats and mice which degrade and destroy agricultural crops. Insects were consumed intensively; their frequency of occurrence in the pellets varied from 73% to 80%. Birds and frogs were also consumed but much less frequently. It was concluded that rats and mice were the main items of the diet of owls.

INTRODUCTION

Owls feed intensively on field rats and mice (Southern and Lowe, 1968, 1982; Morris 1979; Bowman, 1980). At least four species of owls, namely, Horned Owl (*Bubo* sp.), Little Owl (*Athene brama*), Short-eared Owl (*Asio flammeus*) and Barn Owl *Typo alba*) affect cultivations in the Punjab (Pakistan). The Horned Owl favours well-wooded country-sides in the neighbourhood of water and human habitations. The diminutive Little Owl affects park-lands, gardens, environs of villages and cultivations in the study area in large numbers. In contrast to these two species, the Short-eared Owl and the Barn Owl are winter visitors to the study area. The former affects open scrublands and cultivations and the latter favours abandoned buildings, ruins, ancient trees and other disused structures in cultvations and habitations.

Because of their predilection for small mammals, these raptors play an important role in inhibiting the field rats and mice population of the agroecosystem. Unfortunately, very little is known about the food habits of these raptors in cultivations of Pakistan. Recently, Fulk and Khokhar (1976) have provided some information on the predation of Great Horned Owl (*Bubo bubo*) on the short-tailed mole rat (*Nesokia indica*). The present paper describes the food habits of four species of owls found in the agroecosystem of the central Punjab.

*Department of Zoology and Fishries, University of Agriculture, Faisalabad.

MATERIAL AND METHODS

The present study is based on the analysis of 68 pellets of owls collected from three districts of the Punjab, namely, Faisalabad, D. G. Khan and Leiah from grounds under the diurnal roosts of the owls. Witherby (1943) was omit consulted to identify the species of the owls from the shape and size of the pellets. These pellets belonged to the Horned Owl (N = 30), Little Owl (N = 17), Short-eared Owl (N = 6) and Barn Owl (N = 5).

The pellets were soaked in water for 2 to 3 hours before being analysed. All types of food remanents were sorted out from entangled mass of hair, feathers and plant fibres using a pair of forceps and needle and were examined under a binocular microscope. An attempt was made to identify all the remanents from the pellets. The teeth of small mammals were used to identify the species of the prey. Reference specimens of the teeth of small mammals were used to facilitate identification.

RESULTS

Analysis of pellets of the Horned Owl, Little Owl, Short-eared Owl and Barn Owl revealed that they comprised of mainly bones, hair, feathers, and appendages and fragments of insect cuticle. Present in the pellets were also lice, mites, termites, fibres and other tissues of plants which have been put under "miscellaneous" in Table 1. Beside these, some unidentified animal remains were also noted in the pellets.

Small mammals

Seven species of small mammals were represented in the owls' pellets their frequencies of occurrence in the pellets being 93%, 88%, 100% and 100% in the Horned Owl, Little Owl, Short-eared Owl and Barn Owl, respectively. The small mammals identified in the pellets comprised of the Indian gerbille (*Tatera indica*), the short-tailed mole rat (*Nesokia indica*), the house shrew *Suncus murinus*), the house mouse (*Mus musculus*), the bandicoot rat (*Bandicota bengalensis*), the soft-furred field rat (*Rattus meltada*) and the desert gerbille *Meriones hurrianae*). In the case of Horned Owl, the Indian gerbille and bandicoot rat were the most frequently eaten animals. The Short-eared Owl too depended mainly on these two rats for its food, but this species heavily preyed on the bandicoot rat while the Indian gerbille was the staple of the diet of the

Horned Owl. In the pellets of the Little Owl, the desert gerbille was predominant, but the house mouse and bandicoot rat were also frequently consumed. In the case of the Barn Owl, Indian gerbille, house shrew, bandicoot rat, desert gerbille and soft-furred field rat were represented with equal frequency.

