NATIONAL PROGRAMME FOR RODENT PEST MANAGEMENT

ICAR

# RODENT NEWSLETTER

Vol. 10, Nos. 1 to 4

1986

COORDINATING & MONITORING CENTRE

CENTRAL ARID ZONE RESEARCH INSTITUTE, JODHPUR

# Breeding cycle of *Rattus meltada* (Gray) in captivity

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A soft furred field rat, *Rattus meltada* (Gray) female was trapped on 25.7.81 from *Jowar* field in village Gangwa (Hisar) and observations were made on its breeding cycle in captivity in the department of Entomology, Haryana Agricultural University, Hisar during July 1981 to June, 1982. The female delivered a total of 26 ratiles in 6 litters. The number of ratiles varied fom 3 to 6 per litter (Av. 4.33). The ears and eyes of ratiles opened 3 to 4 and 10-11 days after delivery, respectively. The gestation period ranged from 20 to 21 days. It was observed that 3, 2 and 2 young ones in first, fifth and sixth litter, respectively, escaped cannibalism while rest of the newly born were killed and consumed by the lactating mother within 8 days of delivery (Table ).

Table : Litter size and incidence of cannibalism in *Rattus meltada* (Gray) when bred in captivity.

| S.No. of litter | Litter size | Date of Pairing | Date of delivery | Date of Cannibalism | Number of youngones eaten | Total number of youngones eaten/litter |
|---|---|---|---|---|---|---|
| 1st | 6 | — | 5.8.81 | 5.8.81 | 1 | 3 |
| | | | | 6.8.81 | 1 | |
| | | | | 7.8.81 | 1 | |
| 2nd | 4 | 28.8.81 | 15.10.81 | 18.10.81 | 2 | 4 |
| | | | | 22.10.81 | 1 | |
| | | | | 23.10.81 | 1 | |
| 3rd | 4 | 29.10.81 | 18.12.81 | 19.12.81 | 1 | 4 |
| | | | | 21.12.81 | 2 | |
| | | | | 22.12.81 | 4 | |
| 4th | 3 | 28.12.81 | 13.2.82 | 14.2,82 | 1 | 3 |
| | | | | 15.2.82 | 1 | |
| | | | | 18.2.82 | 1 | |
| 5th | 5 | 19.2.81 | 6.4.82 | 6.4.82 | 1 | 3 |
| | | | | 8.4.82 | 1 | |
| | | | | 10.4.82 | 1 | |
| 6th | 4 | 14.4.82 | 1.6.82 | 2.6.82 | 1 | 2 |
| | | | | 4.6.82 | 1 | |

## Assessment of rodent damage in a hybrid rice trial

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Damage to hybrid rice by field rodents was assessed during the wet season of 1983 in the Main Research Station of University of Agricultural Sciences, Bangalore. Burrow excavations in the field revealed that *Bandicota bengalensis* Gray was the major rodent species infesting the plots. Populations of this species was estimated by live burrow count. The infestation was severe, as the live burrows indicated an average of thirty eight bandicoots per acre.

The study area consisted of 36 rice plots, each of which measured one square metre. The plots were completely randomised in three replications during the early wet season of 1983. These plots were planted with seven hybrids and five check varieties of rice (Table 2), each in three replications. At the time of flowering of the entries, the rodent damage became apparent. Nearly 89% of the plots were damaged by the rats. The rats cut the tillers at about 10 cm above the ground level, and the damaged tillers were randomly scattered in the plots.

The tiller damage was significantly ($p<0.01$) more in the centre of the plot than at the periphery or middle zone (Table-1). Both the tillers of hybrid as well as of check varieties were damaged by the rodents, but to varying degree (Table-2). The Mangala variety and the hybrid V20A/IR2307-247-2-2-3 were affected to a lesser degree than the other varieties. Other entries were damaged ranging from 12.01 to 79.72% of the total tillers existing in the plot (Table 2)

Table 1 : Rice tiller damage by rats at different zones of the plot

| Zone | Number of Plots examined | % of existing tillers damaged |
|---|---|---|
| 1. Periphery (upto 1m from the field edge) | 16 | 10.92 ± 2.86 |
| 2. Middle (from 1m to 4m from field edge) | 8 | 20.59 ± 3.5 |
| 3. Centre (from 4m onwards from the field edge) | 7 | 58.99 ± 10.54 |



