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CONTENTS

Bush Rat in the Aravallis

ISHWAR PRAKASH, PRATAP SINGH AND HIMMAT SINGH

Desert Regional Station, Zoological Survey of India, Jodhpur – 342 009

The bush rat, *Golunda ellioti* is a very old Gondwana element called "ARYAN" by the famous mammalogist, W.T. Blanford. Peninsular in origin, it was probably distributed from Southern India to Aravallis even before the Himalayan uplift. During our studies, in a DST sponsored project, on the ecology of small mammals in the Aravallis, along with fourteen other species, the bush rat was collected from the main range, Abu hill and Udaipur Banswara(UB) zone in varying numbers. On the Abu hill, the *Golunda* was found at every trapping site in various habitats and altitudes, even up to 1600m. However, in the Udaipur- Banswara zone its distribution was found to be patchy and discontinuous at 9 locations. Likewise on the main Aravalli range, from Abu road to Beawar, the species was trapped at three localities in three habitats out of 5 study spots and 5 habitats. *G. ellioti* were abundant at the highest altitude of Abu hill, but on the main range and Udaipur zone, the foothills were their preferred altitude. Considerable difference was revealed in the habitat preference of bush rat in three zones of Aravallis (Table 1). Whereas, in the main Aravalli range, it was found to be more abundant in rocky habitat, this habitat harboured minimum number over Abu hill and in UB Zone (x^2 (1) = 33.7, $P > 0.001$; x^2 (1) = 22.6, $P > 0.001$ respectively). Over the Abu hill, the species was significantly more abundant in runnels than in UB Zone (x^2 = 12.5, $P > 0.001$). However, their occurrence in the crop fields was relatively more uniform in the three Aravalli zones.

According to Ryley (1913, JBNHS, 22 : 684-699) *Golunda ellioti* was found to be common at Orai over the Abu hill. The present data indicates that the bush rat is one of the most abundant small mammal over the Aravallis. The augmentation is attributed to two factors, introduction of irrigated agriculture after clearing forests and that the *Golunda* has ascended higher peaks of this montane ecosystem through runnels. The impact of human intervention on the hill environment has altered the species composition of small mammals in the Aravallis during the last 80 years.

Table 1. Habitat preference of bush rat in various zones of Aravallis

	Per cent occurrence		
	Main Aravalli range	Abu hill	Udaipur-Banswara zone
Scrub land	22.2	18.2	57.1
Rocky	44.4	4.0	9.5
Runnel	–	40.4	14.0
Crop field	33.3	37.4	19.4

Identification of Four Sympatric Rodent Species by Their Hair

R. KANAKASABAI, K. SARAVANAN, V. BALAN, K. BALAMURUGAN
J. ABDUL RAJAK AND G. SENTHILKUMAR

A.V.C. College, Mannampandal (Mayiladuthurai) – 609 305

The present study focuses on the structural features of hair of the four rodent species viz., the Indian mole rat, *Bandicota bengalensis;* Soft furred field rat, *Millardia meltada*; Indian field mouse, *Mus booduga* and Indian gerbil, *Tatera indica*. The hair samples were taken from different regions of the experimental animals. All hair samples were washed in hot water, cleaned in 70% alcohol and mounted with the help of D.P.X. mountant. The mounted slides were studied for characteristic features of the cortex and medulla in three different regions of hair viz., proximal, medial and distal. Results indicated considerable differences in the medullary arrangement at the proximal, medial and distal regions of hair among the four rodent species.

In cortex, there was no difference among the four species. The cortex was serrated and dentate, whereas, in some cases it was plain. The medullary arrangements varied from species to species. The proximal region of hair of all parts of *B. bengalensis, M. meltada, M. booduga* and *T. indica* were arranged with uniserial ladder medulla.

In the medial region, *B. Bengalensis* hair had a regular pattern in the structure of medulla with wide aeriform lattice. In *M. meltada* the medial region had crank like medulla. While in the *M. booduga*, it had maze like medulla. In case of *T. indica* it was multitier crank medulla in the medial region. Interestingly the three rodent species *B. bengalensis, M. meltada*, and *M. booduga* had narrow aeriform lattice medulla in the distal region and in *T. indica* the medulla disappeared in this region.

The results would be helpful in identifying the rodent species on the basis of their hair. As such they will be highly useful for the studies on prey - predator relationship and food habit of predators.

