

FOOD HABITS OF MOLE RAT (*NESOKIA SP.*) IN DATE-PALM ORCHARDS OF DISTRICT CHAGHAI BALOCHISTAN, PAKISTAN

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ABSTRACT

The faecal pellets of mole rat, *Nesokia sp.* were collected from the infested date-palm orchards of district Chaghai, Balochistan during 2005-2006. The study showed that the mole rat had a narrow feeding niche. The summer diet (Fruiting season of date-palm) of the rat was relatively less diversified than that of the winter diet (Non-fruited season of date-palm). About 30.5% of the faecal contents were not identified. Insects were eaten sparingly. Highest frequency of 40.24% was recorded in date palm fruits whereas in case of stem, it was 45.9%.

Key Words: *Nesokia sp.*; date-palm, diet, food habits.

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INTRODUCTION

The short tailed mole rat, (*Nesokia indica* Gray), is widely distributed in Pakistan, India, Bangladesh, Iran, Iraq, Egypt, Syria, North Arabia, Chinese Turkistan and Southern Russian Turkistan (Poche *et al.*, 1982 Roberts, 2005). In Pakistan, it is a serious agricultural pest and damages wheat, rice and sugarcane crops (Beg *et al.*, 1981; Fulk *et al.*, 1981) Greaves *et al.*, 1975;. Stomach contents of mole (*Nesokia sp.*) rat has been studied by a number of workers (Smiet *et al.*, 1980; Fulk *et al.*, 1980, 1981; Tousif *et al.*, 1985) This paper describes the analysis of faecal pellets of mole rat *Nesokia sp.* in date-palm orchards of Tehsil Nok Kundi of District Chaghai, Balochistan and a revised version of Ahmed *et al.*, (2007).

MATERIALS AND METHODS

Monthly collection of faecal pellets of *Nesokia sp.* was made during July 2005 to June 2006 from the infested date-palm orchards of Gawalistap, Wadiyan and Rajay of Nok Kundi, Balochistan. Each month collection of at least 10g faecal pellets was made. Collection of faecal pellets was made randomly. In the laboratory, faecal pellets were thoroughly washed and mixed in water over a 0.1mm mesh screen and preserved in combination of formalin, acetic acid and alcohol (Hercus, 1960). Reference slides of different species of plant (Table III) were prepared by following the procedure of Hansen *et al.*, (1971). From 10g mixed faecal pellets samples, 3g sample was suspended in 100ml of water and three sub-samples of 1g each were used for slide preparation. Twenty slides, each of 1gm sub-sample, were then made by the same procedure as described for reference material. From the twenty slides of each sub-sample of faecal pellets, fifteen best slides were chosen. Forty-five slides, for each month, were studied in detail. On each slide, having twelve points or fields were located in a predetermined manner such that the point/field was evenly distributed over the slide. The diameter of each point was 2mm. Each location was studied in detail with a trinocular tube version at 100X magnification. The percent relative frequency of each of six different types of food including date fruit, date stem, grass roots (Bulb), grass leaves, insects and un-identified fragments were calculated and results were shown at 95% confidence limit (Sokal and Rohlf, 1969).

Percent of food item present in the faecal pellets were categorised as minor food item if it accounted 3 to 9 percent of the content, major food item if it accounted 10 to 49 percent of the content and important food item if it accounted 50 to 100 percent of the content. If the food item were less than 3% in the faecal pellets, it was called as traces. To determine the degree of dominances of the individual food item in the sample, Berger-Parker Index (Magurran, 1988) was used.

RESULTS AND DISCUSSION

Analysis of faecal pellets of *Nesokia sp.* showed that only five different food items represented in the contents (Table-I) gave the relative frequency of food item in the faecal pellets of *Nesokia sp.* Month wise highest frequency of date-palm fruit was recorded in the month of August i-e, 40.24% followed by the month of July and June which was 30% and 29.3% respectively.

