NATIONAL PROGRAMME FOR RODENT PEST MANAGEMENT

ICAR

RODENT NEWSLETTER

Vol. 9, No. 1

February 1985

COORDINATING & MONITORING CENTRE
CENTRAL ARID ZONE RESEARCH INSTITUTE, JODHPUR

Daily Food Cycle of the Indian Gerbil, Tatera indica indica

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The rhythmic changes in daily food intake cycle of gerbils, were studied in observations of subjects belonging to a wild-caught stock of *Tatera indica*. Adults, excluding pregnant females, were chosen (body weight 100g); and housed individually or in a bisexual group of one male and three females in wire-mesh enclosures, 1 32 x 1.0 x 0.32 m. or cement tank, 1.8 x 1.5 x 1.2 m. The cages were kept in a rattery covered by wire-mesh on two sides; with canvas screens all around. The screens were rolled up from 9 a.m. to 5 p.m.

Food cycle was followed by giving weighed amounts of food, pearl millet *(Pennisetum typhoides.)* in large metal dishes at 5 p.m. The residue in each cage and tank was then weighed every four hours till 9 a.m. next day; and at 12 noon and 5 p.m. The weighings each time took about 5 to 10 minutes; during which rattery lights were kept on.

As canvas screens were rolled-up at 9 a. m., feeding between 5 to 9 a m. belonged to dark period. Analysed on this basis, the results clearly show that there was practically no day-time feeding. All the food was consumed during the dark phase.

Feeding over exclusively dark period did not, however, follow a flat course. Maximum amount of food was consumed between 5 to 9 p.m. and minimum between 1 to 5 a. m. Secondary 'peaks' in consumption occurred after it, in the time-interval 5 to 9 a.m. (Table 1).

Table 1. Food intake at various intervales

Time Interval	Food Intake (gm)							
	Male				Female			Colony
	1	2	3	4	1	2	3	
5—9 P.M.	3	4	7	2	3	5	4	11
%	(33)	(29)	(60)	(16)	(34)	(40)	(35)	(33)
9—1 A.M.	3	4	2	1	2	2	3.5	9
%	(33)	(29)	(16)	(8)	(22)	(16)	(31)	(27)
1—5 A.M.	2	2.1	1	1	1	1	1	6
%	(23)	(14)	(8)	(8)	(11)	(8)	(8)	(17)
5—9 A.M.	1	4	2	8	3	4.5	3	7.5
%	(11)	(29)	(16)	(68)	(33)	(36)	(26)	(23)
9—12 Noon	—	—	—	—	—	—	—	—
12—5 P.M.	—	—	—	—	—	—	—	—

It may be concluded, therefore, that intensity of feeding gradually declines over the first half of the dark phase (5 p. m. to 1 a. m.); but it slowly increases over the second half (1 to 9 a. m.).

Apparently thus 'food cycle' of gerbils maintained *ad libitum* under distinct dark-light conditions, is similar to that of laboratory rat or wild *R. norvegicus*. Consumption follows a course largely determined by feeding rhythms, which probably coincide with periods of maximum general activity.

Behaviour of *Bandicota indica* toward young ones

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To Study the behaviour of *Bandicota indica*, commonly known as larger bandicoot, a female confined in a rat cage was supplied with young ones of other female She explored them for a while and then killed them one by one. The dead young ones, later on, were feasted by the female. In another experiment, newly born young ones of two females, 7 and 8 in number, respectively, were mixed. Before mixing the two populations, the young of a female were tagged to ensure their identity. The mixed population was supplied to each of the above females which were kept separately. Both the females accepted the youngones of the mixed population without any descrimination and suckled them. They exercised all the care and brought up the young ones till the latter took to independent way of living.

In one case, 5 young ones which were 20 day old killed their mother in the cage and ate up her head, ears, thorax and legs.

Common rodent pests in the cultivated fields and godowns of West Bengal

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The species composition of common rodents is different in the fields and godowns of West Bengal. Here the most common field rodents are *Bandicota bengalensis*, *Bandicota indica*, *Mus booduga*, *Mus cervicolor*. Besides the above four, the other two less common field rodents are

the Soft-furred Field Rat or Metad, *Millardia meltada* and the Indian Gerbil or Antelope Rat, *Tatera indica*. Only two specimen of *Tatera indica*, one from Medinipur District and another from Hughly District have been recorded so far. The author has recorded *Mus cervicolor* and *Millardia meltada* for the first time in West Bengal. The relative proportion of these species in the fields is in the order of *B bengalensis* > *M.booduga* > *M. cervicolor* > *B, indica* > *M. meltada* > *T. indica*.

