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Studies on composition and ecology of important rodent species of Mizoram

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A peculiar phenomenon is observed in the union territory of Mizoram where the periodic mass-flowering and seeding of bamboo is accompanied by a tremendous increase in rat population. These rats cause such an extensive damage to food crops that it almost results in a famine like conditions. Since the basic information on the types of rodents and the species responsible for crop-damage in particular and their ecology, which are essential in taking any control measures before-hand, is lacking an attempt was made during 1976-79 to fulfil the lacunae by undertaking extensive field survey and collecting rats and mice from the crop-fields, forests and tribal settlements in several blocks of Aizawl and Lunglei districts.

The entire collection of about 2497 rats and mice constituted 8 different species. The 5 species of wild rats and mice, namely, *Rattus rattus brunneusculus* (Hodgson), *Rattus bowersi machenziae* (Anderson); *Bandicota* sp., *Cannomys badius badius* (Hodgson) and *Vandeleuria oleracea dumitocola* (Hodgson), constituted the major part of our collection and the percentage occurrence of these was

92.6, 0.9, 0.8, 3.9 and 0.2 respectively. Other 3 rat/mice species viz., *Rattus rattus* (L); *Rattus nitidus* and *Mus musculus* were found to occur mainly in tribal settlements and granaries. Their number was very low as compared to the rats found in the cultivated areas and forests, and were not found in any way connected with the damage of paddy cultivation. Few other minor species of rodents including squirrels were observed in these areas. The collected species except *Rattus rattus brunneusculus*, were fairly versatile in their association with a number of vegetation communities. *R. r. brunneusculus* a serious pest of paddy crop, were invariably collected from paddy fields. It causes damage by cutting tillers, eating and hoarding grains. It makes simple to complex burrow systems on hill slopes. The burrows were found to contain stored paddy grains and vegetable matters. After harvest, the grain stores of burrows were found to be slowly depleted but paddy husk, chilly, ginger, brinjal, tomato, gossypium flowers could be seen. These observations suggest that although the main food of this rodent is rice but when it is not available, the rats start feeding

on other vegetable matters and tender shoots of plants. The Bower's rat *Rattus bowersi mchenziei* were also found to make complex burrow systems in the paddy areas. They mainly feed on tender shoots of various crop plants and underground vegetables. *Bandicota* species were found to be highly social and strongly built. They were normally found in the low lying areas under wet-land rice cultivation and near marshy stretches. They make very complex burrow systems. Although the population of these rats was found to be insignificant, the damage caused by them to paddy crop was often quite extensive. The bamboo

rats *Cannomys badius badius* were usually found in sugarcane, arabi, ginger and sweet-potato fields. They were also found to occur in grassy areas, near bamboo thickets, bushes and trees. They make complex burrow systems which were usually found to contain ginger and sugarcane pieces. At times nearly 5-6 kilograms of these material was collected from a single burrow. They also feed on other plants, grasses, seeds and fruits. *Vandeleuria oleracea* were found to occur in bushes, trees and bamboo thickets and feed on fruits, buds, rice grains etc. Their nests were usually found in tree cavities or between branches.

Rodents of Sikkim

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It is always beneficial to possess information about the types of rodents of any area before doing ecological studies or implement control measures on them.

Sikkim is a small state of Indian Union lying on the southern slopes of the Himalaya between 27°5'N to 28°9'N and 87°59'E to 88°56'E with a total area of 7298 square kilometers. About 100 forms (species and sub-species) of mammals are known from Sikkim, of which 25 are rodents. According to the

literature, the following are the rodents found in Sikkim :

The Hairy-footed Flying Squirrel, *Belomys pearsoni pearsoni* (Gray); Lesser Giant Flying Squirrel, *Petaurista elegans caniceps* (Gray); Hodgson's Flying Squirrel, *Petaurista elegans caniceps* (Gray); Hodgson's Flying Squirrel, *Petaurista magnificus magnificus* (Hodgson); Particoloured Flying Squirrel, *Hylopetes alboniger alboniger* (Hodgson, 1836); Golden-backed Squirrel, *Callosciurus caniceps crumpi*

