NATIONAL PROGRAMME FOR RODENT PEST MANAGEMENT

ICAR

RODENT NEWSLETTER

Vol. 7, Nos. 1 & 2 Feb. & May, 1983

COORDINATING & MONITORING CENTRE
CENTRAL ARID ZONE RESEARCH INSTITUTE, JODHPUR

Rodent pests in rural environment in south Gujarat

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Rodents were collected in three villages(Nawagam,Bhulaphalia (Navsari) and Pathri Gandevi) in Valsad district of South Gujarat by placing rat trap at various places in different houses of each village. Three species viz. *Rattus rattus*, *Mus musculus* and *Bandicota indica* (Commensal type) were commonly found in all the three villages. Their relative proportion was more or less in the order of *R. rattus* > *B. indica* > *M. musculus*.

B. i. malabarica was got identifield from Bombay Natural History Society, Bombay, while other two species were indentified in the laboratory by the authors.

Rodent activities in mature *Kharif* crops in PAU fields, Ludhiana (Punjab)

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The rodent populations, depen-ding on the shelter and food availbility, may exercise some crop preferences for habitat selection which were studied by live burrow-hole census in mature *Kharif* crops in the fields of Punjab Agricultural University (PAU), Ludhiana. Because of difficulties in location of burrows in some crops, burrow census in them was made during harvesting. These observations have shown that maximum activity of rodents occur in groundnut followed by maize, moong, bajra and jowar fields (Table 1). Minimum number of burrow-holes were seen in arhar and cotton fields. Before harvesting of other crops from its vicinity the sugarcane field contained lesser burrows, the number of which increased more than three time after harvesting of other crops. The burrows of *Bandicota bengalensis* and *Mus* spp. occurred in all crops, *Tatera indica* in groundnut, jowar, maize, and moong and *Rattus meltada* in arhar, bajra, maize and sugarcane.

Tabie I. Live burrow-holes of different rodents per acre in mature and harvesting stage of *Kharif* crops in PAU fields.

Crop	Number of live burrow-holes				Total number of live
	B. bengalensis	*T. indica*	*R. meltada*	*Mus* spp.	burrow-holes
Arhar	8	—	3	10	21
Bajra[a]	13	—	7	18	38
Cotton	11	—	—	10	21
Groundnut[a]	21	43.5	—	8	72.5
Jowar[a]	18	6	—	10	34
Maize[a]	15	6	6	19	46
Moong[a]	29	6	—	7	42
Paddy	16	—	—	7	23
Sugarcane	22	—	—	5	27
Sugarcane[b]	70	—	5	17	92

a. burrow census carried out during crop harvesting.
b. burrow census taken after harvesting of other crops from its viscinity.

Recovery time of field rodent population affected by flood at Singur in Hugli District, West Bengal

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A field rodent population affected by flood can even recover with in a span of two years. The authors observed this fact on the rodent in cultivated fields at Singur in Hugli District, West Bengal.

The species found there are *Bandicota bengalensis* (Gray), *Bandicota indica* (Bechstein), *Mus booduga* (Gray), *Mus cervicolor* Hodgson, *Millardia meltada* (Gray). The number of rodent burrows found in the harvested fields in the years 1974 to 1978 (up to early September) were on an average 40 per acre (96/hectare).

Due to torrential rains and release of water through irrigation canals, crop fields at Singur were inundated with water up to 1.5 m for 12 to 15 days during late September, 1978. Such enormous floods are unprecedented in the history of West Bengal. After harvest (during the months November to January), a great reduction in the number of rodent burrows (19.7/ha) in these fields were noted, indicating a reduction of rodent population (about 80 per cent). It appears that during the flood, most of the rodents were either drowned or were eaten away by predatory birds. Only a few which might have escaped into the high ground or in the nearby houses appear to have immigrated back to the fields after flood water receded and rehablitated themselves in the fields. It is interesting to observe that even after extensive flood, about 20 per cent rodent population could survive this natural calamity and the entire population was not wiped out.

Subsequently during harvesting season in 1979-80' (January), it was found that the number of rodent burrows increased (78.8/ ha), which indicated 60 per cent recovery of rodent population in the fields. It was found during harvest in 1980 (November and December) that the rodent burrwos increased (96/ha) and thus it took two years for its recovery after 80 per cent reduction by a natural calamity like flood.