The common rodents in the godowns are *Bandicota bengalensis*, *Rattus rattus* and *Mus musculus*. So far the Norway Rat, *Rattus norvegicus* has been recorded from the godowns and port areas of Culcutta and Howrah. But recently, the author has recorded it from a grocer's shop at Sakherbazar in 24-Parganas District. The relative composition of these rodents in the godowns is in the order of *B. bengalensis* > *R. norvegicus* > *M. musculus* > *R. rattus*.

Effect of ploughing on the population of short-tailed bandicoot rat, *Nesokia indica*

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During the years 1976-77 at the Indian Agricultural Research Institute, wheat crop was grown on its main farm area of 20 acres. Some area adjoining the farm road was left un-utilized. As a result of this, rats made burrows at the edge of farm road. It was felt that it will be interesting to note effect of ploughing on the rat population. Five consecutive ploughings were given from December 1976-May 1977, with the tractor at an interval of 35 ± 5 days. The reduction in number of live burrows after each ploughing was recorded. The data were transformed to arcsins and the effect of ploughings on the rat populations was tested by F-test.

It can be seen from the Table that the maximum reduction in burrow numbers was noticed after second ploughing, whereas there was no further reduction in burrows as a result of subsequent ploughings.

Treatments (ploughings)	1	2	3	4	5
Percentage of reduction in burrow nos.	34.0 (35.65)	57.3 (49.18)	32.9 (34.99)	26.5 (26.89)	32.6 (34.82)
S. Em. ±	3.46				
"F" test	Significant at 5%				
C.D. at 5%	10.83				
	2	1	3	5	4
Rating	49.18	35.65	34.99	34.82	26.89

Note: Figures in parenthesis represent transformed values.

Field tests on *Nesokia indica* Gray with zinc phosphide

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Comparison was made of the success of rodent control when zinc phosphide baiting was carried out in conventional manner and by providing encapsulated baits at I.A.R.I. Farms during first quarter of the year 1985 under field rodent control programme. Both baits comprised 2.0% zinc phosphide with wheat flour as carrier. In encapsulated baits, outer covering on capsule was also of wheat flour paste. After demarkating active burrows in similar habitats along channels by the side of wheat fields, baiting was done by inserting baits 2-4 cm inside the burrows. Data were recorded 7 times from 28th Feb. to 11th March, 1985 on acceptance, burrow activity and relative mortality as evident from ceasure of characteristic burrow activity-the plugging with clay. Besides these, bait rejection and shyness were respectively interpreted with bait discarding and bait nipping.

Data revealed that in conventional pellet baits, the acceptance ranged between 36 and 76 %, bait discarding was 8 and 4 % on first two days, nipping of baits was 4 to 8 % (highest being 8 on 4th day),

burrow plugging ranged highest 52% on first day and decreased from 44% to 16% till 8th day but went upto 44% on 12th day. Ceasure of burrow activity ranged 16-28% with highest on 5th day and decreased to 20%. Relative per cent mortality ranged from 4 to 60% with increasing rates that ranged from 32, 44, 52, 60, 60 and 36% respectively on 3 to 12th days of baiting.

In encapsulated baits, acceptance ranged from 48 to 96% and showed increasing trend throughout Consequently non-acceptance showed a decreasing trend (52 to 4 against 68 to 24% in pellet baits). Bait discarding ranged from 8% to zero, nipping of bait ranged from 0 to 8% (be ng highest on 8th day but was zero on 12th day), burrow plugging also showed decreasing trend ranging from 36 to 9% and relative mortality per cent showed increasing rates ranging from 16 to 84% against 4 to 36% in pellet baits. These results thus amply indicate considerably higher baiting success with encapsulated baits.

Field tests of Bromadiolone baits on *Nesokia indica Gray*

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Bromadiolone cake baits have lately drawn wide attention in field rodent baiting for its easy application, bait durability besides shelf life of baits, etc. Field tests were therefore initiated at IARI Farms from 28th Feb. to 8th April, 1985. In the study, characteristic burrows of *Nesokia indica* Gray were located and checked for occupancy by confirming with de-plugging and marking those re-plugged burrows on succeeding days. Live burrows were selected and Bromadiolone cakes and different sizes, namely, full cake, half and one fourth cake were inserted 2-4cm deep into the burrows. Observations were recorded from day of baiting-2nd March to 8th April, 1985.

Data indicated that for 1/4th cake baits, acceptance ranged from 48 to 96%, bait discarding till third day ranged up to 12% and was subsequently reduced to zero; bait nipping was 4% on 4th day and zero on subsequent days; ceasure of burrow activity showed a downward trend and ranged from 36 to 4%; mortality though showed an increasing trend but commenced from 4th day and ranged from 4-48%.