Estimation of Rodent Losses in Single and Double Cropping System of Chickpea

O.P. Dubey And G.S. Thakur

J.N. Krishi Vishwa Vidyalaya, Jabalpur – 482 004

A survey was undertaken during 1994-95 and 1995-96 to assess the rodent damage in chickpea crop on farmers fields of Kymore plateau and Satpura hills. Predominant chickpea variety of the area was 'JG 315'. The soil type was light to medium black. The cropping pattern was rice, gram and wheat based. Four villages under single and double cropping system were selected for study. Of them 2 fields in each village with a total 6 samples per field (1 m^2 cropped area) were surveyed. Number of cut branches and damaged pods were counted at prematurity stage of crop by converting the cut branches into pods after estimating the average pod bearing capacity of each branch.

The mean number of damaged pods varied from 2.77 to 9.02/m^2 in single cropping system, while it was 17.77 to 20.01/m^2 in double cropping system. The overall mean damage to pods was 5.59 and 18.43 in these situations, respectively (Table 1). The estimated yield loss due to rodent damage was 15.93 kg/ha and 52.70 kg/ha in single and double cropping system respectively. Hence, it can be concluded that the rodent damage is comparatively higher in double cropping situation.

Table 1. Rodent damage in chickpea under single and double cropping system

Year x Fields x Samples	No. of damaged pods/m^2					
	Single Cropping			Double Cropping		
	Mean	±	SD	Mean	±	SD
2x4x12	2.77	±	2.67	17.77	±	28.24
2x4x12	9.02	±	9.52	18.63	±	33.52
2x4x12	4.29	±	6.43	20.01	±	33.33
2x4x12	6.28	±	6.90	17.33	±	19.71
Mean	5.59	±	12.76	18.43	±	18.69

The Baiting Schedule to Control Roof Rat (*R. Rattus*) Infestation In Rice Mills

K. Muktha Bai, Yashoda L. Urs And A.N. Raghunathan

Central Food Technological Research Institute, Mysore – 570 013

Although various methods of managing the rodent pests are available, which are generally employed by the people when the pest (rodent) problem becomes acute and damages are felt. Also, the most common measure employed during such times is the poison baiting technique due to its popularity, ease in application and wide spectrum of activity.

The house rat *(Rattus rattus)* is one of the most ubiquitous and abundant rodent pest species of our country. While this has a potential of breeding throughout the year, two lean periods viz. (i) February to April and (ii) August to October have been reported. Many a times the control operations that are aimed to contain these rodent pests are mainly based on their reproductive potential or peak breeding seasons which coincides with the maturity of crop harvesting periods. However, meager information is available regarding the effect of control methods carried when the population is at lowest ebb. Keeping this in mind, a rice mill infested moderately by roof rats was selected to find out the effect of poison baiting carried in two lean periods of the year. The surveillance of the premises indicated that the rats had access to various other alternate foods viz., rice bran, paddy, parboiled and raw rice. The baiting schedule adopted was as follows.

I Phase (Jan-Feb)

Prebaiting with cereal based new bait formulation for a period of 4 days using protective bamboo bait containers resulted in a total intake of 1027 gms of plain bait. This was followed by one night of Zinc phosphide (2%) baiting resulted in an intake of 70 gms of poison bait and recovery of 29 roof rat corpses. Post- poison baiting carried after a gap of 6 weeks of poison baiting showed an intake of 290 gms of plain bait for 3 days. The per cent control achieved was calculated as 72% during this phase.

II Phase (Oct-Nov)

Prebaiting for a period of 2 days resulted in an intake of 1192 gms of plain bait. This was followed by bromadiolone 0.005% baiting for 6 days

continuously wherein surplus baits were laid in strategic points. Care was taken to replace the baits in places where it was consumed completely. Although a total of 53 dead rats (47 *R. rattus* and 6 *B. indica*) were collected between 4-9 days of baiting, maximum death was noticed between 5-6 days. However, post-poison baiting carried after 6 weeks of bromadiolone baiting resulted in an intake of 135 gms of bait for two days. The per cent control achieved during this phase was estimated as 89%.

The above study has shown that if baiting technique is adopted during the lean periods of rodents breeding season, the time taken for the built up of population (after first poison baiting) would be more than 6 months.