Wroughton; Irrawaddy Squirrel, *Callosciurus pygerythrus lokroides* Hodgson; Himalayan Striped Squirrel, *Tamias maccllellandi maccllellandi* (Horsfield); Orange-bellied Himalayan Squirrel, *Dremomys lokriah lokriah* (Hodgson); Malayan Giant Squirrel, *Ratufa bicolor gigantea* (M'Clelland); Himalayan Marmot, *Marmota bobak himalayana* (Hodgson); Crestless Himalayan Porcupine, *Hystrix hodgsoni hodgsoni* (Gray); Sikkim Vole, *Pitymys sikimensis* (Hodgson); Indian Long-tailed Tree Mouse, *Vandeleuria oleracea dumeticola* (Hodgson); House Rat, *Rattus rattus brunnesculus* (Hodgson); House Rat, *Rattus rattus tistae* Hinton; Turkestan Rat, *Rattus rattoides*

rattoides (Hodgson); Himalayan Rat, *Rattus nitidus nitidus* (Hodgson); White-bellied Rat, *Rattus niviventer lepcha* (Wroughton); Chestnut Rat, *Rattus fulvescens fulvescens* (Gray); Little Himalayan Rat, *Rattus chaeha* (Wroughton); Edward's Rat, *Rattus edwardsi edwardsi* (Thomas); House Mouse, *Mus musculus himomurus* Hodgson; House Mouse, *Mus musculus urbanus* Hodgson; Sikkim Mouse, *Mus pahari pahari* Thomas; Lesser Bandicoot Rat, *Bandicota bengalensis bengalensis* (Gray).

Among the above rodents, squirrels including flying squirrels, Sikkim Vole and Sikkim Mouse are unique to Sikkim.

Rodents of Jammu and Kashmir

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Geographical location with physical features of Jammu and Kashmir make it a proverbial bridge between the two major faunal regions, namely, Palaearctic and Oriental and thus the composition of rodent species is somewhat different than that of other parts of India. During the years 1975 faunistic surveys were conducted by me in different parts of the state and the present report on rodents is based on that collection as well as

those already present in ZSI and BNHS collections. Altogether four families, 18 Genera and as many as 41 species and subspecies of rodents are represented from this area. A list of the species are given below along with their habitat in J & K. Those marked with asterisk are serious pests.

Petaurista petaurista : Himalayan moist temperate forest. *Hylopetes fimbriatus* and *H. baberi* : Himalayan moist temperate forest as well as

Himalayan dry coniferous forest and often in deserted bungalows or rest houses amidst them. *Eupetaurus cinereus* : Isolated pockets of blue pine and spruce forest of steppic mountains of northern Himalayas. *Funambulus pennanti* : Orchards and gardens of the large cities and semiarid regions of Jammu. *Marmota bobak* : Alpine desert condition on the sides of valleys. *M. caudata* : Alpine scrub and moist alpine meadow above tree line. **Hystrix indica* : Steppic mountains, Himalayan moist temperate forest, broken rocky hillsides and irrigated forest plantation areas. *Sicista concolor* : Alpine and subalpine scrub zones as well as in the grassy slopes on the edge of forests in moister mountain region and fields of terraced cultivation. *Apodemus sylvaticus* : Himalayan dry temperate forest as well as in subalpine scrub and meadow up to 3600 m. *A. flavicollis* : Moist temperate forest. **Rattus rattus* : Commensal and associated with human habitation and villages. **R. rattoides* : villages, coniferous forest and also in barren rocky mountains. **R. vicerex* : Fields and cottages of Kashmir

Valley. *R. norvegicus* : Main cities like Jammu, Punch, Srinagar as well as in the main halting stations of road transports. **Mus musculus* : Widely adapted, found almost every where except in very high regions. *M. booduga* : Drier cultivated fields and gardens of Jammu region. *M. cervicolor* : Irrigated fields of Kashmir valley. *M. sublimis* : Ladak. Status uncertain. *Golunda ellioti* : Thick bushes around drier cultivated fields of Jammu region. **Bandicota bengalensis* : Widely adapted, found almost everywhere except in higher regions. *Cricetulus migratorius* : Dry temperate forest and may frequent terraced cultivation. *C. alticola* : Higher regions of Ladak, **Tatera indica* : Low and dry mountainous areas along the cultivated tracts and somewhat commensal. *Alticola roylei* Upper limits of coniferous tree line to the edge of permanent snow line. *A. stoliczkanus* : Plateaus of northern Ladak. *Hyperacrius wynnei* : Himalayan moist temperate forest between 1850m. to 3050m. *H. fertilis* : Subalpine scrub zone. *Pitymys leucurus* : Along the river banks of Ladak.

House mouse, menace to sprinkler irrigation sets

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In sandy areas of Bhiwani in Haryana, sprinkler irrigation systems are successfully used with the introduction of Jui Canal during

the last decade. Water is driven in to main lines by high voltage power electric motors and then diverted to distributing lines for irrigation through sprinklers.