Table 2 : Extent of rodent damage to the rice tillers of different entries

| Entries | Rodent Damage (%) |
|---|---|
| 1. V20A/IR2307-247-2-2-3 | 6.15 |
| 2. V20A/IR9761-19-1 | 66.56 |
| 3. V20A/IR13420-6-3-1 | 12.01 |
| 4. V20A/IR13419-113-1 | 20.54 |
| 5. IR10154 23-3-3A/IR15795-232-3-3-2 | 24.86 |
| 6. KMS1/Pushpa | 37.99 |
| 7. KMS1/Intan mutant 1 | 50.35 |
| 8. Pushpa | 64.26 |
| 9. Mangala | 11.59 |
| 10. V20B | 79.72 |
| 11. Vani | 77.07 |
| 12. IR54 | 36.77 |

Three noteworthy observations can be made from the results of this study. Firstly, the rodent damage was high in the study area compared to other nearby plots. Secondly, damage to tillers by the rats occurred more in the centre of the plot than in other zones of the plot. Though the rats live in burrow made at the field edges, they get into the centre of the plot and damage the tillers. The rats eat the tender parts of the tiller after breaking them into bits. This behaviour offers the rat, some survival value and obviates the predator pressure. By entering into the centre of the plot, the rat increases its chances of not being noticed by the predators. Thirdly, this study revealed that atleast some varieties and hybrids of rice are not attacked by the rats for their depredative activities.

## Efficacy of glue trap against commensal rodent pests

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A new type of rodent trap, commonly known as sticky or glue trap designed by M/s Sankyo Shodoku Ltd. Japan were supplied by M/s Gujarat Petrosynthese Ltd. Bombay for their efficacy evaluation in various rodent habitats. The trap is made of card board (foldertype) with its inner side plastered with highly viscous glue (Polybutane). It is reported to have a shelf life of over 5 years if stored at a temperature upto 45°C.

The experiment was laid in 10 houses, where 1-3 glue traps were

set in each house in the areas of maximum rodent activity. Before setting of the glue traps, a paper was kept around the board so that dust does not reach the board through rodents feet. The same boards were set on subsequent days after removing the trapped rodents till rodents were seen in these houses. For comparison, Sherman traps were set in 3 houses (5 traps per house). The observations were recorded regularly.

The results indicated superiority of glue traps, as far as their trapability was concerned. *Rattus rattus* and *Mus musculus* were the two rodent speceies trapped on the glue boards Besides, two shrews, one lizard and several house hold insect pests were also trapped. On first day maximum rodents were trapped in all the houses and within five days the population level reached to zero. In one glue trap a maximum of six rodents were trapped in one setting, whereas in Sherman traps a maximum of one rodent was trapped in one setting. In the present study, only *R. rattus* was trapped by sherman traps though houses were infested with *R. rattus* and *M. musculus* both.

It was observed that within an hour of setting of glue board, the rodents started getting trapped. Once forelegs were glued on the board their whole body get stuck up in the process of struggling, with the result the animals get exhausted. The trapped animals were gently removed from the board and were dipped in water for killing them.

The glue traps showed an edge over other traditional traps in several respects, viz.,

(a) One glue trap can trap more number of rodents in one setting.

(b) Though these are made as disposal type traps, but same trap can be used for subsequent days after removing the trapped animals.

(c) Being very handy (folder type) it can be placed at any site, where other conventional traps can not be set.

(d) The glue is non-poisonous material, hence it is very safe for use in houses.

The preliminary observations have a estblished the high potentialities of glue traps for safe management of commensal rodents in house, stores, godowns, hospitals and hotels.

## Response of *Rattus rattus* and *Mus musculus* to some plant extract

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Plant extracts of *Datura stramonium*, *Lantana camara* var, *aculeata* and *Ageratum houstonianum* were prepared by mascerating the leaves. Plant juice was concentrated in sun shine and sweet pellets were made by adding wheat flour and a little bit of sugar. These pellets were fed to *R. rattus* and *M. musculus*.

