

BURROWING PATTERN OF SHORT-TAILED BANDICOOT RAT *NESOKIA INDICA* GRAY

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ABSTRACT

Nesokia indica Gray made burrows at levels higher than fields on bunds and the linings of channels. Depending on their tunnelling pattern burrows were grouped into 5 distinct categories. Most of the burrows were zig-zag, others were straight and a few were very short with blind alleys. In zig-zag burrows, fumigation may not yield desirable results.

INTRODUCTION

Rats and other rodents often make burrows to provide them safe shelter and protection against climatic extremes and to some extent against predators, to breed their young ones and often to store food materials. The pattern varies to some extent according to the weather and species. The burrow system is, therefore, an important component of the rodent life system and as such, it may influence the success of the control measures.

Nesokia indica Gray, a common field rat in northern India causes damage to barley, wheat, potato, groundnut and sugarcane (Peswani *et al.*, 1975), mustard (Prakash, 1977), Brinjal (Ramesh and Katiyar, 1976) and tomato (Ramesh, 1977). The present study was undertaken to fully understand its burrowing pattern.

MATERIAL AND METHODS

The study was done by excavating 112 burrows of *N. indica* on the bunds of fields, linings of irrigation channels and on flat fields at the Indian Agricultural Research Institute, New Delhi and in villages around Delhi. These studies were undertaken during winter (November, 1976-January, 1977), Summer (March, 1977-May, 1977) and a part of rainy season (June, 1977-July, 1977). Live burrows were located as described by Barnett and Prakash (1975). The direction of burrow opening was noted with the help of magnetic compass, by holding it in the centre of opening after carefully excavating the central holes with the "kharpi" without disturbing the tunnel. The excavation of tunnels was followed for their full length. The length, vertical depth, diameter and the distances between the openings were recorded.

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RESULTS AND DISCUSSION

A large number of burrows (46) had single openings, followed by those having two (22), three (13) or four (11) openings. The number of burrows having 5, 6 and 8 openings were 3, 6 and 4, respectively. Of the 7 remaining burrows out of the total 112 studied, there was one burrow each having 7, 9, 10, 11, 12, 18 and 19 openings per burrow. Maximum number of burrow openings on the sides of irrigation channels were at a height of 46-50 cm (28), followed by those at a height of 56-60 cm (26), 61-65 cm (23) 51-55 cm (18). Other aspects of burrowing pattern of *N. indica* are given in table 1. The burrow system was found to be a wide tunnel, roughly circular in cross section, the diameter ranged from 3.5 cm - 11.5 cm and opened in the NW, SW, NE and SE direction at 5-90°. The maximum openings were in between 15-30° in all the directions and the minimum between 1-15° NW and SW, 45-70° and 75-90° NE. *N. indica* plugged the openings of the burrow with 76-489 g soil/opening. It was also found that most of the burrows had soil plugs inside the tunnel in all the seasons. During winter months it was observed that rats became inactive and remained in the burrows by plugging openings with the soil upto a tunnel length of 15-60 cm. This observation is a pointer regarding futility of baiting during winter months. Most of the burrows had 2-4 link holes at a distance of 20-45 cm from main opening. A single colony had 5-15 burrows.

On the field bunds as many as 21 openings were at a height of 13-28 cm and the number was minimum (5 burrows) at 23-28 cm. In case of water channels, highest number (28) was observed at a height ranging from 45-50 cm.

Zig-zag tunnels (Figs. 4 and 5), having many (1-19) openings were inhabited for considerable period. Inter-distances between the openings of same burrow varied from 41-572 cm while the distances between link holes were 5-14 cm. The length of the tunnel ranged from 17-3443 cm and the depth between 9-56 cm.

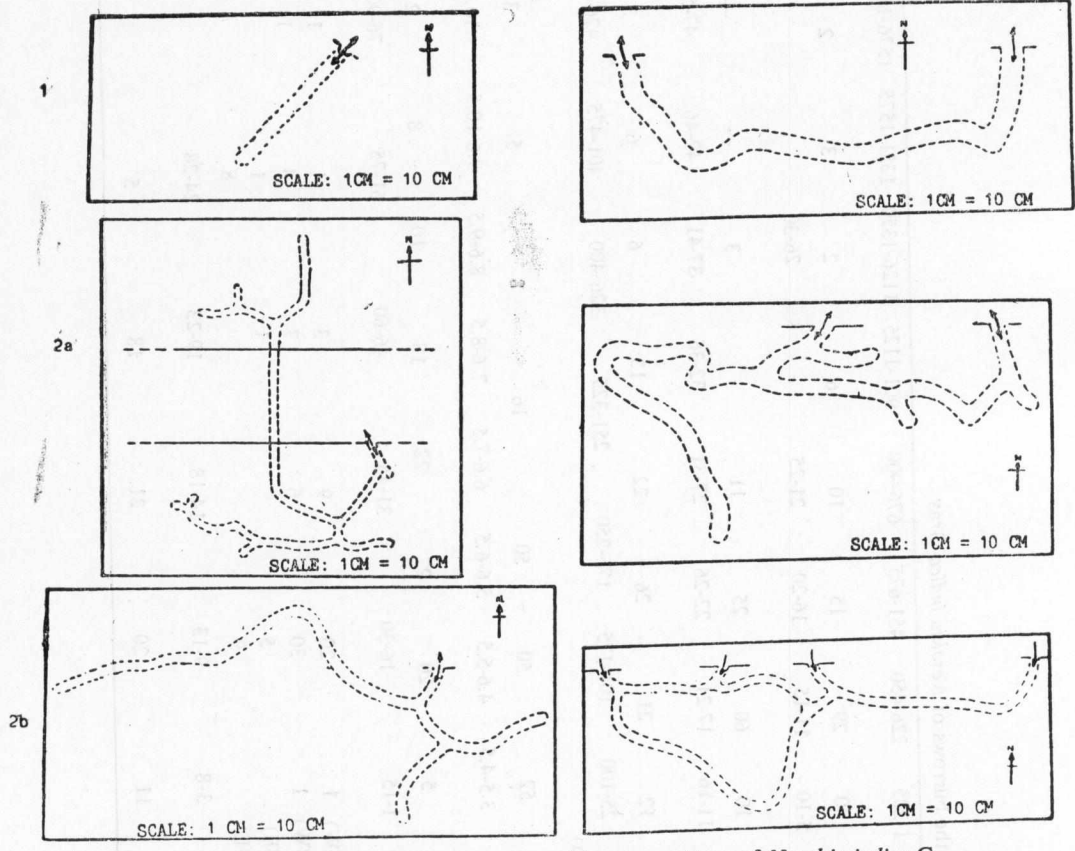
The burrows of *N. indica* varied considerably in their pattern. Most of them were zig-zag and having many openings. In some cases the tunnel was straight with one or two openings only. However, in a few cases the tunnel was very short, with a single opening. In these short tunnels, rats sought shelter only for brief periods in case of some danger, when they were out for feeding. Most of such burrows occurred in the crop fields. None of the excavated burrows contained hoarded food grains.