Rat damage to oil palm plantation in Little Andaman

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Rat damage to palm seedlings and young palms upto 2½-3 years old (from its germination) occured at its collar portion. Since the collar portion is succulent and sweet, the rats first chewed off the base of leaves and then made a hole in the collar, feeding on the internal portion. The rats attacked such plants again and again. In many cases the interior of the collar is exposed and in some extreme cases the plants are totally killed. In mature and bunch bearing palms, the rats gnawed the female flower bearing bunches and also the tender and ripe fruits. The female bunches are gnawed badly. In the tender bunches the rats made a small hole in every fruit and fed on the sweet water. In ripe bunches the rats chose the fruits having hard nuts and in such selections they picked up and discarded fruits which do not have nuts.

The rat *(Rattus)* paths identified in the field were tracked to their nesting places either below the logs or tree stumps. These rats do not live in burrows but make their nests in concealed places above the ground under the heaps of dried leaves and twigs. In some cases, their nests were also found on the crown of mature palms.

Table indicating the extent of damage to various age group of Oil Palms

	Nursery			Young Palm 26 months old		Young Palm (52 months old)	Mature fruit bearing Palm (113 months. old)
	Plot 1	Plot 2	Diagonal	Area on a hillock with no water source	Area adjacent to stream		
Palms counted	500	100	6000	149	150	200	150
Palms damaged	200	10	600	44	71	6	86
% damage	40%	10%	10%	29.5%	47.3%	3%	57.3%

Rat damage in Nursery occured in patches near the rat harbourages. In the young plantation area, the damage was more near the water source such as a stream and was comparitively less on the top of the hillock where there was no water source. Whereas in the Mature Palms the damage occured in all the fruit and flower bearing Palms.

Phago-stimulant property of body odours

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Conspecific odours function as phago-stimulant in several rodent species. To test whether the odour of other rodent species influence the food consumption in a similar way, male and female *T. indica* were lodged in separate cages for 24 hrs prior to experimention. The food carrying the body odours of male or female *T. indica* was provided separately to male and female *Rattus meltada pallidior* along with ordinary food in different containers. Total daily intake of two foods was recorded for 6 days. The consumption of scented bajra was found to be significantly more ($P<0.001$) in comparison to ordinary bajra (Table 1)

The same experimental procedure was followed for investigating the phago-stimulant property of interspecific body odour on *T. indica* using odour of *Rattus meltada pallidior*. The food consumption of scented food was significantly more ($P<0.05$) than ordinary millet (Table 1).

These two experiments indicate that body odours of interspecific species function as phago-stimulant in these rodents.

Table 1. Influence of interspecific body odours on food consumption.

Sex	Rodent species	Sex	No, of observations	Consumption of bait (g/100 g body wt.) Mean ± S.E.	
♂	*Rattus meltada*	Male	42	*T. indica* odour	ordinary
				5.99±0. 55**	3.57±0.41
		Female	42	5.16±0. 50**	3.25±0.45
○ +	*Rattus meltada*	Male	42	*T. indica* odour	
				8.86±0. 85	1.22±0.30
		Female	42	8.41±0. 74	2.07±0.51
				R.m. pallidior odour	
♂	*Tatera indica*	Male	42	5.44±0.47*	3.79±0.58
		Female	42	4.84±0.47*	3.75±0.48

* $P<0.05$
** $P<0.001$

Food preference of the rat, *Rattus rattus brunneusculus*, a common field rat in Jhums of Mizoram

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There are numerous reports on rodents feeding on bamboo seeds but the knowledge of their relative preference for bamoo seeds and other food items is lacking. A study was conducted to find out the food preference of *Rattus rattus brunneusculus* (Hodgson), a predominant rodent pest of paddy in North-eastern hilly region (Mizoram) of India. The rats were provided with various food items such as seeds and fruits of a few bamboo species, paddy and vegetables like ginger, arabi, chilly, brinjal and potato (cash crops of Mizoram). Ten rats of approximately same body weight were kept in separate cages and a known quantity of each food item was provided in small bowls in each cage. The quantity of each food was weighed after every 24 hours and replenished. The study was carried out for 10 days. The preference was judged by the amount of foods consumed during the period.

It was observed that these rats consumed more of bamboo seeds, fruits as compared to paddy and vegetables, and the descending order of preference was the seeds of

Dendroclaamus sikkimensis, Bambusa tulda, Melocanna bambusoides, Bambusa arundinaria, paddy and vegetables. Repeated trials of this experiment gave similar results. Therefore, it can be concluded that whenever there is availability of bamboo seeds/fruits in the areas surrounding the 'jhums, the rats possibly move to those sites and prefereably feed on them, but when the seeds/fruits are not available, paddy serves as their main food.

The choice of wild rats for mixtures of inferior cereal foods as white flour with groundnut oil

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Wild rats show marked aversion to highly extracted cereals as white flour. It is, however, preferentially eaten when sweetened than more attractive cereals as whole meal. Oils of no marked taste as groundnut oil are, however, considered to be better additives than sugar. But whether the oil has the same effect as sugar in enhancing the choice for such infereior cereals, is not known.