*Datura* and *Lantana* sp. were not found effective but it was observed that the animals fed on *Ageratum* extracts became aggressive within 5 minutes after feeding and started running inside the cages. It was also observed that *R. rattus* started taking water after every 20-30 seconds and 50 per cent of the animals died within 24 hrs. Some degree of cannibalism was also observed in these animals. In *M. musculus* no mortality was observed.

## Acceptance of dry baits by common mice of North Malabar

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The house mouse, *Mus musculus urbanus* the little field mouse, *M. b. booduga* and the long tailed tree mouse, *Vandeleuria oleracea* are very common in North Malabar area. Of them, the house mouse is a common household pest, whereas the field mouse predominates the rodent fauna on the ground level in the coconut and cocoa plantation, followed by tree mouse which inhabits the branches.

Studies on the acceptance of dry baits by these rodents were conducted under caged conditions by offering three cereals (rice, wheat and finger millet) and three pulses (Bengal gram, green gram and cowpea) in multiple choice test. The baits were offered in three different textures (Whole grains, cracked grains and powders ) and also by mixing with oils, sugar, and salt, etc.

Studies revealed that cracked forms of rice and wheat were preferred most by the house mouse and the field mouse, respectively. Further, they preferred plain baits to oily and sweetened ones. On the contrary, the tree mouse significantly preferred rice in its cracked form.

## Effect of prebaiting on the efficacy of zinc phosphide bait against field rodents.

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Role of prebaiting done for different durations on the efficicacy of zinc phosphide bait against field rodents was investigated during January-February, 1986, at the Regional Research Station, Bawal (Haryana) in a pomegranate orchard of one hectare area. All the burrows were

plugged with soil. Next morning, 174 live burrows were observed, of which 71, 52 and 51 burrows were treated with 2.5 per cent zinc phosphide bait preceded by: (i) no prebaiting, (ii) one day prebaiting (iii) two days prebaiting respectively. Pearl-millet grains smeared with 3 per cent mustard oil were used as bait carrier. About 10g bait material was kept in loose paper packets 2-3 cm inside each burrow.

Based on observations recorded both on 3 and 6 days after poison baiting mortality of 80.2 per cent was achieved in the treatment which involved no - prebaiting as against 100 per cent when prebaiting was done either for one or two days. Results clearly reveal the imporance and necessity of "prebaiting component" even for one day for effective rodent control, The species composition was Indian desert gerbil, *Meriones hurrianae* (Jerdon) > Indian gerbil, *Tatera indica* (Hardwicke) > and *Mus spp.*

## Control of Bandicoots in Tomato Field by Aluminium phosphide

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In the rabi of 1986, the lesser Bandicoot, *Bandicota bengalensis* (Gray) was found in higher density attacking the tomato field at the village Belkhadu of Jabalpur. The rodent activities were noticed only from the fruiting stage of the crop. It was further noted that the bandicoots were attracted towards fruits of bigger size and preferred unripe fruits as compared to ripe ones.

No burrows were found in the field of 3ha. during transplantation, however 8 live burrows were made till the vegetative growth stage, but, with the maturity of the crop, the number reached 147 probably due to migration from the adjacent sugarcane fields. As high as 10.56 kg of hoarded unripe tomatoes were collected from a single burrow, with an average of 06.9 kg/burrow. All the burrows were then fumigated with Aluminium phosphide tablets (3 g), first application resulted into 64.6 per cent control. However, immediate second application fetched 100 per cent control.



## Field evaluation of Bromadiolone against Bandicoot, *Bandicota bengalensis*

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Four bait materials viz., whole wheat grain, crushed wheat grain, wheat flour and cake prepared in 0.005% cocentration from Bromadiolone, a single dose anticoagulant rodenticide have been evaluated in an extensive area against the bandicoot, *Bandicota bengalensis* at National Sugar Institute farm, Kalyanpur, Kanpur (U.P.). The roose bait materials were packed in small polythene packets and applied in live burrows @ 20-30 g and ready to use bait material @ 11 g (wt. of one cake) in each burrow.

The experimental area was kept under strict observation to note the number of active burrows for 12 days with three days interval commencing from third day after treatment. The per cent control success was based on the live burrow count method.

