

**NATIONAL PROGRAMME FOR RODENT PEST  
MANAGEMENT**



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**COORDINATING & MONITORING CENTRE  
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## Murids of Garhwal Himalayas

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Garhwal Himalayas have not been intensively investigated in so far as the rodent problem is concerned. It is for the first time that a detailed programme has been initiated to study the ecology, behaviour, reproduction and the control of the various murids at/around Srinagar (Garhwal), situated at an elevation of 570 m above MSL on the left bank of river Alaknanda.

The present investigation reveals

that the following murid species inhabit the fields, waste-lands, farm houses, godowns and houses around Srinagar.

In addition we have also identified *Mus musculus* collected from godowns and houses in general, and also the paddy fields at Srinagar, and *Nesokia indica* collected from Jhangora, wheat and paddy fields at Srinagar and Daang.

Species	Habitats
<i>Bandicota bengalensis wardi</i>	Wheat, Paddy, Sunchana ( <i>Vicia faba</i> ), Jhangora ( <i>Echinochloa frumentacea</i> ), Koda ( <i>Eleusine coracana</i> ) fields at Srinagar and surrounding villages (Daang and Aithana)
<i>Mus platythrix gurkha</i>	Paddy, Sunchana, Groundnut, Wheat fields at Srinagar and Daang
<i>M. booduga booduga</i>	Paddy, Jhangora, Koda, Wheat fields at Daang and Aithana
<i>M. cervicolor</i>	Farm - houses and paddy fields at Srinagar
<i>Rattus rattus gangutrianus</i>	Godowns, houses at Srinagar

## Distribution pattern of rodent species in different soils

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There is a relationship between a particular species of rodent to a particular type of soil. It has been observed that different species of rodents survive better in different soil types.

With a view to note the habitat of rodent species in relation to type of soils, an intensive survey was carried out in different localities of Kanpur district in Uttar Pradesh. During surveys, rat burrows were dug out and the rats were collected from different types of soils. The animals were identified and their numbers recorded.

## Severe outbreak of field rats in some parts of U.P.

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Irregular rains caused considerable loss to Kharif crops during 1982. The dimension of crop losses has been greatly accelerated due to severe outbreak of rat menace in extensive areas. Jowar, Bajra, Maize and Paddy have seriously been affected by attack of

Results of the surveys indicate that in the sandy loam soil predominant spp. was *Tatera indica* which was found in maximum number (73 individuals) followed by the dominant rodent spp. *Bandicota bengalensis*. In loamy soil, the maximum number individuals (58) belonged to *Bandicota bengalensis* and the minimum (32) belonged to the species *Tatera indica*. In clay loam soil, quite different species were found with 39 individuals of *Mus booduga* and 34 of *Rattus melstada* among those which were recaptured from this area.

rats. At some places, the seeds sown in the soil were eaten by rats resulting in total failure of germination. The resowing of seeds could not prove successful due to heavy rat attack. The damage was caused by cutting the germinating plants at ground level. Such damage was

noticed particularly in Hamirpur, Banda, Jalaun, Etawah and Kanpur districts of U.P.

The population of rodents included *Bandicota bengalensis bengalensis* gray and *Tatera indica*. The long lasting drought in mid of rainy season also favoured the population growth of rodents. The ecological conditions prevailing in between July to middle of August were responsible for higher and sudden increase in

the population of field rats. The population observed ranged between 20-65 individuals per hectare when normal population was 5-12 rats.

The heavy rains later on occurred in middle of August which changed the situation in minimising rat population. The fields remained submerged with water for a longer period thereby reducing the population of rats considerably (upto 2-4 individuals per hectare.)

## Groundnut oil increases bait consumption by rodents in fields

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The field rodents in groundnut crop at its podding stage showed poor response towards plain whole wheat grain bait, the consumption of which increased significantly after addition of groundnut oil. After inducing the bait consumption the

withdrawal of oil from the bait had no significant effect on its feeding.

In paired bait tests in podding groundnut crop the addition of oil increased the consumption of wheat and millet significantly (Table 1). The difference between daily consumption

Table : Mean daily consumption (g per bait station) of rodents in paired bait tests in maturing groundnut and growing lentil crops.

Crop	Number of bait station pairs	Days	Mean consumption, g $\pm$ S.E	
Maturing groundnut	10	4	Wheat	Wheat & oil
			1.09 $\pm$ 0.2	3.5 $\pm$ 0.1 <sup>b</sup>
Maturing groundnut	10	7	Millet	Millet & oil
			2.5 $\pm$ 0.6	3.4 $\pm$ 0.9 <sup>b</sup>
Growing lentil	10	7	3.1 $\pm$ 0.1	7.0 $\pm$ 0.2 <sup>b</sup>

a, The bait station pairs were exposed to the same population.

b, The differences between mean consumption within a pair are significant ( $P < 0.05$ ).

umption of millet grains was significantly more when the bait station When pairs were shifted to growing

lentil crop which reflect the effect of availability of food material on the feeding responses of rodents.

