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Coconut losses due to rodents in Krishna District, Andhra Pradesh

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While undertaking field screening trials of Bromadiolone in Dakaram village, observations were also made on the losses caused due to rodents in coconut plantations in Mandavalli block of Krishna District, Andhra Pradesh. Coconut trees are planted on the canal bunds in this area. The trees belong to TxD hybrid variety that can give an yield of 100 nuts/palm/year. Farmers reported an average loss of 5 nuts/tree/year. Hence data on the number of affected trees by rodents,

number of bunches/tree, number of total nuts/bunch, number of damaged nuts per bunch, sizes of damaged nuts were collected from randomly selected 30 coconut trees in a belt of 400 trees.

The nuts were found damaged at the bases. Only forty per cent of the trees examined showed nut losses by rodents implying that all the trees will not have the nut losses caused by the rodents. However, the damage is more on the affected trees. Each tree was found to have 4.66

Table 1. Rodent damage to coconut trees.

1. Total number of coconut trees examined	: 30	
2. Number of trees with rodent damage	: 12	% loss per
3. Percentage of effected coconut trees	: 40	tree : 14.67
4. Number of bunches/tree	: 4.66 ± 1.03	
5. Number of damaged bunches/tree	: 1.00 ± 0.01	
6. Number of coconuts/bunch	: 22.66 ± 9.82	
7. Total number of nuts/tree	: 105.59	
8. Number of damaged nuts/bunch	: 15.5 ± 7.71	
9. Total number of damaged nuts/tree	: 15.5 (columns 4x5x8)	

bunches at the observation period. It is of interest to note that the rodents make damage to the nuts of only one bunch and leave the other bunches intact. When most of the nuts were damaged in one bunch, then only damage is extended to other branches.

The present data (Table 1) indicate that rodents take 15.5 nuts/tree and the loss will be coming to

Rs. 15.50 per tree at the rate of Rs. 1/- per coconut. The nuts at sizes 15 x 7 cm were found to be damaged more ($P < 0.01$) than other sizes, probably due to the tenderness and sweetishness of the nut at that size. The rodent species responsible for this loss was found to be *Rattus rattus* only. Squirrel damage was not observed.

Role of scent marking in social organisation of *Meriones hurrianae*

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Scent marking by certain rodents through the odour of their ventral gland has been attributed a

number of functions. In our earlier work, it was reported that scent marking by male as well as female

Table 1. Behavioural acts in similar and opposite sex encounters in *M. hurrianae*.

Behaviour patterns	Total acts in encounters				
	♀ : ♀	♂ : ♂	Total	♂ : ♀	
Olfactory communication					
Ventral marking	4	30***	124	86	38***
Urination	—	12	12	7	17*
Defecation	—	3	27	13	14
Exploratory behaviour					
Sniffing	157	48***	477	186	288***
Naso-nasal approach	76	47***	55	40	15***
Naso-anal approach	36	58**	53	40	13***

χ^2 test — * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$

Meriones hurrianae may have a role in maintaining the social organization among them. To confirm this observation, desert gerbils were maintained in large laboratory cages in groups of 3 (males, females and bisexual). After acclimatisation in the cage, observations were made on their behaviour patterns for 15 minutes at the time of their maximum activity period. Experiments were repeated on three groups of each category.

Results (Table 1) indicate that the scent marking is relatively at the lowest in the female groups increases in male groups, and is further enhanced in the mixed group. Similar observations were recorded in respect

of the frequency of urination and defecation which are also considered to be important in scent marking by rodents.

The enhanced scent marking activity in the bisexual groups may indicate a territorial occupancy and establishment of dominance hierarchy in the social group which were apparently absent in all male and all-female groups. Likewise, the increase in the acts pertaining to exploratory behaviour could be to perceive the scent markings by individuals in the bisexual group. The increased marking behaviour of *M. hurrianae* signifies the role of sebum as well as urine odours in the social organisation of this species.

Albinism in the Lesser Bandicoot Rat, *Bandicota Bengalensis*

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During our studies on the reproductive biology of wild rodents, in one of the recent collections, an albino type of the Indian mole rat, *B. bengalensis*, was collected twice along with the commonly occurring wild *B. bengalensis*. In the first instance, a male *B. bengalensis* (160 g) was trapped from Nagli and in the second trap, it was a female (120 g) from Mulbagal - Kolar district. They exhibited much dif-

ference in their body colour; male with a patch of white colouration on either side and on the belly and the female was completely white coloured. The trapped albino form *B. bengalensis*, resembles exactly the common wild variety in all the external characters.

Further an attempt to cross and to breed them in the laboratory, is under observation.

Pregnant female lesser *Bandicoot* - feeding requirement

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General observations revealed that pregnant females need more food during breeding season to feed the foetus and young ones. An experiment with one normal and the other pregnant female caged separately in animal breeding cages (52.5 cm x 40 cm x 32.5 cm) without soil was carried out with a view to ascertain the feeding requirements of a pregnant female lesser *Bandicoot* *Bandicota bengalensis bengalensis* Gray in captivity. Each female rat was provided with 30 g soaked

gram daily for a period of 30 days. Unconsumed gram was collected and weighed before giving fresh food the next day. Each cage was provided with some grass for nesting in absence of the soil. A litter consisting of 5 youngones was produced by the pregnant female. Average daily consumption of food by both normal and pregnant female rats was calculated at the expiry of the experiment which came to about 19.53 g and 28.45 g in normal and pregnant female rats respectively.

