

**NATIONAL PROGRAMME FOR RODENT PEST  
MANAGEMENT**



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**COORDINATING & MONITORING CENTRE  
CENTRAL ARID ZONE RESEARCH INSTITUTE, JODHPUR**



## All India workshop on Rodent Research and Training

The second All India Workshop on Rodent Research and Training was held at the University of Agricultural Sciences, Bangalore from August 19 to 22, 1980. It was attended by more than 100 participants from ICAR research Institutes, Agricultural and other Universities, Department of Food (Govt. of India), Directorate of Plant Protection, Central Food Technological Research Institute, Farmer's Friends Association and Pest Control industries. Following were the major topics which were discussed during the meeting—

1. Reviewing the work of each of the centres of the All India Coordinated Research Programme (AICRP).

### A. AICRP RESEARCH PROGRAMME

#### *Realignment of Technical Programme*

1. The work on bionomics and population dynamics, behaviour of rodents, bait shyness may be continued for the next three years. However, attempts may be made to streamline the parameters of observations and of other methodologies. It was recommended that the Project Coordi-

2. Demarcating areas of research of common interest at various centres under different agro-climatic conditions.
3. To undertake projects of regional importance assigned to the particular centre.
4. To highlight priority areas of rodent research.
5. Realising the technical programme keeping in view the existing infrastructure of the Institutes/Universities and the budget allocation of the ICAR plan project.

The proceedings of the workshop are being printed. The following recommendations emanated out of the scientific discussions held at the workshop :

nator may circulate the proforma so that uniformity is maintained with respect to methodology and the techniques are standardised for various experiments with a view to attain comparable results. It was emphasised that all the centres should follow these as far as possible.

### Duplication of work

2. To avoid any duplication of work, it was decided that Jodhpur centre may concentrate on predominant species like *Meriones hurrianae*, *Tatera indica*, *Rattus* spp. and *Mus musculus*, the Bangalore centre on *B. indica*, *B. bengalensis* in rice, ragi and *Sorghum* fields, *Mus* spp. and *R. miltada*, whereas, the Ludhiana centre may concentrate on *B. bengalensis* in wheat and sugarcane fields, *R. miltada* and *Mus* spp.

### Experiment on Social Engineering

3. From the deliberations of the workshop meeting, most of the experts and the group strongly felt that more emphasis be given on the work relating to social engineering activities on rodent control as this type of work has direct relation to the field oriented problems. For this, the objectives, the parameters, the methodology already standardised and used at CAZRI may be sent by the Project Coordinator to other centres in a sort of proforma so that tangible and useful results could be achieved under different agro-climatic conditions at different AICRP Centres. The group also emphasised that technical programme may be so drafted to include the threshold level to commence the rodent control operation and to work out cost benefit ratio of the techniques and the frequency of control campaign.

### Monitoring

4. It was also felt that since these centres have to cater to the needs of the region for rodent control operation, they should maintain a vigilance on the outbreak of rodent epidemics in various areas and on different crops so that timely control operations can be organised.

## B. FUTURE PLANS/SUGGESTIONS

### Apex Level Trainers' Training

5. It was desired that the Apex Level Trainers' Training pertaining to rodent control under the auspices of National Programme for Rodent Pest Management be continued every year.

### All India Seminar

6. Taking into consideration the National importance of minimising losses due to rodent pests, the group felt that a time has come to organise an all India Rodent Seminar sponsored by agencies like the Indian Council of Agricultural Research, Department of Food, Government of India, Directorate of Plant Protection and Rodentological Society of India as early as possible.

### Six more Centres of AICRP

7. Considering the rodent species diversity occurring under different cropping areas in the country, it was recommended to start six more centres under the Coordinated pro-

gramme to cover all pest species of economic importance in relation to major crops and agro-climatic zones.

### Teaching of Rodentology

8. It was recommended that the Agricultural Universities may introduce courses on Rodentology at both graduate and post-graduate levels.

### Recognition of Rodentology by ASRB/ICAR as a distinct subject

9. It was recommended that the ICAR and ASRB may be requested to recognise Zoology/Rodentology/Agricultural Zoology as an approved subject for competitive examination and also include it as a cadre-discipline in ARS.