### Aldicarb acts as rodenticide too

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In the series of screening insecticides for their rodenticidal action, a granular form, technically known as Aldicarb (2-Methyl-2-(Methylthio) propional dehydro (methylcarbamoyl) oxime), was chosen to evaluate its efficacy against Indian gerbil, *Tatera indica*. The experiment was run in laboratory and poison baits were prepared in the form of pellets by mixing aldicarb in wheat flour in the ratio of 1:1000. The pellets, thus prepared, were passed in the wheat flour for its uniform coating over the pellets. This coating of flour increases the acceptability of poison bait to the test animal. The approximate weight of each pellet was one gram and the number of pellets given to each rat were five. In all, there were six replicates.

The observations recorded during the experimental period revealed that all the animals died within five minutes of feeding 2-3 pellets. The treated rats manifest

peculiar symptoms of poisoning before the death occurs. The most striking behaviour of these animals was the frequent jerking in the neck region followed by unconsciousness which finally leads to death. A few experimental animals after regaining consciousness started jumping for a while and then attained almost a vertical position. Following this, such animals fell down in their respective cages and died.

During experimentation, it was seen that all the poisoned animals excreted the faecal matter before death. In all the dead animals eye balls remained open and it appeared as if normal living rats are lying in the cages but the body of such animals was markedly hard and tough.

From the foregoing observations, it is obvious that aldicarb granules can successfully be employed for killing rats by preparing and feeding its pellets to these animals.

### Control of rodent pests in a rice mill using zinc phosphide as a rodenticide

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Surveillance of a rice mill showed that area is moderately infested by various rodent species, viz, *Rattus rattus*, *Mus musculus* and *Bandicota indica*. The roof structure included asbestos, Mangalore tiles, and cement concrete. The alternative foods freely available to them were paddy, rice bran, puffed rice, and raw rice of different grades stored either in gunny bags or kept as such in heaps. The control programme followed was: first two days-prebaiting using standard bait (74 parts rice flour; 20 parts wheat flour; 5 parts groundnut cake flour, 1 part salt roasted well and mixed with 12 parts of ground nut oil) followed by 2% zinc phosphide + 0.2% tartar emetic poison baiting on third night. Leaving a gap of 5 days post-poison baiting was conducted to assess the residual rodent population. A total number of 120 baiting points

were distributed and the type of bait containers used being bamboo, tins (5 kg capacity) and cocount shells.

The results showed that standard bait was accepted by rodents even in presence of other alternative food material. There was an intake of 638 and 1107 g of prebait for 1st and 2nd day, respectively. However, one night poison baiting resulted in the death of 63 *R. rattus* and seven *M. musculus* for an intake of 246 g of poisoned bait. A total intake of 165 g (or 55 g/day), for a period of 3 days during post-poison baiting indicated that zinc phosphide was effective in bringing the rodent pests even in presence of alternative food source. Post-operational surveillance conducted also confirmed that the rodent menace was greatly reduced in the premises.

### Efficacy of racumin (0.75% coumatefralyl) against *Rattus rattus*

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Poison trials were conducted in the laboratory using racumin (3-( $\alpha$ -tetralyl)-4-hydroxy coumarin), an anticoagulant rodenticide against the house rat, *Rattus rattus*. Both no-choice and choice trials were

conducted using 0.037% concentration of rodenticide in wheat flour. In no-choice trials poison bait was offered to rats for 1,3,5,7 and 10 days, respectively. The data show that 5 days feeding of 0.0375% coumatetralyl caused 50% mortality in case of *R. rattus*. Absolute kill could be obtained only after feeding the rats 0.0375% coumatetralyl bait for 10 days in no-choice feeding. Maximum

number of rats were killed between 7-15 days. No significant difference in the intake of plain food and subsequent poison bait was observed in all the tests. However, in choice feeding, plain alternative was consumed significantly more ( $P < 0.01$ ) than the poison bait, only 50% mortality occurred in choice test with the same duration of feeding.