Laboratory evaluation of Silmurin against the Indian field mouse, *Mus booduga* Gray

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The toxicity of Silmurin (1% technical) an acute rodenticide containing scilliroside as active ingredient [(6 β acetyloxy)- β (β -D-glu-

copyranosyloxy - 8, 14 - dihydroxy buta-4, 20, 22-trienolide)] extracted from red squill was evaluated against the Indian field mouse, *Mus booduga*

Concentration in bait	Mortality %	Average consumption (g/100g wt)	average a.i consumed	Average time taken for death
0.1% (0.001% a.i)	60	8.154	0.00163	48 h
0.2% (0.002% a.i)	100	7.173	0.00142	24.5 h

Gray. A preliminary shyness test conducted gave negative result. Laboratory tests with two concentrations (0.1 and 0.2%) of poison mixed with preferred bait (Rice flour + sugar + oil) gave 60 and 100 per cent mortality respectively.

Mice poisoned with silmurin

showed characteristic symptoms a few hours before death. There were irregular and rapid breath and symptoms of paralysis. The limbs were extended, back hunched and tail stiffened over body onto head. The urine was frequently passed and the color of urine was deep yellow.

Efficacy of super caid (Bromadiolone) against various rodent species

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Poison trials were conducted in the laboratory using anticoagulant, Bromadiolone. Data presented in the table 1 indicate a single exposure of poison bait (super caid, 0.005%) resulted into 100% mortality of *Rattus meltda* and *Mus platythrix*, 60% mortality of *Bandicota bengalensis* and a 85% kill of *Rattus rattus*

(Table 1). Time of death varied from 2 to 15 days.

Two day poisoning, using 0.005% concentration of Bromadiolone baits, revealed 100% mortality in *Rattus rattus* and 90% kill of *Bandicota bengalensis*. Time of death varied from 5 to 23 days.

Table 1. Efficacy of Bromadiolone against rodent species

Species	Feeding period (days)	% mortality	Average poison ingested (mg/kg)	Average days to death Mean (range)
<i>Rattus meltda</i>	1	100	5.8	6.4 (5-8)
<i>Mus platythrix</i>	1	100	1.1	5.8 (3-7)
<i>Bandicota bengalensis</i>	1	60	4.7	5.3 (4-7)
	2	90	7.0	11.0 (6-23)
<i>Rattus rattus</i> (from poultry farms)	1	85	3.5	5.8 (2-15)
	2	100	6.7	7.4 (5-11)

Toxicity of difenacoum to *Rattus rattus rufescens*

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Central Arid Zone Research Institute, Jodhpur

An anticoagulant rodenticide difenacoum (3-(3-p-diphenyl-1, 2, 3, 4-tetrahydronaph-1-yl)-4-hydroxycoumarin of sorex (London) Ltd., U.K. was evaluated against the house rat, *Rattus rattus rufescens* Gray in the laboratory. The rats were collected from houses and godowns and were caged individually for three weeks before initiating the experiment. Two sets of twelve *R. rattus* each were provided with 0.005% difenacoum treated pearl millet (*Pennisetum typhoides*) grains for 2 days and unrestricted feeding till death on no-choice basis. Water was available *ad libitum*. Maximum intake of bait was on day 2 which gradually decreased and on day 10 consumption was only 40 per cent of the initial level. No animal succumbed to death in 2 days trial (Table 1) whereas all died in unrestricted feeding. The sex difference in the mortality was not significant. The combined sex mortality data reveal that deaths started from 8th day and lasted up to 20th, average day to death was 15.1. Mean bait consumption by dead rodents during unrestricted feeding was 99.2 ± 6.5 g ranging between 53 to 131 g. Average lethal dose required to kill *R. rattus* was found to be 46.72 mg/kg the range being 32.92 to 69.84 mg/kg (Table 1).

Table 1. Mortality in *R. rattus* feeding on 0.005% difenacoum treated pearl millet

Feeding period (days)	Average body weight (g)	Anticoagulant (mg/kg); Mean (range)	consumed \pm S.E.	Mortality	Days to death mean (range)
		Died	Survived		
2	120	—	6.31 ± 0.82	0/12	—
Unrestricted	108	46.7 ± 3.1 (32.9—69.8)	(4.3—9.5)	12/12	15.1 (8—20)

National rodent control week in Tamilnadu

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The Save Grain Campaign Regional Office, Madras and National Social Service Organisations attached to the Agricultural College (Annamalai University) in collaboration with State functionaries organised a National Rodent Control Week during March 1982 immediately after harvest in different districts of Tamilnadu and Pondicherry Union Territory.

