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Hoarding losses by *Bandicota bengalensis* in wheat field

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An attempt was made to estimate the hoarding losses caused by the lesser Bandicoot rat, *Bandicota bengalensis* in harvested wheat fields of the University at Hisar during April, 1984. Number of burrow systems per acre; number of storage chambers per burrow system; amount of food stored per chamber and number of occupants and their sex per burrow system were examined. The investigation involved the excavation of 32 live burrows in 7 fields of one acre each.

Excavation of 19 burrows recovered 7780g. of wheat grains hoarded in 65 storage chambers alongwith 69 rodents. Among 13 burrows, though 30 rodents and 25 storage chambers were recorded but did not yield any wheat grains while eaten up wheat ears were present. The examined burrows yielded (Av. in parentheses) 0-1345g. (389g.) of wheat grains, 0-7 (2.8) storage chambers and 1-11 (3.09) occupants. Thus, 285-3065 g. (1297g) of wheat grains hoarded by 1-31 (14.14) rodents in 1-11 (4.71) burrow system were found in each acre. The sex ratio of rodents was 1:1.18 as male and female, respectively.

Scent marking behaviour and role of chemical signals in voles life

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The present studies were conducted on five species of voles viz., *Microtus arvalis*, *M. socialis*, *M. guentheri schidlouskii*, *M. nivalis* and *Arvicola terrestris*. The former three species have very complex underground burrow system and track on the surface. *M. nivalis* lives in stony habitat and *A. terrestris* is aquatic and terrestrial. The studies were carried out in laboratory in boxes of 5.7 x 24.5 sq. m. with nesting houses, sand places, feeding and drinking jars, and in aquarium for *A. terrestris*. Each group included different number of animals with definite sex and age ratio and origin. The experiment was run for

560 to 2950 days.

M. arvalis, M. socialis, M. guentheri started marking their territory as soon as they were placed in the experimental boxes. They cleaned the tracks between the houses and feeding and drinking places. Dominant males marked all the tracks and the chemical signals were deposited. For exmpales, if some obstruction is erected on the unmarked tracks, the animals go around, whereas if the obstruction is erected on the marked tracks it is downed by their head. Dominant males not only mark the tracks but also the houses, females, other males and pups.

M. nivalis exhibited a very simple social structure as evidenced from their simple marking habits. They do not have special track houses and so marking is not observed very often.

A. terrestris proved to be a very aggressive species, because after establishing the territory and marking of the borders, the fighting with other animals started taking place near aquarium.

Interestingly, the sub dominant animals in all the species avoided touching the tracks and moved on high legs. Their scent marking glands were poorly developed.

Thus, the present investigation proves varied systems of chemical communication depending upon their social structure and biotopes inhabited by them, which in favourable conditions provide them extra and intra population structure.

Tendency of Cannibalism in the Longtailed Tree Mouse *Vandeleuria oleracea* (Bennett)

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During the third week of September 1984, while I was collecting abnormal nests of *baya, Ploceus Philippinus* (Linn.) at Tatar Pur (17 degree 47' N: 76 degree 31 'E) in Alwar District of Rajasthan State, I came across a fully built nest of same species occupied by a female Long-Tailed Tree-mouse, *Vandeleuria oleracea* with her six youngs. I collected this nest from a *Prosopis cineraria* tree standing at the fringe of plantation area.

To study the rearing activities of tree mouse I suspended the same *baya* nest with female tree mouse and six youngs on a small *Acacia tortilis* tree in my *Eucalyptus* nursery. To watch the activities of mouse family I made an incision with scissors in the egg chamber of the *baya* nest. I used to provide grains like bajra, wheat, etc., and pieces of wheat chapati through the slit to feed the female tree mouse.

The eyes of the six young were still closed and their skin was completely hairless. Their mother was rather very shy and I could not see it coming out-side.

First two days everything was OK But perhaps she did not take any food. On third day morning at 08 00 hrs when I examined the nest, the mouse family was well. But when I again examined the nest on same day at 14 00 hrs. the female was not alive. I opened the nest with scissors I came to surprise that out of six only one young was alive. Remaining all five were partially eaten by their mother itself. Again it was a thing of surprise that all five were eaten towards tail end. I carefully observed the casualties, except one, all four were without tails. It means that their tails were eaten by their mother along with some hind portion of body.

Then I examined the infanticide mother. There was an approximately 4 mm long incision near her left foreleg. There was some bleeding also. Perhaps that cut was made by some sharp grass strip edge, as grass strips are used by bayas for nest building. Perhaps that injury made her so cruel towards her own babies. This appears to be first record of cannibalism in *V. oleracea* in natural environment.

