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THE DIET OF BARN OWL (*Tyto alba*) FROM CANAL BANK, CANAL REST HOUSE AND GRAVEYARD OF GOJRA

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Abstract: The present study was carried out for a period of 10 months extending from September 1999 through June 2000 to know about the food habits of barn owl (*Tyto alba*). During this study, 603 pellets were collected from three localities viz., canal bank, canal rest house and graveyard of Gojra. The analysis of these pellets revealed that major components of the diet of the owl were hairs and bones of small mammals. The feathers and bones of birds were also present to some extent. The small mammals identified from their skulls lower jaws and hair constituted 98.47% while birds (in the form of beaks, feathers or bones) were only 1.52% of the diet. Shrews (*Suncus murinus*) were the dominant food item among the small mammals eaten by the owl constituting 63.00% of the diet followed by rats and mice, which were 35.47% of the diet. Among rats and mice the relative abundance of *Rattus rattus* was 8.40%, of *Millardia meltada* was 6.26%, of *Nesokia indica* was 3.05% and of *Tatera indica* was 1.22%.

Keywords: food habit, mice, owl, pellets, rats.

INTRODUCTION

The extent of damage caused by rats and mice to farm crops and stored grains [Durre-i-Shahwar 1988, Mushtaq-ul-Hassan *et al*. 1998] is a matter of concern for agriculturists all over Pakistan. Vertebrate pest managers heavily depend on toxicants for inhibiting the populations of rodent pests. The natural control factors seem to have rarely been used in Pakistan against rats and mice. Owls fall within general area of natural control factors. They form a group of widely distributed predacious birds.

The barn owl (*Tyto alba*) feeds almost exclusively on small mammals and yet little attention has been paid in Pakistan towards its conservation and possible use in rodent; pest suppression [Mahmood-ul-Hassan *et al*. 2000].

In spite of the fact that the barn owl for most of the time is a generalist (Polyphogous) predator, it has been found effective against rats and mice. Unfortunately, this natural rat catching device is being severely persecuted in Pakistan on the false belief that it portends bad omen [Beg and Irshad 1998, Mahmood-ul-Hassan *et al.* 2000].

So far, about 35 subspecies of barn owl have been identified. The subspecies *Tyto alba stertens* (Hertert) is found in South Asia [Taylor 1994]. In Pakistan, it is erratically distributed in the Indus plain [Roberts 1991]. In central Punjab the owl is common in the premises of canal rest houses built on the banks of the major irrigation canals [Beg and Irshad 1998, Mahmood-ul-Hassan *et al*. 2000]. Present work was undertaken to

know the diet of the barn owl (*Tyto alba*) from canal bank, canal rest house and graveyard of Gojra.

MATERIALS AND METHODS

A total of 603 pellets of barn owl (*Tyto alba*) was collected from three different localities viz., canal bank, canal rest house and graveyard of Gojra. The pellets were collected weekly for a period of ten months extending from September, 1999 through June 2000. The pellets were placed in polythene bags along with tags indicating the site and date of collection before being brought to the laboratory. The pellets were kept at 55^{o}C in an oven in the laboratory before breaking them for analysis.

Each of the pellets was broken using forceps and needles to sort out the remnants of the preys eaten by the barn owl (*Tyto alba*). The analysis of comprised of broken loosing and separating skulls, lower jaws, bones, feathers, hairs, remnants of insect, plant materials and dust. All the contents of each pellet were placed in separate polythene bags along with tags showing the specimen number, date of collection and site of collection.

Skulls, lower jaws and bones were examined carefully to know whether they belonged to mammals, birds, reptiles or amphibians. In case of mammals the skulls and particularly the teeth were used to identify them to species level.

To facilitate identification reference skulls and teeth of the most of the small mammals known to be present in the study area were made available in the laboratory for comparison.

Information about the dietary habits of the predators of the small mammals is often obtained from the analysis of their scats and pellets. Undigested fragments of bones and particularly teeth in the scats and pellets provide valuable information about food habits of the predators. But bones, at least, in the pellets of owls do not always present faithful record of animals eaten by them [Lowe 1980]. Furthermore, fragments of skull and teeth are most often lacking in the scats of the fox and jungle cat [Khan 1982].

