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Comments on Cacao Feeding by Rats

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Comments by Bhat in this journal (Vol 2 (4) : 3) recalled observations made in the Eastern Caroline Islands, where roof rats (*R. rattus*) and Polynesian rats (*R. exulans*) depredations often made cacao cultivation uneconomic. No squirrels were present, so damage was restricted to these rat species. As indicated by Bhat, feeding was restricted to the mucilagenous covering of the beans. Typically the ripe pods were opened on the stem half. Holes were ovoid, sometimes triangular; we did not distinguish between the two rat species in the damage observed.

Observations under caged conditions with Polynesian rats trapped from areas where experience with cacao plantings was not possible indicated that such rats would not open cacao pods. Rats from cacao plantations readily did. Even when naive and cacao-eating adult rats were placed together for 10 days, the non-eaters did not change their feeding preferences. We concluded that cacao-eating by Polynesian rats must be learned (probably at an early age by imitation of mother or other adults) and suggested that good sanitation and prompt picking of ripe pods might reduce the depredations of Polynesian rats, especially in new plantations.

Comparable experiments were not undertaken with roof rats. We had already observed that this species adapts to strange foods readily and that rats from non-cacao areas readily fed on the pods in the laboratory.

Some physiological adaptive mechanisms of the Indian desert gerbil

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Certain physiological characteristics of the Indian desert gerbil, *Meriones hurrianae* Jerdon like basal metabolic rate (BMR), conductance (C), evaporative water loss (EWL) and body temperature within the zone of thermoneutrality for this rodent species were studied. BMR

and C were found to be 0.7896 ml 0_2/g/hr (67% of the predicted value) and 0.149 ml 0_2/g/hr/°C (127% of the predicted value), respectively. A low BMR, high conductance and a comparatively high average body temperature (38.7°C) apparently prevent overheating in these crepuscular animals.

The EWL in gerbils was found to be around 1.89 mg H_2O/mlO_2 consumed and there was a conspicuous increase in this value at ambient temperatures of around 37°C. It seems that the gerbil has a high upper lethal temperature of around 44°C. There is usually a rise in the body temperature of these animals above an ambient temperature of 36°C. A fall in body temperature by 2.6°C was observed at 21°C (i. e. below the animal's thermoneutral zone), which indicates its poor thermoregulation at low temperatures This may be due to its high conductance allowing loss of heat instead of conserving the same for the maintenance of body temperature. It has been observed that this gerbil comes out of its burrow for surface foraging early in the morning and late in the afternoon during summer and throughout the day during winter. Apparently, such shifting patterns of diel activity helps the gerbil to withstand extremes of environmental temperature.

Influence of an ultrasonic sound device on the feeding behaviour of black Rat (*Rattus rattus*)

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An ultra-sonic sound device (Rat Expeller) which emits ultrasonic sound of 15 KHZ to 20 KHZ has been developed by TELCO Ltd., Bombay. It weighs only 3 kg. and measures 96 H x 96 W x 200 D which was claimed to be the most efficient and safest weapon for driving away rats from infested areas without killing them.

The Rat Expeller was tested at this Institute to see its effect on the feeding behaviour of black rat (*Rattus rattus*). The rats were starved for 24 hours, weighed and known quantity of standard bait (wheat flour, maize flour and gram flour etc.) was kept in each cage. The instrument was operated at 16 KHZ, 18 KHZ and 20 KHZ frequencies continuously for three hours. Both mode of operations i. e. Intermittent (INT.) and Continuous (CONT.) were tested. Bait consumption during 3 hours of operation was noted. Similarly the consumption of bait in control was also recorded.

Table : Average consumption of bait by the caged black rat (*Rattus rattus* in three hours.

Frequency	Mode of operation	Average consumption of bait (g)
16 KHZ	CONT.	5.41
	INT.	8.07
18 KHZ	CONT.	7.44
	INT.	7.32
20 KHZ	CONT.	6.74
	INT.	5.47
CONTROL	—	5.16

It is evident from the table that the consumption of bait per 100 g body weight of rat is more at all the frequencies than in the control. Similar results were obtained when it was tested in a closed room providing a free choice of bait consumption and movement to rats. Hence the Rat Expeller has no influence on the feeding behaviour of black rat (*Rattus rattus*).

Population explosion of rodents in groundnut fields in Gujarat

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During kharif season of 1976 there was an unprecedented explo sion of the rodent population in the Saurashtra region of Gujarat comprising seven districts. The genesis of outbreak of rodents dates back to October 1975 when a large amount of groundnuts were left over in soil on account of late kharif rains at the harvest time. This provided ample food for an unrestricted multiplication of the

rodents. Early rains in 1976 further enhanced the breeding and availability of green food for the new generation assured a high level of survival. The rodents thus assumed a severe-pest dimension.

Panchayat authorities launched mass scale campaigns using 2248 and 7789 kg. zine phosphide during 1975 and 76, respectively. Training was imparte to both Panchayat staff and primary school teachers and 15096 and 451440 kg. of zinc phosphide was distributed for campaign operations in November 1976. The baiting material was contributed by the farmers. Aluminium phosphide tablets worth Rs. 1 lakh were used to tackle the residual population of rodents. About 3 million hectares of crop fields were treated and the crop was saved. The cost benefit ratio of the operations worked out to be 1 : 30.

Relative acceptability of zinc phosphide and RH-787 Baits by *Rattus Rattus*

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In suburban area of Hyderabad (Rajendranagar) 2% and 0.5% baits of Zinc phosphide and RH-787 respectively were exposed to free living population of *Rattus rattus* after recording three day prebaiting consumption of feed in a poultry farm.