Table 1. *Frequency of occurrence of various food items in the pellets of four species of owls*

Food Types	Frequency of occurrence of (%)			
	Horned Owl (N = 30)	Little Owl (N = 17)	Short-eared Owl (N = 6)	Barn Owl (N = 5)
1. Small Mammals	93	88	100	100
T. indica	47	6	33	20
N. indica	3	—	—	—
S. murinus	3	6	—	—
M. musculus	3	18	—	—
B. bengalensis	13	12	50	20
M. hurrianae	—	29	17	20
R. meltada	—	—	—	20
Unknown	27	35	—	20
2. Birds	7	35	17	—
3. Frogs	—	6	—	—
4. Insects	80	76	83	80
5. Miscellaneous	100	—	100	100
Lice	27	12	17	20
Mites	37	6	33	20
Termites	20	—	—	—
Plant tissues	100	82	100	100
6. Unidentified animal remains	47	41	17	40

Birds

Remanents of birds were represented in the pellets of the Horned Owl, Little Owl, and Short-eared Owl. Thirty-five per cent of the pellets of the Little Owl, 17% of Short-eared Owl and 7% of Horned Owl contained avian remains. One of the pellets of Horned Owl had a beak of a King Fisher.

Frogs

Frogs were represented in the pellets of the Little Owl only; 6% of its pellets had vertebrae and girdles of frogs or toads in them.

Insects were intensively consumed by all the four species of owls. The frequency of occurrence of insects in the pellets of the four species were more or less of similar magnitude; it was 80% in the Horned Owl, 76% in Little Owl, 83% in Short-eared Owl, and 80% in Barn Owl. Generally, beetles were the most frequently consumed insects; mole crickets, dragonflies and grasshoppers were represented only sparingly.

Miscellaneous Items

The pellets of the owls also contained small arthropods and plant tissues. Among the arthropods were present lice, mites and termites. Frequency of these tiny animals was generally low. But plant tissues were represented in almost all the pellets of the four species of owls.

DISCUSSION

The results of present study indicate that rats and mice are the main constituents of the diet of the Horned Owl, Little Owl, Short-eared Owl and Barn Owl. Heavy dependence of owls on rodents has been recorded by some other workers also. Dwight *et al.* (1972) and Bowman (1980) reported that mammals, primarily *Microtus*, were the staples of the diet of the Barn Owl during all seasons of the year. Nikodem (1972) working on the food habits of different species of owls reported presence of remains of small mammals in 90.42% of the pellets. Thus, under normal conditions, small mammals and particularly rats and mice are the main staples of the diet of owls.

From the analysis of the present samples, it appears that the Little Owl and Short-eared Owl consumed avian prey more frequently than the other two species. Presence of remains of frogs/toads in the pellets of Little Owl seems to be related to the foraging behaviour of the Little Owl in the present study area. These small raptors hang around light poles and feed on insects. Toads and frogs, which are also attracted there, fall prey to the owl.

Regarding the occurrence of mites, termites and lice in the pellets of the owls, it may be pointed out that mites and lice are external parasites of rats and birds and they might have been swallowed in by owls alongwith their hosts. Mites and termites could have also infested the pellets after they were regurgi.

tated by the owls and dropped on the ground. The specimens of termites in the pellets were intact and this indicated that they entered the pellets when the latter were lying on the ground. Similarly, the presence of plant tissues in the pellets may be traced back to the rat and mice which fell prey to the owls.

It should also be mentioned that the remains in the pellets of owls do not necessarily present a faithful record of animals actually eaten by the owls. Lowe (1980) found that skull bones of small mammals extracted from the pellets were least fragmented during autumn and winter when the large meals were not always completely digested. This was in contrast with summer months, when digestion appeared to be most efficient. He also found that losses of skull bones of certain species were more serious than those of other species. Losses of young specimens were more frequent than those of adult specimens. Furthermore, composition of species of the prey in the diet of owls, like other predators, depends on two other factors: 1. The food preferences of the predator, and 2. the relative densities of the various prey species. Since the samples of pellets were small and were obtained from somewhat ecologically different areas, food preferences of the owl species cannot be assessed from the present data. However, the data do indicate that the owls depended mainly on rats and mice for their food.

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