In view of these facts, hairs, which are generally, present in the scats and pellets in good numbers may prove to be a better tool for knowing the food habits of the predators of small mammals.

For this purpose, hairs collected from the pellets were used for identification of small mammal species. In this connection, five guard hairs were randomly selected from each of the pellets containing them. The cuticular scale impressions of each of the hair, thus selected were obtained to compare with those of reference hairs of known species. The impression of the cuticular pattern of the hairs was obtained in the following way.

Five of all the hairs were washed in alcohol and then dried on blotting paper. A thin film of commercial glue “Pan-fix” was made over a slide and

hairs were placed over the wet film gently and allowed to lay there for about two minutes, so that suitable impressions were formed on it, after two minutes, the hairs were lifted from one end and pulled away. The impression of the cuticular covering of hairs thus obtained were examined under a high power of a microscope and compared using the reference photographs prepared by Mushtaq-ul-Hassan [1986]. Relative abundance (%) of different groups of animals was calculated to know the degree of dominance of the prey items eaten by the barn owl (*Tyto alba*).

RESULTS AND DISCUSSION

The results (Table 1) revealed that *Suncus murinus* attained a maximum relative abundance of 68.54% (in winter) and minimum 35.71% (in summer), The minimum relative abundance of *R. rattus* was recorded in winter (6.95%) and maximum in summer (19.64%). The minimum relative abundance of *M. meltada* was recorded in fall (5.22%) and winter (5.96%) and maximum in summer (8.92%). The relative abundance of *B. bengalensis* ranged from 3.73 % (in fall) to 13.58% (in spring). The minimum relative abundance of *T. indica* was 0.99% (in winter) and maximum was 1.78% (in summer).The relative abundance of *N. indica* varied from 2.31 % (in winter) to 6.22% (in fall). *M. Musculus* attained maximum relative abundance of 14.28 % in summer and minimum 6.79% in spring. The minimum relative abundance of bird's remnants was 0.66% (in winter) and maximum was 5.35% (in summer).

Table 1: Seasonal variations in the relative abundance (%) of various prey items from the pellets of *Tyto alba* collected from different localities of Gojra (N = Number of pellets; Number in parenthesis = Number of prey items).

Species Identification	Fall N=120	Winter N = 280	Spring N= 153	Summer N = 50	Total N= 603
S. murinus	66.42 (89)	68.54 (207)	59.25 (96)	35.71 (20)	63.00 (412)
R. rattus	7.46 (10)	6.95 (21)	8.02 (13)	19.64 (11)	8.40 (55)
M. meltada	5.22 (7)	5.96 (18)	6.79 (11)	8.92 (5)	6.26 (41)
B. bengaiensis	3.73 (5)	7.28 (22)	13.58 (22)	10.71 (6)	8.40 (55)
T. indica	1.49 (2)	0.99 (3)	1.23 (2)	1.78 (1)	1.22 (8)
N. Indica	5.22 (7)	2.31 (7)	2.46 (4)	3.57 (2)	3.05 (20)
M. musculus	8.95 (12)	7.28 (22)	6.79 (11)	14.28 (8)	8.10 (53)
Bird	1.49 (2)	0.66 (2)	1.85 (3)	5.35 (3)	1.52 (10)
Total	134	302	162	56	654

The most abundantly eaten food item was *Suncus murinus* (63.0%) Second abundantly consumed prey items were *R. rattus and B. bengalensis* (8.40% each). The relative abundance of *M. musculus* was 8.10%, of *M. meltada* was 6.26%, of *N. indica* was 3.05%, of bird's remnants was 1.52%, and of *T. indica* was 1.22%.

In the present study a total of 603 pellets was collected and analyzed. Small mammals were the staple diet contributing 98.47% of the total owl's diet. Birds (in the form of beaks, feathers or bones) were only 1.52% in the owl's diet.