Evaluation of Non-poiosnous sticky rat traps under field condition

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The non-poisonous sticky rat traps manufactured by M/s Sankyo Shodoku Co Ltd. Japan and supplied to this field station by M/s Gujrat Petro Synthese Ltd. Bombay were tested in the rural houses of Madnapally village which is about 20 kms from the field station. This village has 20 houses. The population of the house rat (*Rattus rattus*) was estimated by catch mark release and recatch method. During the estimation of house rats population the movement of house mice (*Mus mus-*

culus) was also noticed. The population of house mouse could not be estimated due to its small size, as it escaped in between the gap of two wires of the cage.

After estimating the population of house rats, one sticky rat trap was placed in each house. The trap was placed on waste paper and it was kept in position with stones. The observations for the trapped animals were recorded daily upto 7 days. Table-1.

Table 1. Animals trapped from 20 houses by sticky traps.

Animal	Total no. of animals trapped/day							Total	Trapped/ mortality %
	1	2	3	4	5	6	7		
R. rattus	17	18	16	18	2	5	1	67	69.4
M. musculus	13	17	15	12	9	5	—	71	Not estimated
Lizard	1	—	—	2	—	—	—	3	,,
Chameleon	—	1	—	—	—	—	—	1	,,

It is evident from the Table-1 that 69.4% house rats of the village were trapped and killed. The maximum number of rodents were trapped on 2nd day. Incidently, 3 lizards and 1 chameleon were also trapped, which were removed and buried.

It is also observed that 9 house rats and 21 house mice were trapped by one trap during 7 days duration. The maximum house rats and house mice trapped by one trap in one day were 3 and 8 respectively. In all 67 *R. rattus* and 71 *M. musculus* were trapped in a week which proved that house mice which are difficult to trap by other traps, can successfully be trapped by this trap. It was seen that rats escaped from the trap after 4th day. This may be due to loss of stickyness with time due to regular use.

The sticky traps are found to be effective for domestic rodents where there were limitations to use chemical control. The economical viability of the traps also to be considered before undertaking the popularisation of such methods. The trapped rats should be inspected regularly so that the traps can be reused after removing the trapped rats. Moreover the removal of the rats from the traps appears to be very crude, therefore it is better if some sophistication is introduced for the same.

Efficacy of Non-poisonous sticky traps for rodent control

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With a view to find out an effective control of rodents non-poisonous sticky traps in houses were tested in village Akrauli, near Hapur. These non-poisonous sticky traps were designed and developed by M/s. Sankyo Sodoku Ltd., Japan, and supplied by M/s Gujarat Petrosynthese Ltd. Bombay for their efficacy in various rodent habitats.

Seventy five sticky traps were placed on floor in 28 houses. These traps were placed on the newspapers in such a way that the rodents before reaching the traps will travel through newspapers and thus dust carried by them will be removed. In the houses with more than 5, 3-5 and 1-2 rooms, 3-4, 2 and 1 sticky traps were set, respectively on first day.

Before starting the trial, rodent population was also estimated by catch, mark and release method and thus 5 *Rattus rattus* and *Mus musculus* were recorded. Total 178 rats, 10 lizards and a number of flies were trapped by these traps in one week period. It was further observed that 6-8 *Rattus rattus* and *Mus musculus* were trapped in one operation and the animals coming in contact of glue could not escape and remained stuck with glue. Thus, sticky traps proved quite effective against commensal rodents.

Field evaluation of bromadiolone against rodent pests of paddy in Manipur

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Paddy is the major crop of Manipur in the valley as well as in the hill area. In the Wet Rice Cultivation (WRC) rodents in general, is not a big problem so far. However, in the recent years, the presence of Indian mole rat, *Bandicota bengalensis* was noticed

in and around Imphal town. A survey during 1984 and subsequent observations indicated that these bandicoots are building up their population in the State owned Mantri-pukhri farm, adjoining paddy fields, in the homesteads of Imphal and along the embankment of Impha river. Their presence in the paddy fields is considered to be an alarming situation, since without facing any competition and availability of plenty of food and shelter, these fast breeding, ferocious rodents can occupy entire valley within a very short period.

To combat the problem of *Bandicota bengalensis* in WRC, we have evaluated a single dose anticoagulant rodenticide bromadiolone in three paddy fields of 3-5 acres each, near Laipham Khunou, Imphal. The fields were heavily infested 25–30 burrows per acre by bandicoots. The trials were conducted during November 1984, at that time the fields were dry and burrows could be easily located in the fields. The damage caused by them was heavy and atleast half of the crop in certain plots were devastated by them.

In two of the three fields, 0.005% bromadiolone loose bait was placed at the rate of about 30 grams per live burrow. The bait was prepared by mixing bromadiolone 0.25% concentrate with cracked rice at 1:49 ratio to form 0.005% bromadiolone bait. Bait was wrapped in a paper before placing inside the burrows.