The burrow system of *N. indica* could be grouped into 5 distinct categories:

1. Single opening with short and blind tunnel (Fig. 1).
2. Single opening with long and zig-zag tunnel (Fig. 2a, b)
3. Straight tunnel with two openings (Fig. 3)
4. Zig-zag tunnel with openings (Fig. 4)
5. Ramified tunnel with several openings (Fig. 5)

Table 1. Characteristics of the burrows of *Nesokia indica* Gray

	1-225	226-450	451-675	676-900	901-1125	1126-1350	1351-1575	1576-1800	1801-2025	2026 and above
Total length of tunnel (cm)	1-225	226-450	451-675	676-900	901-1125	1126-1350	1351-1575	1576-1800	1801-2025	2026 and above
Number of tunnels	40	29	15	10	6	2	3	2	2	3
Minimum depth of tunnel (cm)	5-10	11-15	16-20	21-25		26-30			31-35	
Number of tunnels	10	60	25	11		3	—	—	3	
Maximum depth of tunnel (cm)	11-16	17-21	22-26	27-31	32-36	37-41	42-46	47-51	52-56	
Number of tunnels	12	21	26	22	13	6	6	3	3	
Interdistances between opening to opening (cm)	25-100	101-175	176-250	251-325	326-400	401-475	476-550			551-625
Number of openings	52	50	50	16	8	5	3			2
Diameter of openings (cm)	3.5-4.5	4.6-5.5	5.6-6.5	6.6-7.5	7.6-8.5	8.6-9.5	9.6-10.5	10.6-11.5		
Number of openings	5	20	27	22	18	10	8	2		—
Direction of burrow opening (Degrees)	1-15	16-30		31-45	46-60		61-75	76-90		
Number of openings (SW)	1	20		9	3		1	1		
Number of openings (NW)	1	30		6	7		4	1		
Number of openings (SE)		5			1		1			
Number of openings (NE)		9					8			
Burrows on field bunds	3-8	9-13		14-18	19-23		24-28			
Height (cm) 25±										
Number of openings	11	20		21	18		5			



Figures 1-5. Graphical presentation of burrow pattern of *Nesokia indica* G.

1. Single opening with short and blind tunnel,
- 2a & 2b. Single opening with long and zig-zag tunnel
3. Straight tunnel with two openings,
4. Zig-zig tunnel with two openings,
5. Ramified tunnel with several openings

Burrow pattern and its suitability for control operations .

In fields with zig-zag burrows having many openings, the only suitable method for control of rodents is poison baiting and not fumigation, trapping etc. Straight tunnels with one or two openings are considered suitable for fumigation.

ACKNOWLEDGEMENTS

I thank Dr. R.N. Katiyar for his valuable guidance during the study.

REFERENCES

- Barnett, S.A. and Prakash, I. 1975. *Rodents of Economic importance in India*. Arnold Hinemann, New Delhi and London, 121-122 p.
- Peswani, K.M., Katiyar, R.N., Bhatia, P.G. and Singh, Nathu. 1975. Control of field rats *Nesokia indica* Gray & Hardwickei and *Millardia melzada* G. at I.A.R.I. farm. *Proc. All India Rodent Seminar*, Ahmedabad, Sept. 23-26 1975 : 194-196.
- Prakash, I. 1977. Rodent pests of agricultural crops and their control. *Indian Fmg.* 27 (1) : 39-45.
- Ramesh, P. 1977. *Studies on the burrowing habits of Nesokia indica Gray in relationship to its control*. M.Sc. thesis. Division of Entomology, P.G. School, I.A.R.I., New Delhi. 70 p.
- Ramesh P. and Katiyar, R.N. 1976. Rat damage in brinjal. *Entomologists Newsletter*. 14 (10): 59.