Shrews were the dominant food item among the small mammals eaten by the owl constituting 63.00% of the diet followed by rats and mice, which was 35.47% of the diet. Among rats and mice the relative abundance of the house rat (*R. rattus*) was 8.40%, of bandicoot rat (*B. bengalensis*) was 8.40%, of house mouse (*M. musculus*) was 8.10%, of soft-furred field rat (*M. meltada*) was 6.26%, of short-tailed mole rat (*N. indica*) was 3.05%, and of Indian gerbil (*T. indica*) was 1.22%.

The shrew is widely distributed in central Punjab where it inhabits cities, towns, villages, farm houses and croplands [Mushtaq-ul-Hassan *et al*. 1999]. The owl heavily depended on this shrew for food during fall and winter seasons [Beg and Irshad 1998]. The owls living in the cultivations capture the shrew either from the croplands or in and around the villages and the farm houses [Mushtaq-ul-Hassan, *et al*. 1999].

The shrew dominated in the diet of the owl in fall, winter and spring seasons when its proportion for exceed the combined proportions of six species of rats and mice. Probably during those season the reproductive potentials of various rats and mice is low or stops to breed specially during winter. In the present study area most of the mice cease to reproduce or slow down the process of reproduction during the period of extending from late November to early February [Beg 1986]. The breeding season of the house shrew is even shorter being more or less restricted to six months of the spring and summer season [Mushtaq-ul-Hassan *et al.* 1999]. As a result of the size of the population of small mammals is much smaller during the colder months of the year [Mahmood-ul-Hassan *et al*. 2000].

During summer the proportion of rats and mice (58.33%) dominated in the owl's diet and shrews were only 35.71%. the population of the rats and mice greatly improve in size during spring and summer seasons as a result of intensive reproduction and subsequent recruitment of the young to the population [Chaudhry and Beg 1977, Beg *et al*. 1980, Beg 1986, Khan and Beg 1986, Roberts 1997, Mushtaq-ul-Hassan *et al.* 1998]. Being new and inexperienced, the young animals are more prone to the owl's predation than the older ones. Another factor which promotes vulnerability to predators of such rodents pests as field crops as *B. bengalensis, M. meltada, T. Indica* and *Mus* spp. is the removal of vegetation cover from the fields following harvesting of wheat crop in April and May [Mahmood-ul-Hassan *et al*. 2000].

The Chi-square test (X^2) as a test of homogeneity [Steel and Torrie 1980] showed that the diet of the owl in seasonal samples was similar (X^2 = 5.410 E-7; d.f. = 3; $p>0.05$).

The owl hunts either by flying low above the ground or by employing perches [Taylor 1994]. In either case it is very unlikely that it will detect and capture a rodent or a shrew active under the cover of fall crop plants possibly the shrew uses the open micro-habitats (e.g. inter field verges, embankments of irrigation ditches, trials, and dirt roads) in the croplands

more frequently than the rodents and hence fall prey to the owls more frequently [Mahmood-ul-Hassan *et al.* 2000].

Rats and mice are known to pretty common throughout the year in croplands. Vegetation covers in the croplands probably provides protection to the rodents and prevent the owl from catching its prey. Suitable perching sites may be provided to the owl to enhance its predatory activities. Scattered through the croplands may improve the owl's visibility and the case of aerial maneuvering of the prey [Khan and Beg 1994]. Monoz and Muroa [1990] experiment in the pine forest of central Chile supports this point.

Lekunze *et al.* [2001] analyzed 739 prey remains to know the diet of the barn owl in Nigerian savanna. They reported that the diet of the barn owl made up largely of small mammals, which accounted for 92.2% of all the remains, with rodents (76.0%), insectivores (12.3%), and chiropterans (3.1%) being the primary prey groups. Unidentified remains accounted for 0.8%. Nile rat (*A. niloticus*) was the favourite prey and accounted for 30.9% of all prey and 26.5% of prey biomass. Birds accounted for 4.7%, reptiles 1.6%, amphibians 1.1% and insects 0.4%. As a result of the preponderance of rodents and some granivorous birds in the diet of barn owls, the owls are deemed to be playing an important role in the biological control of these potential agricultural pests.

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