Food, available space, predators, fighting of rodents within colonies etc. has greatly contributed towards maintaining the equilibrium in rodent population at a given area, and weak population tend to migrate. *Mus Musculus*, being weaker than house rat, *Rattus rattus*, have possibly migrated from houses to fields for food exploration. Huts near sprinkler sets where essential commodities are placed by the attending staff of Jui Canal are also perhaps responsible for their population increase and escape from the predators. The mice sometimes enter the electric appliances and gnaw the wires within. There is a report of burning of

about 16 motors from Dec. 1979 to Feb. 1981 (Unpublished). When these electric motors were taken to electric works for repair, dead and burnt mice were found in 7 out of 16 burnt electric motors. When these mice gnawed the wires, sparking might have took place due to Short circuitity which resulted in burning of whole electric motor. One electric motor is responsible for irrigating about 100 hectares of land in one month. Since it takes about one month for repair and running the motor again, the farmers were disappointed because of non-functioning of the motor in time which resulted in huge damage to flourishing crops during this period. 5 motors were burnt at the time of sowing of crops and thus fields remained barren throughout the season.

Behavioural changes in burrowing rodents during solar - eclipse

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This study was made from 15th to 17th February 1980 in the cultivated fields adjacent to two villages viz., Apurbapur and Jalaghat (Singur), Rugli District, West Bengal, to find out wheather there was any perceptible behavioural changes of burrowing rodents

durin 14.47 to 17.01 hours (solar-eclipse time in Calcutta) on 16th February 1980.

Continuous observations were made during 11.00 to 18.30 hours from 15th to 17th February 1980 in the above-mentioned cultivated fields for studying the comparative

behaviour of rodents during the non-eclipse and eclipse periods. During this season most of the fields remained uncultivated. The fields which however were cultivated, supported crops like wheat, potato, cauliflower, cabbage, pulses and other seasonal vegetables. The numbers of burrows of rodents as observed were maximum in the wheat and potato fields. Previous observations of the rodents having burrows in such fields were chiefly of the Lesser Bandicoot Rat, *Bandicota bengalensis* (Gray), the Large Bandicoot Rat, *Bandicota indica* (Bechstein), the Little Indian Field Mouse, *Mus booduga* (Gray), the Fawn-coloured Mouse, *Mus cervicolor* Hodgson, the soft-furred Field Rat or Metad, *Millardia melhada* (Gray).

From 15th to 17th February 1980 during 11.00 to 18.14 hours not a single rodent was found outside their burrow—this is the normal behaviour of the rodent species of the area. No perceptible behavioural changes were therefore indicated as an effect of eclipse during 14.47 to 17.01 hours on 16.2.80 (solareclipse time). On 15th and 16th February 1980, *Bandicota bengalensis* (Gray) and *Mus booduga* (Gray) were seen coming out of their burrows at 18.15 hours after dusk. On 17th February 1980, they were found to come out of their burrows at 18.17 hours with the change of the time of sunset.

This is therefore observed that there are no perceptible effect of solar-eclipse on the concerned rodents in open fields.

Inter-specific odours enhance food consumption of *Tatera indica*

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It has been reported that conspecific odours function as phagostimulant in *Tatera indica*. To test whether the odours of other rodent species effect the food consumption in a similar way, female desert gerbils, *Meriones hurrianae* were lodged in food boxes for 24 hours. This food, carrying the body

odours of *M. hurrianae*, that of its scent marking gland, urine and faeces; was provided to male and female *T. indica* in individual cages along with ordinary food in separate containers. Water was available *ad libitum*. Total daily intake of the two foods was regarded for 12 days.

Table : 1. Total daily intake of 'scented' and plain pearl millet by *Tatera indica*

Sex	No. of observations	Food consumption g/100, body weight	
		Scented millet with <i>M. hurrianae</i> odours	Plain millet
Male	72	2.59 ± 0.16*	1.31 ± 0.13
Female	72	2.98 ± 0.21*	1.74 ± 0.20

* P < 0.05

The data reveal that pearl millet carrying the odours of *M. hurrianae* was consumed in significantly more quantity (P < 0.05) by *T. indica* as compared to plain pearl millet. (Table 1). Further work on the practical implication of this finding is in progress.