Table : Bioefficacy of 0.005% Bromadiolone against *B. bengalensis*

| Posion bait | Pre-treatment burrow count | Per cent control success | | | |
|---|---|---|---|---|---|
| | | 3 days after treatment. | 6 days after treatment. | 9 days after treatment. | 12 days after treatment. |
| In whole wheat grain | 250 | 52.8 | 67.6 | 95.6 | 98.4 |
| In crushed wheat grain | 250 | 56.4 | 62.8 | 87.2 | 97.6 |
| In wheat flour | 250 | 51.2 | 60.4 | 83.2 | 93.2 |
| Cakes-ready to use bait material | 250 | 59.6 | 70.0 | 92.4 | 96 4 |

It is evident from table that the control success varied at different intervals of observation. The data recorded from 3rd to 12th days after treatments have given successive increase in control per centage. It was minimum on 3rd day and maximum on 12th day in all the four bait materials. Thus, bromadiolone in 0.005% concentration has given promising results and registered more than 93 per cent control of bandicoots under field conditions in 12th days after treatment, irrespective of the bait materials used.

## Evaluation of some rodenticides in coconut orchard

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Rodent is one of the major pest, causing considerable damage to coconut at different stages like, nursery, tendernut and storage. The species involved were identified as *Rattus rattus* and *Vandeleuria* sp. Day by day considerable area under cocount cultivation is increasing in Gujarat and henee effectiveness of four rodenticides was tested in coconut fields.

Thirty palms per hactare were used for each treatment. Zinc phosphide (2% on groundnut seeds) with two days prebaiting; warfarin and fumarin wax cake (0.25% concentration) and bromadiolone (0.005% conc. in wax cake). In case of zinc phosphide (50 g/palm in coconut shell) and Bromadiolone (30-40 g/palm) the bait was replaced where it was completely consumed, whereas, for warfarin and fumarin (100-125 g wax cake/palm) the replenishment continued till wholly consumed. Observations were recorded on nut damage for 15 days both for pre and post-treatment period.

Results evidently revealed that bromadiolone reduced nut loss by 88.2% followed by warfarin (82.5%), Zinc phosphide (81.5%), fumarin (80.3%) (Table ).

Table. Comparative efficacy of rodenticides in coconut field

| Treatments. | Nut damaged from 30 palm/ha | | % of | % success |
|---|---|---|---|---|
| | 15 days before application. | 15 days after application. | reduction in nut damage. | over control. |
| 1. Fumarin 0.025% wax cakes (Ratokilbar 0.025% wax cakes) | 163 | 29 | 82.2 | 80.3 |
| 2. Warfarin 0.025% wax cakes (Rodafarin-R 0.025% wax cakes) | 154 | 24 | 84.4 | 82.5 |
| 3. Bromadiolone 0.005% wax cakes. (Bromadiolone 0.005% wax cakes) | 172 | 17 | 90.1 | 88.2 |
| 4. 2% Zinc phosphide poison bait in groundnut seeds | 187 | 31 | 83.4 | 81.5 |
| 5. Control. | 160 | 157 | 1.88 | — |



## No tes and News

### Apex Level Training on Rodent Control - 1986

The XIth Apex Level Training was organised under the aegies of National Programme on Rodent Management at CAZRI, Jodhpur from 29th April - 1st May 1986. Twenty personnels of the states departments of agriculture & Forests from Rajasthan, Haryana and Maharastra, Union Territories of Dadra Nagar & Haveli, Central government organisations (Railway, and Anti Locust) and Universitis (M. S. University Udaipur, Jodhpur University, P. K. V., Akola) participated in this three day training programme. The efforts were made to impart pratical knowledge through theory lectures, practical demonstrations in laboratory as well as at farmers field and Film shows on rodent control. A booklet on "Practical guide to rodent Management" was also provided to the particiants as reference material.

The Training Programme was inaugurated by Dr. K. A. Shankarnarayan Director, CAZRI on 29th April 1986 and the valedictory address was given by Air Vice Marshal Shri P. K. Jain on 1st May 1986.

Contributions for inclusion in the Newsletter may please be forwarded to :
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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.