In the remaining field bromadiolone cakes (0.005% bromadiolone ready to use bait embedded in paraffin wax) was placed at the rate of 30 grams per burrow.

Two days after placement of poison baits, the bandicoots started succumbing to bromadiolone poisoning. Few dead rodents were recovered upto two weeks after bait placement. Entire area was having a foul smell of dead rodents which indicated that many more bandicoots must have died in their burrows.

Further, no damage was noticed from these crop fields, indicating that the control operation was quite successful. It was intersting to note that though a number of stray dogs and other animals were roaming around the area, there was no case of non-target or secondary poisoning in the treated crop fields.

Efficacy of cholecalciferol (Vitamin D_3) against house rat *(Rattus rattus)*

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The efficacy of 0.075% cholecalciferol (Vitamin D_3) was evaluated in the laboratory against house rat (*Rattus rattus.*) The rats were trapped from the near by village (Kismatpura) and kept on plain bait in the laboratory for one week to acclimatize them. There after, 10 rats each for 24 hours and 48 hours were kept on poison baiting and plain baiting (Control) in wonder cages separately. The body weight of each rat was also recorded before placing in cages.

Only 30% and 60% respective mortality within 5—12 and 4—12 days period was obtained in one and two days no choice baiting (Table 1). It is also clear from the table that there is no bait shyness in house rats against the poison as they consumed 10.3g and 8.5g poison bait per 100g, body weight per day during one and two days respectively in comparison to 7.9 g plain bait/ 100 g body weight per day. It is concluded that one day and two days feeding periods were not effective for the control of house rats. Thereforc, it is suggested that either poison baiting period or poison concentration percentage be increased.

Table 1 : Efficacy of cholecalciferol 0.075%) against house rat in no choice

Feeding period (day)	Bait consumption g/100 g. rat/day	Poison consumed (mg/kg)	Mortality (%)	Av. days to death	
				Mean	Range
1	10.26	76.95	30.0	9.7	5-12
2	8.5	127.72	60.0	7.3	4-12
16 (Control)	7.90	—	—	—	—

Efficacy of brodifacoum against house rat, *Rattus rattus* Linn.

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Efficacy of brodifacoum (0.25% liquid formulation) was evaluated in the laboratory against house rat *Rattus rattus* at 0.005% concentration. The rats caged individually were kept on normal food before offering of poison bait. The dry poison bait containing 0.005% active ingredient was offered to rats for 1, 2 & 3 days in 'no-choice' feeding test and 3 days in 'choice' feeding test.

Table : Efficacy of brodifacoum against house rat, *Rattus rattus* at 0.005% concentration.

Type of feeding	Feeding period (days)	Average weight of rats (gm)	Mortality (%)	Average poison ingested (mg/kg)	Average days to death Mean (range)
No-choice	1	107.0	100	6.074	8.4(4-16)
-do-	2	105.2	100	12.053	5.6(5-7)
-do-	3	106.2	100	15.960	6.2(3-10)
Choice	3	112.4	100	9.839	8.4(4-15)

It is apparent from the results (Table) that even 1 day no-choice feeding yielded cent percent kill in the house rat. Average days to death was also noted to be same in 1 day 'no-choice feeding' and 3 days 'choice feeding' (8.4 days). Average days to death was considerably reduced in 2 and 3 days of exposure (5.6-6.2 days).

The results thus indicated that brodifacoum is very potent anticoagulant and requires very short peried of exposure.

NOTES AND NEWS

1. Shri M. Balasubramanyam, Senior Research Fellow, Deptt. of Zoology, Sri Venkateshwara, University, Tirupati was awarded Ph.D. degree (May, 1987) for his thesis entitled "Studies on the potency of warfarin and super-warfarin compounds (rodenticides) for the control of the Indian Field mouse, *Mus booduga* Gray" from Sri Venkateshwara University, Tirupati.
2. The fifth workshop of AICRP on Rodent Control was held at ICAR Research Complex for NEH Region, Shillong from 24-26 Feb. 1988. Over 50 delegates from AICRP Cooperating Centres, ICAR, Deptt. of Food (G.O.I.), Dte. of Plant Protection, Quarantine and Storage (G.O.I.), Universities, Zoological Survey of India, State Agriculture departments and Pesticide Industries, participated in the deliberations. The workshop was inaugurated by Dr. R. N. Prasad, Director ICAR Research Complex for NEH Region, Shilong and Chief Guest Dr. Ishwar Prakash, Professor of Eminence, delivered key-note address.

Contribution for inclusion in the Newsletter may please be forwarded to :

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