Evaluation of New Packing of Aluminium Phosphide (1.5 g. Pouch) for Rodent Burrow Fumigation

S.K. CHHAWARA, R.S. THAKUR, P.K. DWIVEDI AND P.C. BANSODE

Indian Grain Storage Management & Research Institute, Field Station, Adhartal, Jabalpur – 482 004

The new packing of Aluminium Phosphide (1.5 g. pouch) formulated by M/s Excel (India) Ltd., Bombay was tested for rat burrow fumigation in three study villages. The identified live burrows in the fields of standing wheat crop in semi-mature stage with heavy rodent infestation were fumigated by placing one torn pouch of Aluminium phosphide fumigant powder in each burrow. Thereafter, the opening of the fumigated burrows were sealed with mud plaster. On the next day reopened burrows were refumigated following the same procedure. Percentage of control success was calculated by using following formula:-

$$\% \text{ control success} = \frac{\text{No. of fumigated burrows found closed on the last day of the observation}}{\text{No. of burrows identified as live burrows initially}} \times 100$$

The details of the results obtained from three crop fields are presented in Table 1. The control success in the three study villages was 97% (Rajvai Deori), 90% (Mahagaon) and 100% (Sonwani).

The results indicated that the new packing of Aluminium phosphide 1.5 g. pouch can successfully be used for rodent burrow fumigation in the crop fields. This packing seems superior to the tin packings, as it is easy to operate with least wastage.

Table 1. Evaluation of new packing of Aluminium Phosphide fumigant against rodent pests in wheat field

S. No.	Study villages	No. of burrows identified as live burrows	No. of live burrows fumigated next day	No. of burrows refumigated	No. of live burrows left	% control success
1.	Rajvai Deori	60	35	8	1	97%
2.	Mahagaon	30	20	2	2	90%
3.	Sonwani	20	12	2	Nil	100%

Rodents in News

Ministry for Rat Control

"The Union Government should have a separate ministry for rat and infestation control with a sizeable budget allocation to launch a vigorous national programme on an emergency basis. Dr.H.A.B. Parpia, Director, Central Food Technological Research Institute, Mysore, has suggested."....."If this loss could be avoided there would be no food problem".

(Hindustan Times, May 7, 1966).

Rats Dine on Sleeping Boy

"A group of rodents feasted on a live, two-year-old boy at Netra village" (near Bhuj, Gujarat). "The boy was sleeping with his mother, a Harijan labourer, on the ground. The rodents came milling around and dug in, as the mother lay fast asleep. By the time the mother woke up, around midnight, the child lay quite lifeless with rodent still busy eating into him".

(Hindustan Times, April 1, 1972)

Rats caused a Flood

"The cause of a breach which occurred in Dhusi bund along the Sutlej yesterday has been traced to rats. Gushing water from the breach flooded several villages in Kapurthala and Jullundur districts.". "According to a report received here today, water flowing through some holes made by rats in the earthern bund----- the longest in the State to check floods------caused the breach at a point between the Bharmania and Gidderpindi villages".

(Hindustan Times, July 16,1972)

Move to cut U.S. aid to India

Rodents have always been in the news since Vedic times. During the sixtees of the twenteeth century the rodent menace in India was discussed in the U.S. House of Representatives with a proposal to cut U.S. aid to the country. "India's huge population of rats is responsible for that country's food shortage". "India is now feeding about 2,500 million rats that outnumber the population 4:1, and which consume practically all of the increase in their food production each year". Conservative representative Mr. H.R. Gross introduced a proposal to cut off all military and economic aid to India; which was, of course, rejected by 223 to 159 votes. "Until they show a disposition to get rid of this huge population of rats, I do not know of any way by which we can feed the hungry people of India".

(Hindustan Times, Dec. 14, 1974)

Rodents Feast on Baby in Calcutta Hospital

"Rodents allegedly feasted on a three-month-old baby in a city hospital here yesterday, says PTI".

(Times of India, January 22, 1975)

Mouse Plunges Rampur into Darkness

"A mouse managed to shake the "power structure" of Rampur and plunge the town into darkness on Thursday, reports PTI. The mouse ran into the oil circuit breaker of a 6,600 volts power station and completely disrupted power supply to the town. The engineers took nearly 16 hours to repair the station, which was partly burnt because of short circuit.

(Statesman, December 11, 1978)

(Compiled from Dr. Ishwar Prakash's collection of newspaper clippings)

Contributions for inclusion in the Newsletter may please be forwarded along with 1-2 good black and white photographs to :

Project Coordinator,
AICRP on Rodent Control,
Central Arid Zone Research Institute,
JODHPUR - 342 003

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