As a special feature it was observed that in view of the continued drought situations in the districts of Chengalpattu and North Arcot, the breeding potentiality of rats was apparently less and the crops suffered less damages or below-normal damages. However in other districts due to good crops and availability of food material the rat population was found to be on the increase resulting in heavy damages both in the field and in storage.

Adequate publicity was given through Press, All India Radio and personal contacts and the campaign was run on war footing by engaging Save Grain Campaign trainees available in the villages and was made as a 'Peoples Project'.

Six villages and their surrounding

hamlets were covered under intensive rat control campaigns in the houses as well as in fields. In as many as 2503 farmers' houses demonstrations for control of rats using chronic poison viz., Rodafarin 'C' was given. As a result, 9340 rats were found dead. During the course of field demonstrations conducted in the fields as many as 17,421 rat burrows were fumigated with Aluminium Phosphide pellets and 2965 acres treated with Zinc Phosphide by way of tarpedo baiting.

Rodenticides worth Rs. 4876/- were supplied free of cost to the farmers for the campaign and as a result of intensive operations, food-grains worth Rs. 56,040/- and Rs. 13,06,575/- were saved through house and field rat controls respectively. The percentage of control observed in different districts is 85-90 in houses and 90 in the fields.

The species of rodents found prevalent during the course of operations are :

Bandicota bengalensis, *B. indica*, *Rattus rattus*, *Mus booduga*, *Mus musculus*, *Tatera indica* and *Rattus meltada*.

Rodent Pest management in Kolhapur region of Maharashtra State

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In Kolhapur region, the problem of rodent menace to sugarcane crop in Kharif season (June-October) and wheat crop in rabi season (January-February) is very serious, with a view to save these crops and household articles from rat damage the Department of Entomology, Mahatma Phule Agricultural University, Kolhapur, launched rat control campaigns during 1974 to 1977 in the Kolhapur, Satara and Sangli District of Maharashtra State.

Before launching the campaigns, a team of technical personnel

visited the selected villages and meetings organised to convince the farmers about the need of rat control. The demonstrations about the technique and precautions to be followed pre, post and during operational periods of rat control campaigns were arranged to train the farmers. The students from National Service Scheme (N.S.S.) of Agriculture College, Kolhapur and the Village youths of the respective villages actively participated in the campaigns.

marked with lime solution. On the second day the marked places were surveyed and the burrows which were found open were considered as live burrows. After ascertaining the live burrows, pre-baiting operation was carried out with broken sorghum grains mixed with groundnut oil for next two days @ 20 g/ burrow. On the fourth day, 2% poison baits of Zinc phosphide were placed in the burrows by a long bamboo stick @10 g/ burrow. The openings of the rat burrows were closed with loose wet soil. On the fifth day the dead rats were collected and buried deep in the soil. The farmers were advised to repeat the campaign on the same lines fifteen days after the first campaign is over

Rat control campaign in Houses

In houses, prebaiting operation was carried out for two days with

baits prepared by mixing groundnut oil in wheat flour with little quantity of water. Ten fresh baits were placed every night in each house on the path ways of the rats. The poison baits were prepared by mixing one part of Zinc phosphide in fifty parts of wheat flour with little quantity of water and groundnut oil. Small pills of equal size were prepared and poison baiting operation was carried out on the next day. Next morning the dead rats and uneaten pills were collected and buried.

From the operational observations it was noticed that to get rid of the rodent menace on a very large scale the cost factor is not a hinderance but only the active co operation and the vigilance of the villagers is a must.

Table 1. The details of rodent control Campaigns

Villages operated	District	Period of Operation	Area teated in ha	Rats killed
Nerli	Kolhapur	5 day, June 1974	20	2000
Shiye	Kolhapur	5 day, Feb. 1975	26	970
Malewadi	Sangli	5 day, June 1975	48	5000
Bharatgaon-wadi	Satara	9 day, June 1976	18 102 houses	1000 975
Donawade	Kolhapur	5 day, October 1977	12	300

(i) Average number of live burrow—50/ha (ii) Average number of rats per house—9 (iii) Cost of Operation—Rs. 1/house and Rs. 5 / ha (approx.)

Rodent Control Campaigns in Field

The fields where the campaigns were organised were surveyed on

the first day. All the openings of rat burrows on the bunds or in the fields were closed with wet soil and

Notes and News

Dr. P. K. Ghosh has taken over the charge of Coordinator of the All India Coordinated Research Programme on Rodent Control from 11th March, 1982, at its Coordinating Centre, CAZRI, Jodhpur.

In the Sixth Five Year Plan, ICAR has further strengthened the All India Coordinated Research Programme by creating four more centres to this project viz, Indian Institute of Sugarcane Research, Lucknow; ICAR Research Complex

for Northeastern Hill Region, Shillong; Jawaharlal Nehru Krishi Vishwa Vidhyalaya, Jabalpur and Andhra Pradesh Agricultural University, Hyderabad.

Dr. Ranjan Advani has been promoted to the post of Scientist S-2 (Rodent Ecologist) in AICRP on Rodent Control at its Centre functioning at Central Plantation Crops Research Institute, Kasaragod.

The next issue will appear in Nov., 1982 Contributions for inclusion in the Newsletter may please be forwarded to :

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