### Railway Board

10. The Railway Board may be requested to take up rodent control

operations in the railway yards where large amounts of foodgrains are stored for transportation.

### Non-lethal techniques of Rodent Control

11. In addition to testing newer rodenticides for the control of the rodents, it was recommended that research work on certain non-lethal techniques may also be carried out.

### ZSI

12. It was recommended that Zoological Survey of India may be requested to augment its work on rodent pests by creating a Rodent Division to study the rodent species composition in various bio-climatic zones and crop types of the Country and to work out the population cycles and other related aspects of rodentology.

## Embryonic sex ratios in the Genus *Bandicota* from Bombay-Pune region

M. S. Pradhan and P. Viswanathan

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While undertaking the ecological studies of field rodents from Bombay-Pune region, an attempt was made to study the embryo indices and embryonic sex ratio in the Genus *Bandicota*. Distribution of embryos in the respective horns and their correlation with the number

of mammae on the same side was also studied as it varies in *B. bengalensis* from individual to individual.

About sixty pregnant females were caught from Bombay-Pune region by using different methods. The embryos were removed from

the horns and the sexes were recorded by studying the internal sex organs. The embryo indices were calculated using the following formula :

$$E.I. = \frac{\text{Total No. of embryos}}{\text{Total No. of pregnant females}}$$

#### Embryo index and the sex predominance in *Bandicota*

Type	No. of pregnant females	Embryo Index	Average no. of embryos in left horn	Average no. of embryos in right horn	Sex predominance
<i>B. bengalensis</i> (35)	8	5	3	female	
<i>B. indica</i> (28)	6	4	2	female	

We found that the left uterine horn bore more embryos than its counterpart. A slight predominance of females was also found among the

embryos (2:1 to 5:1). The female predominance at the embryonic level is an important factor pertaining to multiplicity of this pest.

### Feeding behaviour of Soft-furred field rat, *Rattus meltda* (Gray)

Girish Chopra and M. L. Sood

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Feeding behaviour of *Rattus meltda*, under confined conditions, was studied in order to find out most preferred bait material to be used for their successful control. The rate of consumption and defecation for the five most common cereals namely, wheat, rice, millet, sorghum and maize was studied by single-

choice and bi-choice methods. The order of preference for these cereals was also observed by single-choice and multiple choice methods. Each test was conducted for 10 days study period.

The metads consumed relatively little food material during the day

time. Although, food was constantly present, they consumed only 26.04% (single-choice) and 12.3% (bi-choice) of their total intake in either grains or calories between 7.00 to 19.00 hours. Likewise, defecation rates were lower during the day time than at night, 21.41% (single-choice) and 19.40% (bi-choice) of the faeces by weight being eliminated between 7.00 to 19.00 hours.

No linear preferential order was observed when the five cereals were presented in different choice tests. In single-choice method, the metads preferred grains in the decreasing order, wheat > millet > sorghum > rice > maize. In bi-choice method, the murids exhibited no fixed preference. Based upon totals, wheat was most preferred to all combinations.

Millet was preferred over rice and maize. Equal preferences were observed for millet and sorghum. Rice was preferred over sorghum and maize was preferred over sorghum. In multiple-choice method, the preferential order observed was millet > sorghum > rice > wheat > maize. The results clearly indicate that the metads show adaptation according to the environment i.e., they prefer one food at one time and they may prefer the other food at other time.

The five cereals were also offered in three particle sizes (whole, broken and powder) to study the texture preference. The metads sampled and ate all the textured forms of the cereals provided and a linear preferential order was observed i.e. powder > broken > whole grains.

### *Abrus precatorius* as a rodenticide

R.B. Doharey, K.K. Arora and Ranvir Pahwa  
Indian Grain Storage Institute, Hapur (U.P.)

From times immemorial the seeds of *Abrus precatorius* have been used by jewellers for weighing gold and precious stones. Its cotyledons contain poisonous substance called abrin, which is a toxic protein (toxic albumin) analogous to snake venom. This has also been used for homicidal and cattle poisoning.

The efficacy of powdered seeds was tested as rodenticide against black rat, *Rattus rattus* (Lin.). The seed powder at the concentration of 2.5% and 5% (w/w) was used in the bait. Both the concentrations yielded 75% mortality in rats within 14 days and 11 days of continuous baiting, but the remaining 25% rats did not die at both the concentrations even after one month of continuous baiting.



