

Scat Analysis of the Small Indian Mongoose (*Herpestes auropunctatus*) to know its Depredation on Vertebrate Fauna of Croplands of Faisalabad, Pakistan

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Abstract

Common remains in 500 scats collected from various farms constituted volume of insects as 22.6%, that of soil 17.7%, feathers 16.1%, plant material 14.9%, bones 10.8%, and hairs 7.0%. The frequency of occurrence of soil in the scats was 82.0%, plant material 81.0%, insects 67.0%, bones 52.0%, feathers 46.2% and that of hairs was 31.2%. The vertebrate remnants included those of birds and mammals which seemed to be consumed most intensively during all the four seasons of the year. Eleven species of small mammals namely, the palm squirrel (*Funumbulus pennanti*), Indian gerbille (*Tatera indica*), house mouse (*Mus musculus*), house rat (*Rattus rattus*), bandicoot rat (*Bandicota bengalensis*), short-tailed mole rat (*Nesokia indica*), field mouse (*Mus booduga*), soft-furred field rat (*Rattus meltada*), house shrew (*Suncus murinus*), small Indian mongoose (*Herpestes auropunctatus*) and desert gerbille (*Meriones hurrianae*) were detected by their hairs.

Key words: Mongoose; vertebrate fauna; croplands; Faisalabad

Introduction

There are two species of mongoose in Pakistan, the small Indian mongoose (*Herpestes auropunctatus*) and the common Indian mongoose (*Herpestes edwardsi*). The former is well adapted to live near human habitations. It is a common small carnivore in Pakistan, typically associated with better wooded regions of the Indus plain. It is thought to be beneficial to man as it has been reported to feed on a variety of poisonous arthropods, harmful insects and rodents (Roberts, 1977). This mongoose also abounds in the croplands which happen to be heavily infested with rats and mice.

Most of these rodents destroy and depredate the food crops on large scale (Beg *et al.*, 1980). But at the same time these rodent species are suspected to be fallen prey of mongoose. The present study focalizes to assess the role of mongoose in controlling these pest species of our cropland.

Materials and Methods

A total of 500 scats of small Indian mongoose (*Herpestes auropunctatus*) were collected from the experimental farms of University of Agriculture Faisalabad-Pakistan, the farms of the Nuclear Institute of Agriculture and Biology (NIAB) Faisalabad-Pakistan, and the farms near Nishatabad, Faisalabad-Pakistan. The oven dried and stored scats were soaked in warm water for 2 to 3 hours to loosen the hair and other materials binding the scats. Each scat was examined to sort out bones, hairs, feathers, fragments of insect bodies, plant material, mollusks, and soil under a magnifying glass or low power binocular microscope. The impressions of cuticular coverings of the hairs of various species of small mammals were obtained on a thin film of commercial glue "Panfix" taken on a slide. Species were identified according to the keys given by Mushtaq-ul-Hassan (1986).

Results

Analysis of the scats of the small Indian mongoose (*Herpestes auropunctatus*) revealed the presence of different food items including hairs of mammals, feathers of birds, bones of vertebrates. The invertebrate remnants were wings, antennae, legs and heads of insects, and shells of mollusks. The miscellaneous items included pieces of polythene and stones, sand particles, nylon threads, beads and threads of wool.