This was found by comparing commercial preprations of ground wheat - semolina, wheat flour (wholemeal), white flour; on rats, *Rattus rattus* maintained in cement tanks, 2.16 x 2.8 x 2.4 m, with wire-mesh covers. Oil of groundnut was then added to white flour, and the mixture was compread to the same foods again. Each food was weighed to the nearest 2g and presented in a six-compartment metallic tray. The residue, including that spilled, was weighed the next day. Oil was used in concentrations of 5%. Water was given *ad. lib.*

Semolina was prferred by the rats to wheat flour, and both to white flour (Table 1). The three had obviously the same taste. Likeness for semolina can then be attributed to it's superior texture of large and smooth granules. White flour may have been rejected because of its nutritional inadequacies.

In subsequent tests, white flour and groundnut oil mixture, was not immediately preferred to wheat flour or semolina. It was, however, favoured later over wheat flour; but the rats persisted in eating semolina in preference to the oily mixture (Table 1). Thus, inspite of it's high energy value(4.01 cal./g), the mixture was not preferred to food of superior texture (3.5 cal./g).

It can be concluded, however, that groudnut oil, like sugar, increases the preference for inferior cereal foods; but it does not make them more attractive than superior foods like semolina.

Table 1

No. of rats	Length of test days	Food offered	Consumption g/day	Calories/day
5	10	White flour	4.1±1.2	15.3
		Semolina flour	43.0±3.3	161.2
6	10	White flour	6.0±1.0	21.9
		Wholemeal	61.5±1.7	230.6
8	24	White flour × Gn. oil	41.0±3.4	160.3
		Semolina flour	62.0±3.2	232,5
8	27	White flour +Gn. oil	57.1±9.9	223.3
		Wholemeanl	58.0±9.8	217.5

Laboratory evaluation of brodifacoum against five murid species

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Ready to use anticoagulant bait containing 0.005 %brodifacoum was screened for its efficacy with one day no-choice feeding to *Rattus rattus, R. meltada, Mus musculus, M. platythrix* and *Bandicota bengalensis* and two days bi-choice feeding to *R. rattus*. The rodents were caged individually for at least one week before starting the poison baiting. The mortality data (Table 1) show 100% mortality of all the species and time to death varied in different species.

Table 1 Efficacy of 0.005% brodifacoum 'ready to use' bait against rodents

Rodent species	Feeding period (days)	Average posion ingested (mg/kg)	Mortality	Average days to death
Choice feeding				
Rattus rattus	2	5.1	10/10	7.7 (4-11)
No-choice feeding				
Rattus rattus	1	5.9	10/10	8.6 (5-16)
Rattus meltada	1	7.9	10/10	5.2 (4- 6)
Bandicota bengalensis	1	6.9	10/10	6.6 (5- 9)
Mus musculus	1	11.8	10/10	8.4 (4-20)
Mus platythrix	1	18.7	10/10	7.0 (5- 9)

Limericks on the Rat

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(i)

If you see a rat in the middle of the night
Please go for it with all your might.
A stick is still the best-
To do away with the pest,
While saving your stock of zinc phosphide.

(ii)

A rat would say,
In a Pavlovian way-
That bipeds are rather lazy,
As they sit gloomily off-mood,
And hold back the food,
Till the red light makes them crazy.

Notes and News

All India Rodent Seminar

Limited copies of the Proceedings of the above seminar held at Ahmedabad (India) are available for sale on subsidized rates of Rs.15/- each plus Rs. 5/- towards packing, forwarding and postage.

Those interested may send Rs. 20/- on the following address :

The Secretary,
Rodentological Society of India,
Rodent centre,
Bindu Sarovar,
Sidhpur 384151 (India).

Shri Rameshwar P. Mathur, Research Associate at Coordinating and Monitoring Centre for Rodent Research and Training, CAZRI, Jodhpur has been awarded Ph. D. degree in Zoology by Agra University, Agra on his thesis entitled "The comparative efficacy of certain anticoagulant rodenticides against the gerbils, *Tatera indica indica* Hardwicke and *Meriones hurrianae* Jerdon".

The next issue will appear in Aug. 1983. Contributions for inclusion in the Newsletter may please be forwarded to :

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JODHPUR - 342 003.

Published by the Coordinator of the National Programme for Rodent Pest Management, ICAR, CAZRI, Jodhpur, and printed by M/s Cheenu Enterprise, Jodhpur, at Rajasthan Law Weekly Press, High Court Road, Jodhpur