## Efficacy of gophacide to some commensal rodents

K. Muktha Bai

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Gophacide (O-O-bis(P-chlorophenyl)-acetimidoylphoramidothioate) is relatively a new rodenticide developed by Chemagro Corp. under licence of Farben-Fabriken Bayer AG of Germany. This highly toxic organic phosphorus like related compounds inhibits the cholinesterase activity of the blood. This compound proved to be an excellent toxicant for controlling pocket gophers when formulated

at low concentrations of 0.1 and 0.2% in the bait.

In our laboratory, when this compound was evaluated at 0.25 percent against three species of rodents, viz. *R. norvegicus* (albino), *R. rattus* (roof rat) and *M. musculus* (house mouse), under captivity using standard bait as carrier, following results were obtained.

### Efficacy of gophacide against three rodent species under captivity

Species	Av. Body weight (gms)	Av. poison bait intake/ rat (gms)	A.I. mg/ kg. b.w.	Duration of death time (hrs)	Mortality %
<i>R. norvegicus</i> (albino)	242.0	3.75	40.2	8-20	100
<i>R. rattus</i> (roof rat)	92.0	3.23	97.3	40-65	50
<i>M. musculus</i> (house mouse)	14.0	0.32	70.6	8-16	100

Though all the three species of rodents consumed the poison bait readily (Table), 100 percent kill was obtained with only albino rats and house-mice, while only 50 percent of the roof rats succumbed to it. It was of interest to observe that immediately after consuming the poison bait, no symptoms appeared till 8-10

hours and the animals remained calm. Although, both albino rats and house mice succumbed within 20 hours of ingesting the bait, roof rats took more than 40 hours. The common symptoms observed in all the species being diarrhoea, salivation, loss of body weight, laboured breathing and incoordination.

These preliminary studies conducted suggest that gophacide might be a useful rodenticide to control *R. norvegicus* and also *M. musculus*

(a difficult species to be controlled) while the response of roof rats is poor.

## Laboratory evaluation of silmurin against black rat, *Rattus rattus* (Lin.)

Ranvir Pahwa and R.B. Doharey

Indian Grain Storage Institute, Hapur (U.P.)

Silmurin (1 percent Technical), a single dose rodenticide containing cardiac glycoside (scilliroside) a steroid (6  $\beta$  acetyloxy) - 3 $\beta$ ( $\beta$ -D-glucopyranosyloxy - 8, 14 dihydroxybuta-4, 20,22 - trienolide), extracted from red squill (*Urginea maritima*) supplied by Sandoz India Limited

Bombay, was evaluated against black rats. It was tested in the laboratory at the concentrations of 5 percent 7.5 percent and 10 percent in bait which gave 66.6 percent, 100 percent and 100 percent mortality respectively.

Concentration in bait	Mortality	Average consumption by 100 gm. rat (g.)	Average ai. consumed (g.)	Average time taken for death (hrs.)
5% (a.i.0.05%)	66.6%	0.484gm.	0.00484	24.9
7.5% (a.i.0.075%)	100%	0.45gm.	0.0045	18.7
10% (a.i.0.1%)	100%	0.375gm.	0.00375	17

It was observed that female rats consumed less bait as compared to the male rats in the first two concentrations. At 5% concentration 8 rats died out of 12, while the rest 3 females and one male were alive. This indicates that female is less susceptible to this poison.

Rats died from general paralysis which started from the hind limbs.

They rolled over and over on the long axis before death. During this rolling behaviour the tail often moved in circular flailing manner. These are nerve poisoning symptoms in which excessive urination and frequent passing of faecal matter were observed. The surviving rats also suffered from paralysis but did not die even after 24 days.

## Two Limericks

S. A. Barnett, Professor of Zoology

The Australian National University, Canberra A. C. T.

An ethologist studying rats  
found nothing in favour of cat :  
from his home he expelled  
these creatures that yelled,  
because they were driving him bats.

A pathologist studying mice  
has paid an unfortunate price  
for searching for truth  
in the days of her youth :  
for her boss did not think it was nice.

## Notes and News

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