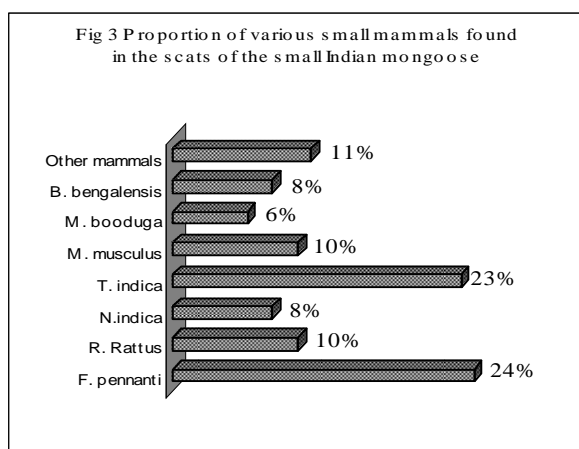
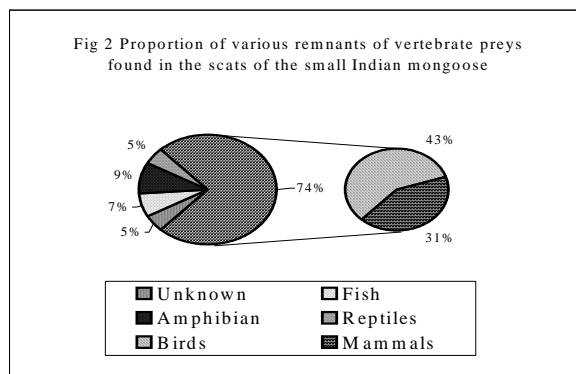
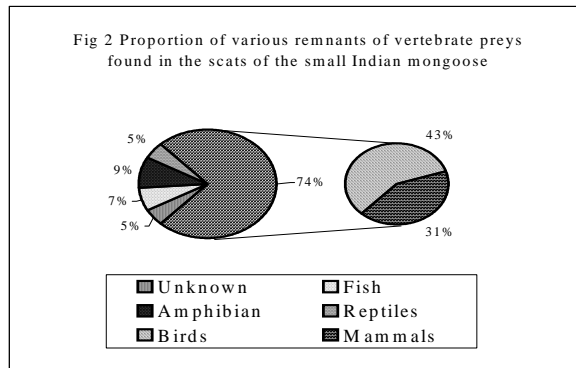
Bones, insects, plant material and soil were the main four items of the mongoose scats. Feathers did occur but less frequently. Hairs were still in lesser number. A few mollusks were also present in the scats (Table 1). Most common remains in the scats were insects (23%) followed by soil (18%), feathers (16%), plant material (15%), bones (11%) and hairs (7%) (Figure 1).

Vertebrae, ribs, limbs, girdles, hairs, teeth, scales of fishes, claws, beaks and feathers of birds were common in vertebrates. Table 2 and Figure 2 explicit the depredation of birds and mammals during all the seasons of the year.

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Reptiles were fairly represented in the fall season, whereas amphibians and fishes were represented in spring and winter seasons, respectively.

The proportion of various small mammals in the scats of mongoose is exhibited by Figure 3. Accordingly, *Funumbulus pennanti* (24%), *Tatera indica* (23%), *Mus musculus* (10%), *Rattus rattus* (10%), *Bandicota bengalensis* (8%), *Nesokia indica* (8%), and *Mus booduga* (6%) fall prey of the mongoose frequently. The other species, namely *Rattus meltada*, *Suncus murinus*, *Meriones hurrianae* and *Herpestes auropunctatus* are consumed only sparingly.



Discussion

The results of the present study suggest the existence of great trophic diversity, not only with respect to the nature of food but also with respect to the size of the food item to make the mongoose prosper in the area. In the literature, the mongoose has been reported to feed on plants, dragonflies, beetles, lepidopteron larvae, grasshoppers and crickets, frogs, toads, reptiles, birds and rodents (Roberts, 1977; Gorman, 1979). The Spanish mongoose (*Herpestes ichneumon*) makes up the greater part of its diet by consuming young rabbits and supplements it by reptiles, insects, mushrooms, etc. (Delibes, 1976). Undoubtedly, the small Indian mongoose of the present study area has a wide feeding niche, but small mammals seem to be very important component of its diet. Among suspected rodent pests, nine species have been recorded to be consumed by the mongoose. Five species of these pests, namely the Indian gerbille, palm squirrel, house rat, house mouse and bandicoot rat are well known pests of food grains (Greaves *et al.*, 1977). Besides, the mongoose feeds upon a number of other rodents namely, the soft-furred field rat, short-tailed mole rat and field mouse. So as far as the consumption of rats, mice and insects is concerned, the small Indian mongoose seems to be a friend of the farmer as it plays a positive role in ridding the cropland of these pests.