Table- I Relative frequency of various food items in the faecal pellets of mole rat (*Nesokia sp.*) in date-palm orchards, Nok Kundi Balochistan. In parenthesis are percentages of fragments examined.

Food Items	Part eaten	July	August	September	October	November	December	January	February	March	April	May	June
<i>Phoenix dactylifera</i> (Date-palm)	Fruit	9.42±4.2 (30.07)	11.64±9.1 (40.24)	7.81±4.0 (20.0)	0.6±0.1 (5)	3.42±1.4 (10.0)	0.66±0.1 (6.0)	12±3.0 (12.4)	8.25±3.4 (12.6)	12.16±6.3 (20.3)	13.58±5.7 (21.9)	17.8±4.3 (22.5)	22.5±9.2 (29.3)
<i>Phoenix dactylifera</i>	Stem Pith (soft part)	7.67±7.6 (24.09)	2.90±3.5 (10.04)	6.77±3.8 (17.31)	5.37±1.7 (42.6)	4.93±2.0 (37.6)	6.31±1.7 (38.8)	34.1±3.9 (45.5)	30.08±5.3 (45.9)	24.92±5.2 (38.2)	28.7±4.2 (41.4)	29.6±2.2 (37.6)	26.0±5.3 (33.8)
Grass	Leaves	3.12± 4.9 (9.94)	3.98±3.4 (13.74)	2.93±5.4 (6.23)	1.93±1.3 (15.3)	3.42±1.4 (16.1)	3.2±2.65 (19.7)	Traces	Traces	Traces	Traces	Traces	Traces
Grass	Root (bulb)	Traces	Traces	Traces	1.64±0.8 (13.0)	1.78±0.8 (13.6)	2.69±1.9 (16.6)	4.83±3.2 (6.4)	2.67±1.4 (4.1)	3.67±1.4 (5.6)	3.17±1.6 (4.5)	3.25±0.6 (4.2)	4.25±1.4 (5.5)
Insects	-	0.14±0.3 Traces	5.64±4.8 (19.51)	4.62±3.1 (11.83)	Traces	Traces	Traces	5.16±3.3 (6.9)	4.42±1.2 (6.8)	3±1.2 (4.6)	2.58±1.1 (3.7)	3.25±0.9 (4.0)	3.33±1.2 (4.3)
Unidentifiable fragments	-	10.98±6.6 (35.00)	4.76±8.8 (16.46)	17.46±10.1 (44.6)	3.06±1.5 (24.3)	2.98±0.9 (22.7)	4.04±1.4 (24.9)	21.58±5.6 (28.8)	20±4.1 (30.6)	17.58±5.6 (31.3)	18.92±5.7 (28.5)	24.8±5.6 (31.7)	20.83±6.8 (27)
Identifiable fragments	-	875 (65.0)	1015 (83.54)	1039 (55.4)	430 (75.7)	477 (77.3)	549 (75.1)	641 (71.2)	545 (69.4)	538 (68.7)	598 (71.5)	645 (68.3)	673 (72.9)
Total Number of fragments examined	-	1347	1215	1877	568	617	731	900	785	783	836	945	923

It has been observed throughout study that the *Nesokia* sp. depends on date-palm (stems). Highest percentage of the stem (date-palm) were recorded in January and February, (Non-fruiting season) 45.5% and 45.9%, respectively. During non-fruiting season of the year, date-palm fruit was also present in the diet as major food item, i.e. more than 10% of the diet.

Insect and grass tubers played an important role in the diet of *Nesokia* sp. In the month of August 19.5% of the diet were insects while in other months of the year insects were accounted as minor food item (3.7 to 11.83% of the diet). In the absence of fruit, *Nesokia* sp. preferred the tubers of grasses also. Highest percentage of tubers was recorded in the month of December, 16.6% of the contents were grass tubers. During fruiting season of the date-palm, insects were also eaten and accounted 19.51% and 11.83% in August and September respectively, while in other months of the year, insects were accounted as minor food item i.e., 3.7 to 6.9 % of the diet.