### Bromadiolone in household rat control in Agatti island of Lakshadweep

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In order to find the efficacy of Bromadiolone, a single dose anticoagulant against the rodents found in the households viz : *Rattus rattus* and *Mus musculus*, a trial was conducted from 10-7-82 to 20-7-82 with 0.005% Bromadiolone mixed with broken rice. This trial was conducted at Vadakku bagam in Block No. 1, situated in Agatti. 47 households were selected randomly in this locality having a specific problem of *Mus musculus*.

It was observed that in these households, the *Mus musculus* caused serious damages to food materials such as rice, chilly, coriander and also damaged clothes, paper and books.

50 g of 0.005% bromadiolone bait was placed in every household

in the evening and the next day, wherever, the bait was consumed, fresh bait was replenished. While this trial was on, the food articles in the households were left uncovered so as to assess the fresh rat nuisance, if any after baiting.

Altogether 18 *Mus musculus* and 6 *Rattus rattus* were found dead from the 3rd day to 6th day of poison baiting, the maximum rodents died on the 5th day. The results indicated that all the houses were relieved of rodent nuisance from the fourth day of poison baiting. Further, it was also found that both the species of rats preferred bromadiolone bait than the available food articles in the household.

### National rodent control campaign conducted by Save Grain Campaign, Madras

Deputy Director (S & R), Save Grain Campaign, Madras

1. There has been a decline in foodgrain production in Tamilnadu during the last 2 years due to the continued drought. It was but natural that more care was evinced by the ryots to protect whatever grains were available with them. Rodent control was therefore observed with interest and enthusiasm. As in the past, Save Grain Campaign, Madras, conducted National Rodent Control Campaign immediately after harvest in April/May 1983. The campaign was well assisted by the State Agricultural Department and the farmers involved themselves with zeal. Save Grain Campaign, Madras, provided brief training/demonstration to the beneficiaries besides inputs like rodenticides supplied free of cost.

2. While analysing the result/achievements of the programme there was a phenomenal reduction in rat damages in the areas where the regular Save Grain Campaign package of practices were adopted. Excepting a few pockets of the State where there is assured water supply and irrigational facilities, the breeding potentiality of rat remained unchanged.

3. As rodents are migratory in habit, capable of adapting to new environments, the adjoining field areas/farm houses where adequate food was available, were seen infested. This has enabled domestic rat control programme to bring about high percentage of rat mortality.

4. Rodafarin was used for the control of house rats and 2725 houses were covered during the campaign period. Nearly 20,000 live rat burrows were fumigated with aluminium phosphide pellets covering an area of nearly 1,803 acres. About 6,000 rats were assessed to be killed in the course of the rodent control operations in houses, zinc phosphide was also made use of wherever burrows were inaccessible. Rodenticides worth Rs. 5,000/- were supplied by Save Grain Campaign, Madras, free of cost to the farmers in villages, while the carrier materials were made available by the farmers.

5. It was estimated that foodgrain worth Rs. 14,37,000/- was saved from the ravages of rodents as a result of the campaign. The

percentage of house rat control ranged from 80 to 90% and field rat control from 76 to 85% in different districts.

The following are the species of rats encountered during the operation.

#### In houses

1. *Rattus rattus*
2. *Mus musculus*
3. *Bandicota indica*

#### In Fields

1. *Bandicota bengalensis*

2. *Mus booduga*
3. *Tatera indica*
4. *Rattus meltada*

6. Besides, rodenticides worth Rs. 4,200/- have been supplied by the Save Grain Campaign free of cost to the various Farmers Training Centres of the State where the "Scheme for the Promotion of Scientific Storage at Farm Level" is in vogue for conducting the National Rodent Week in the adopted villages. Results are awaited from them.

## Structure of audible sounds produced by *Tatera indica*

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Six male and six female adult Indian gerbils, *Tatera indica* (Body weight 100 g each) from a wild-caught stock were observed in cages and audible sounds made by them were recorded on a National Portable Tape Recorder (prinz sound), of 8 kHz maximum sensitivity; with the microphone suspended above the cages. The recordings were replayed into a Kay Electric Sonagraph (0.5-1600 kHz sound spectrograph) for physical analysis of sounds.

The analysis showed that

sounds produced by both sexes have the same structure. Energy is concentrated in two narrow bands; with frequencies between 4.5 to 5.0 kHz and 0.2 to 2.0 kHz. The former sounds last for 128 ms, and latter for 28 ms. Thus, a 'creak' consists of sounds of two distinct frequency ranges; and is emitted at intervals of 272 ms. Apparently the sounds produced by Indian gerbil, *T. indica*, in the audible range do not differ in structure from similar sounds made by mongolian gerbils (peaks mostly between 4 to 6 kHz).

The next issue will appear in Feb, 1984. Contributions for inclusion in the Newsletter may please be forwarded to :

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