Recently, based on public health damages, killing of poultry, extinctions of amphibians and reptiles and destruction of native birds, damages due to introduced mongoose, *Herpestes auropunctatus* have been estimated as \$ 50 million each year in Puerto Rico and Hawaii islands (Pimentel *et al.*, 1999). Thus, these introductions cast the shadows of doubts about the mongoose's efficacy as an agent of biological control of the rodents. Rather, its omnivory signals antagonism with the less diverse food resources of the agroecosystem. Present study indicates that the mongoose feeds on birds also. The chances of appearance of fragments of egg shells in the scats of the mongoose are very rare because the mongoose most probably laps the contents of the eggs. Occurrence of soil in almost all the scats of the mongoose may be taken as an indication that the mongoose feeds on earthworms too.

The data of the present study have clearly shown that rodents are important components of the diet of the small Indian mongoose and as such it must be playing an important role in controlling the populations of rats and mice in the croplands. But, predators with wide feeding niche are known to change their menu according to the availability of food as Southern and Watson (1941) and Coman (1973) have reported for red fox. In habitats, where rats and mice are not so common, the mongoose may switch over to other easily available foods, e.g., the eggs of ground nesting game birds and thus, may become a threat to wildlife.

Table 1: Frequency of occurrence (%) of various food items of all four seasons in the scats of the small Indian mongoose (n = number of scats)

Food items	Frequency of occurrence (%)					
	Spring (n=85)	Summer(n=70)	Fall(n=230)	Winter(n=115)	Total(n=500)	% Relative Frequency
Hairs	42.4 (36)	28.6 (20)	32.6 (75)	21.7 (25)	31.2 (156)	8
Feathers	48.2 (41)	37.1 (26)	46.5 (107)	49.6 (57)	46.2 (231)	11
Bones	49.4 (42)	57.1 (40)	57.4 (132)	40.0 (46)	52.0 (260)	13
Insects	62.4 (53)	71.4 (50)	61.7 (142)	78.3 (90)	67.0 (335)	16
Molluscs	2.4 (2)	8.6 (6)	3.5 (8)	1.7 (2)	3.6(18)	1
Bird Eggs	5.9(5)	2.9 (2)	4.8 (11)	3.5 (4)	4.4 (22)	1
Plants	88.2 (75)	87.1 (61)	78.3 (180)	77.4 (89)	81.0 (405)	20
Soil	80.0 (68)	81.4 (57)	83.9 (193)	80.0 (92)	82.0 (410)	20
Misc.	47.1 (40)	52.9 (37)	43.9 (101)	38.3 (44)	44.4 (222)	10

Table 2: Proportions of various vertebrates represented in all four seasons of the scats of the small Indian mongoose (n = number of animals)

ANIMALS	Frequency of occurrence (%)				
	Spring (n=57)	Summer (n=51)	Fall (n=168)	Winter (n=54)	Total (n=330)
Fish	5.3(3)	3.9 (2)	8.3 (14)	9.3 (5)	7.3 (24)
Amphibians	19.3 (11)	13.7 (7)	3.6 (6)	9.3 (5)	8.8 (29)
Reptiles	3.5 (2)	3.9 (2)	5.3 (9)	3.7 (2)	4.5 (15)
Birds	43.8 (25)	47.1 (24)	42.3 (71)	42.6 (23)	43.3 (143)
Mammals	28.1(16)	27.5 (14)	34.0 (57)	29.6 (16)	31.2(103)
Unknown	-	3.9 (2)	6.5 (11)	5.5 (3)	4.9 (16)

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