In half cake baits, acceptance was 60% on first day and ranged from 60 to 100% against 10 to 90% in full cake, bait discarding was zero (against 20, 40 and 10% respectively on first second and fifth day in full cake baits), consequently bait nipping was zero in 1/2 cake baits

and so also in full cake baits; Mortality in 1/2 cake baits commenced on 4th day and ranged from 10, 60 to 70% respectively on 5th, 7th and 8th day against 10, 10, 10, 40, 40 and 88.9% respectively on first to 8th day in full cake baits.

These results indicate that in view of different perspectives, 1/2 Bromadiolone cake baits appeared to give optimal reults on *Nesokia indica*

Short Tailed Bandicoot Rat, *Nesokia indica* G. damage in Tomato

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Tomato is grown for seed and culinary purposes. Extensive damage by *N. indica* was recorded upto 8.99% of fully mature fruits, as a result of examination of 489 fruits from 31 plants in an area of 40 x 20 m. The number of fruits per plant viz. matured, immature and damaged ranged from 1-18, 2-38 and 1-3 respectively. It has been observed that attack is restricted to only fully mature fruits and none of immature fruit was found damaged.

Laboratory evaluation of WL-108366 against some desert rodents

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Studies conducted on *Tatera indica* and *Rattus rattus* revealed that WL-108366, a new second generation anticoagulant, is highly effective at 0.01 per cent concentration in no choice tests. Even one day exposure knocked down 100 per cent *Rattus rattus* (Table 1). Increasing this exposure period to two days reduced the days to death period. However, in case of *Tatera indica* 100 per cent mortality could be obtained after three days exposure only.

Table 1. Efficacy of WL-108366 in no choice tests

Species	Exposure period	Poison bait consumed (g ± SE)	mg/kg ingested (mg±SE)	Percent mortality	Days to death	
					mean	range
Rattus rattus	1 day	5.95± 0.73	5.83± 0.50	100	8.6	5-17
Rattus rattus	2 days	11.70± 1.00	10.37± 1.29	100	7.1	3-14
Tatera indica	1 day	7.10± 0.80	8.53± 1.18	90	5.8	3-11
Tatera indica	2 days	7.70± 0.82	7.29± 1.30	90	9.0	5-14
Tatera indica	3 days	12.5± 1.02	12.09± 9.95	100	8.0	6-15

Field Evaluation of Brodifacoum (WBA 8119) Wax Blocks in Arid Zone of Rajasthan

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A new formulation of second generation anticoagulant rodenticide-Brodifacoum wax block, supplied by the Indian Explosives Limited, Madras, was evaluated in a 10ha grassland area. The area was first surveyed and all opened burrows were counted (Nos. 2522) and plugged with soil late in the evening. Reopened burrows were again counted next day morning (Nos. 784). Each active burrow was then treated with 10 g of brodifacoum (0.005%). wax block. After this operation, observations on control success were recorded on 5, 10, 15 and 20 days. Pretreatment trapping of rodents revealed *Tatera indica*, *Golunda ellioti*, *Rattus meltada* and *Mus booduga* to be major field rodent species.

Results indicated that with a single exposure of brodifacoum wax block, maximum kill of rodents was observed on tenth day. These results suggest that post control evaluation may be done preferably after 10 days period, when 91.5% rodents are controlled.

Area (ha)	Total number of burrows poison baited	Nuber of burrows reopened on days			
		5	10	15	20
10	784	252	66	19	54
Progressive control success (%)		67.8	91.5	92 4	93.1

Constant use of acute rodenticide decreases its credibility in rural areas

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Farmers have now realised that rat is one of the serious pest of standing crops as well as stored grains. Its menace was so severe in the Rabi crops(*1983-84) that the Govt. of Rajasthan declared it an epidemic in some districts. including Jaipur. Zinc phosphide is the most common rodenticide used by the farmers. The way of its application is generally unscientific and farmers do not practise prebaiting. Those farmers who are using it since a long time are now realising that rats avoid consumption of zinc phosphide bait and even if some eat it they do not die. As the farmers are ignorant about bait shyness and sub lethal dose, they usually doubt the purity of rodenticide. The other drawback which is noticed is the unproportionate use of bait materials and constant keeping of poison bait in houses, which regularly adds to rat memory.

As per door to door survey in two villages of Jaipur District it was found that about 70 percent people are in favour of rodent control. Among the various age groups it is as.

Sr. No.	Age Group	Gents	Ladies
1.	Youngster (15-30 years)	95%	80%
2.	Middle age (30-50 years)	60%	55%
3.	Aged people (>50 years)	35%	35%

Aged people still believe in the legendry saying of "Ganesh Sawari". Most of Jainis do not favour rodent control.

Due to bait shyness. farmers are now realising the importance of rat proofing and mechanical means of rat control. Mechanical method of rat control by rat cage is familiar to all people, but only 5% people use it regularly. The various traps found in the rural areas are wooden traps (79%), wonder trap, rough type (17%) and tin model (4%).

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.