Laboratory evaluation of Silmurin against black rat *Rattus rattus* (L)

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The efficacy of Silmurin powder (containing 1% scilliroside) along with Silmurin ready to use bait (containing 0.05% scilliroside, 97% wheat and 2.95% adjuvants) formulated and supplied by the firm M/s. Sandoz India Limited Bombay, was observed in the laboratory against black rat, *Rattus rattus* L.

Silmurin 1% powder was evaluated at the concentration of 0.05%, 0.10%, 0.15%, 0.20% and 0.25% of a. i. in the form of dry bait in which wheat flour, sugar and oil were used as base. As wet bait (semi solid form) it was evaluated at a single

concentration of 0.05% of a. i. in which in addition to the above bases water was also used. By adding water in the mixture of poison and wheat flour semi solid bait was obtained which was converted into small pills. The pills were then coated with oil and finally smeared with grinded sugar by shaking it in a pen. The ratio of poison (Silmurin 1% powder), wheat flour, water, edible oil and grinded sugar was 1:10:7:1:1 respectively.

The poison bait was offered to rats in cages for 24 hours only. The results of the study are given in the following table.

Concentration of a.i. in bait	Form of poison bait	No. of rats tested	Percentage mortality	Percentage shown complete avoidance to poison bait	Hours to death Average Range	
0.05%	Wet bait (semi-solid)	5	100%	-	19.2	16-32
0.05%	Dry bait prepared and supplied by the firm	5	40%	40%	24.0	16-32
0.05%	Dry bait	6	50%	-	34.6	16-56
0.10%	-do-	6	50%	-	34.6	8-64
0.15%	-do-	6	66.6%	-	32.0	8-72
0.20%	-do-	6	66.6%	-	20.0	8-32
0.25%	-do-	6	33.3%	33.3%	16.0	-

It is evident from the above table that lower as well as higher doses of silmurin in the form of dry bait could not give 100 per cent mortality while wet bait in the form of pills at the lowest concentration yielded 100 per cent mortality.

Those rats which discarded the dry baits and those which escaped death by feeding dry baits, com-

pletely avoided the wet bait too during 24 hours of baiting period which was a clear indication of bait shyness. But forced feeding (Keeping of poison bait in cages for more than 24 hours without any normal food) of dry and wet bait containing 0.05% a.i. yielded 100 per cent mortality between 72-144 hours.

Recent Literature

- Berry, R.J. (Ed.) 1981. Biology of the house mouse. Symposia of the Zoological Society of London (47), 715 pp.
- Clark, B.R. and Price, E.O. 1981. Sexual maturation and fecundity of wild and domestic Norway rats (*Rattus norvegicus*). *Journal of Reproduction and Fertility*, 63: 215-220.
- Felming, A.S., Chee, P. and Vaccarino, F. 1981. Sexual behaviour and its Olfactory control in the desert wood rat (*Neotoma lepida*). *Animal Behaviour* 29: 727-745.

- Goyal, Surendra P. 1981. A simple mechanical device for recording diel activity pattern for small burrowing mammals in their natural habitats. *Journal of Zoology* (London) 195: 235-241.
- Jenkins, S.H. and Llewellyn, J.B. 1981. Multiple captures of *Peromyscus* age, sex and species differences. *Journal of Mammalogy* 62:639-641.
- Kumari, Saroj and Prakash, I. 1981. Scent marking behaviour of *Meriones hurrianae* during oestrus. *Animal Behaviour*, 29: 1269-1271.
- Lund, M. 1981. Comparative effect of the three rodenticides, warfarin, difenacoum and brodifacoum on eight rodent species in short feeding periods. *Journal of Hygiene, Cambridge* 87: 101-107.
- Mahmoud, W. and Redfern, R. 1981. The response of the Egyptian spiny mouse (*Acomys cahirinus*) and two other species of commensal rodents to anticoagulant rodenticides. *Journal of Hygiene Cambridge* 86: 329-334.
- Mathur, R.P. and Prakash, I. 1981. Comparative efficacy of three anticoagulant rodenticides against desert rodents. *Prot. Ecol.*, 3: 327-331.
- McClure, P.A. 1981. Sex-biased litter reduction in food-restricted woodrats (*Neotoma floridana*). *Science* 211 (4486): 1058-1060.
- Musser, G.G. and Gordon, L.K. 1981. A new species of *Crateromys* (Muridae) from the Philippines. *Journal of Mammalogy* 62: 515-525.
- Richards, C.G.J. 1981. Field trials of bromadiolone against infestations of warfarin resistant *Rattus norvegicus*. *Journal of Hygiene, Cambridge*, 86: 363-367.

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