The results, indicate that since there is no significant difference in the pre-bait consumption of plain food on 2nd and 3rd day, prebaiting could be restricted to two days only.

The consumption of Zinc phosphide was stopped completely after first day indicating the development of poison shyness. In case of RH-787 the consumption continued for all the three days though at a reduced rate after the first day. It evidently indicated the absence of shyness of house rats towards this rodenticide.

The mortality of rodents due to RH-787 was assessed to be 61.8%, whereas zinc phosphide could take a toll of 38.2%.

The cost benefit ratio worked out was 1:65.

Rodent control programme in Save Grain Campaign during the year 1978–79

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Collectively all the 17 Teams of Save Grain Campaign fumigated 16,47,822 rat burrows with Alumnium phosphide tablets in the field. 1,68, 150 demonstrations were given at farmers' houses on rodent control measures to be taken in houses. During the year, 4471 farmers in Stipendiary Training Courses were trained, 168 courses were organised for VLWs and 950 courses were organised for Volunteers to train them on scientific storage of foodgrains including control techniques. During the year, 43,858 storage bins were manufactured and 41,105 storage bins were distributed to the farmers which are rodent-proof.

Rodent control Training Programme to railway officers

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The ever growing damage to storage material in railway godowns, shades and destruction of platform yards and tracts by rodents have attracted the attention of Ministry of Railways, Govt. of India to initiate control operations against this devastating pest.

A six days training was arranged by the University for Railway Officers. The first batch consisting of Medical Officers and Engineers participated and manifested keen interest in the training programme.

During the course of training the officers were apprised of the technical know how through lectures, films, slides, exhibits, field trips and demonstrations. On visits to fields and Railway godowns, the nature and extent of damage, intensity of rat population per unit area, structure of rat burrows alongwith the hoarding capacities of food grains were shown to the trainee. The operations based on 'Integrated Control Techniques' employing the use of poision baits, fumigants & chemosterilants were practically demonstrated. In addition, an interesting talk based on newer concept as how to utilize the by-products of rodents like skin, flesh and bones for commercial purposes, was also given to officers.

Does the presence of white rat keeps the Premises free from other wild rodents ?

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A popular belief is that the presence of white rats deter the wild rats from infesting a premises. While a confirmation of this belief has been sought by many people, we have also observed during our rodent control programme, people rearing white rats in the houses as well as in some retail shops.

To assuage the scientific curiosity, preliminary experiments were carried out under cage as well as in rattery conditions, where an equal number of albino rats were released in an already well established colony of roof rats (*Rattus rattus*). In the cage, albino rats chased and fought with the roof rats forcing them to surrender. Some weaker roof rats succumbed during the fight. The roof rats were cornered and forced to huddle together The vanquished roof rats could get only the left over food after the victors' meal. Even though the fighting between the albino rats and roof rats lasted for 24-48 hours, it was observed that both the species co-existed in the cage after 2-3 days occupying separate areas. Observations were also similar in respect of trials conducted in the rattery.

Albino rats appear to be more aggressive and dominant in nature and in consequence they get over the conflict with the roof rats. Even if the roof rats are present in a premises they may not be conspicuously seen, as they are forced away by albino rats from their territory. This may be one of the reasons for the popular belief. But if albino rats are kept in cages in the houses, roof rats are bound to infest the premises. [In the Deshnokh temple, Bikaner 2-3 albino rats co-exist peacefully with 4,000 to 7,000 house rats—Ed.]

Aversion to RH-787 by three rodent species

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Trials were conducted on *Rattus meltada palldior*, *Rattus cutchicus* and *Golunda ellioti gujerati* to evaluate if they develop poison aversion and bait shyness while feeding on food poisoned with RH-787. Rodents of each species were caged individually and provided two foods (*Pennisetum typhoides* and *Sorghum vulgare*) and their total daily intake was recorded for three days. On the fourth day a sub-lethal dose (0.01 per cent) of RH-787 and 1 per cent arachis oil were added to the preferred food, bajra. The total daily intake of this food did not decline on the first day of exposure to sub lethal dose of poison but on the second day the poisoned food was consumed significantly ($P < 0.001$) in a low quantity by *Rattus meltada pallidior*, whereas, there was no significant difference in the rate of its daily consumption by *Rattus cutchicus* and *Golunda ellioti*.

As a result of decline in the consumption of poisoned food, the intake of jowar by *R. meltada* increasd significantly ($P < 0.001$) but such a shift-over between poisoned and unpoisoned foods was not observed in case of the two other species. However, the consumption of poisoned food by *R. m. pallidior* increased on the consecutive days. This tends to indicate that Soft-furred field rat, *Rattus meltada pallidior* dose develop aversion to the poison on the initial day but it does not persist on subsequent day and that *R. cutchicus* and *G. ellioti* do not develop poison aversion towards RH-787.

A Limerick on rodent pest management

To kill or not to kill,
That is the question;
Rodents are Sacred beings,
Of Gods the praises do they sing.

The scientist says rodents are a pest,
They must not,-hence, be kept;
But rodents have great adaptation,
And they have great resistance.
They survive the scientific snare,
They must be controlled with care.

Oh ! that there were the Pied Piper
All the rodents would come after;
And drown in the deep deep water.

Meanwhile, depend on CAZRI,
It'll provide the poisoned 'bajri';
But do whatever you please,
Rats are here with us to co-exist.

—Gopal Krishan

[Shri Gopal Krishan was a participant in the Apex level Training held at CAZRI]

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