Berger-Parker Index of the diversity of the seasoned samples of the faecal pellets of mole rat (*Nesokia* sp.) reflects that summer diet of the rat is least diversified than that of the winter diet. Higher diversity index value for fruiting season of the date-palm was related to the excellent consumption of the date-palm fruits, date-palm stem (tubers, leaves) and unidentified plants (Table-II). The reference plants collected from date-palm orchards are given in Table-III. The results of the present study showed that *Nesokia* sp. had a narrow feeding niche in the date-palm orchards of Nok Kundi, Balochistan, Pakistan.

Table-II Berger-Parker index of diversity for the seasonal samples of the faecal pellets of mole rat (*Nesokia* sp.)

Food items eaten	Number of identified fragments in faecal pellets during	
	Fruiting season (date-palm)	Non-fruiting season (date-palm)
Date-Palm (Fruit)	2335	567
Date-Palms (Stem)	1810	1827
Grass tubers	129	413
Grass leaves	418	201
Insects	155	151
Unidentifiable fragments	2370	1204
Total fragments examined (N)	7217	4363
Maximum abundant food (n)	2335	1827
Berger-Parker index (D)	0.32	0.42
1/d	3.1	2.4

Berger Parker Index

$D = n / N$

Table-III List of reference plants collected from date-palm orchards, Nok- Kundi, Balochistan

NAME	LOCAL NAME
<i>Phoenix dactylifera</i> L.,	Khajoor
<i>Fagonia ovalifolia</i> Hadidi	Shinz
<i>Colligonum polygonoides</i>	Poge
<i>Tamarix aphylla</i>	Guz
<i>Tribulus terrestris</i>	Torat
<i>Cyperus aucheri</i>	Tuzuk (grass)
<i>Cyperus longus</i>	-do-
<i>Danthiopsis stocksii</i>	Kaundal (grass)
<i>Stipagrostis</i> sp.	Muz (grass)

The results of the present study revealed that mole rat in the non-explored area of Balochistan is largely herbivorous and fully dependent on the surrounding area diet. These findings are in agreement with Smiet *et al.*, (1980), Tousif *et al.*, (1985) and Hussain *et al.* (1995). It has been observed that in fruiting and even in non-fruiting season of date-palm, a large quantity of date-palm fragments were present in *Nesokia* sp. faecal pellets. Broken damaged stem parts and riped/unripped damaged fruits, frequently seen in the field, were the major diet of non-fruiting season of *Nesokia* sp.

Nesokia sp. devoured the large amount of date-palm. These fruits may be eaten by gleaning or may be hoarded in burrow by digging. This pest being largely a subterranean species has to do a lot of digging to link with far apart wild growing trees which is an energy consuming act (Hussain *et al.*, 1995). Due to narrow choice in food sampling the pest is fully dependent on date-palm and stem for subsistence in Nok Kundi area of Balochistan, Pakistan.

In the agricultural fields, crop plants seem to be the chief source of diet for *Nesokia indica*. In the sugarcane field of Sindh, as much as 89% of the rats diet comprised of the cane alone (Smiet *et al.*, 1980). Similarly, in the paddy fields, the rats intensively consumed the rice grains at harvest (Fulk *et al.*, 1980, 1981).

In the orchards of Balochistan, about 93% of diet of the rats was due to plants and 7% was due to insects. Two grasses namely, *Hordeum murinum* and *Cynodon dactylon* were consumed round the year and were the main staple foods of the rat's diet (Mian et al., 1987)

CONCLUSION AND RECOMMENDATIONS

It is concluded that *Nesokia sp.* is fully dependent on date-palm and its damage to date-palm is a serious threat to livelihood of the farmers of Nok-Kundi area. The losses need to be intensified with prompt control measures.

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