

# RODENT

*Newsletter*



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ALL INDIA COORDINATED  
RESEARCH PROJECT ON  
RODENT CONTROL

CENTRAL ARID ZONE  
RESEARCH INSTITUTE,  
JODHPUR 342 003

# RODENT NEWSLETTER

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## Review of Sciurid Faunal Diversity in Himalayas and its Eastern off Shoots

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This region covers the lofty mountains running for about 3200 km from east to west. The region is considered to be the most diverse and richest region as far as floral and faunal diversity is concerned. Among the rodent species sciurids show a great diversity. Squirrels and marmots belong to the family of Sciuridae which are recognised by their bushy tails. The sciurid fauna of Himalayas belong to Palaearctic and Indo-Chinese, elements in addition to the endemic forms. Three types of animals are encountered in the region. They are (a) flying squirrels, (b) tree squirrels, and (c) marmots.

a. Flying squirrels : Essentially denizens of tropical and temperate forests, the flying squirrels are arboreal and nocturnal. They possess flap of skin or patagium which help them in gliding. This group consists of 12 species belonging to six genera. They are : *Petaurista petaurista* (common Indian flying squirrel) ; *P. magnificus* (Hodgson's flying squirrel) ; *P. nobilis* (Gray's flying squirrel) ; *P. elegans* (grey headed flying squirrel) ; *P. candidulus* (wroughton's grizzled flying squirrel) ; *Pectinomys fuscocapillus* (small Travancore flying squirrel) ; *Hylopetes fimbriatus* (small Kashmir flying squirrel) ; *H. baberi* (Kashmir flying squirrel) ; *H. alboniger* (Parti coloured flying squirrel) ; *Beomys pearson's* (hairy footed flying squirrel) ; *Eupetaurus cinereus* (wooly flying squirrel) and *Biswamoyopotorus biswasi* (Namdapha flying squirrel). All these species, except *Pectinomys fuscocapillus* are found in the forests of Himalayas, while *P. fuscocapillus* is confined to the tropical forests of Kerala. The distribution of flying squirrels in the Himalayan region are as follows :

- In Western Himalayas : Both the species of *Hylopetes*
- In West and Central Himalayas : *E. cinereus*
- In Central Himalayas : *P. magnificus*, *P. nobilis* & *P. elegans*
- In Central and Eastern Himalayas : *H. alboniger* and *B. Pearsoni*
- (also in North-eastern India)
- In Eastern Himalayas : *P. candidulus* and *B. biswasi*.

(b) Tree squirrels: The group comprises of diurnal tree squirrels which include the giant squirrels belonging to genus *Ratufa*; striped squirrels (*Funambulus*



In spite of very nice colour matching with the background, this species can easily be located in the branches due to its frequent, loud "Tick Ti Tick" call and dropping of leaves, twigs, fruits, seeds, etc.

Activity starts within an hour of the sunrise and continues almost throughout the day till dusk with a lean period from about 10.00 A.M. to 03.00 P.M. For foraging, it comes out of the dense part of the forest to the fringe or somewhat open areas and restricts to a selected number of trees in a small patch (about 1600 to 2500 sq. m) of the forest. In the morning, maximum activity is related to feeding, debarking and intra as well as interspecific chasing. During noon, it settles within the deep foliage or lies flat in the shaded branches.

Wide variety of food items are taken depending upon the availability within the foraging ground. So far identified food items are 'Lali' (Pulp, Bark), Pani Larang (Fruit, leaves), Simul (Pulp), Sisso (Flowers and leaves), Tatari (Fruit), Sal (Leaves, Bark), Udal (Seed, bark), Rudraksha (Pulp). It also appears that debarking is done in search of insect food.

It lives in pair or singly, however, occasionally three or four animals are also found foraging in the same area. It drives away the conspecific intruder by chasing or even by fighting. Other species of diurnal squirrels, viz. *Callosciurus pygerythrus*, *Tamiops maccllellandi*, *Funambulus pennanti*, *Dremomys lokiah* may occur in the same territory but at the lower branches of the trees or in the forest floor. However, different species of birds and Rhesus Macaque share the food items with the *R. b. gigantea* in the upper canopy.

Globular dreys, made up mainly of leaves are found in relatively deep forest, away from the foraging ground and usually constructed on the fork of tender branches for added protection against the heavier predators.

Actual breeding or litter could not be observed, but courtship behaviour was noticed almost throughout the year. Relatively young individuals were observed in February (2 nos.) and May (1 no.)

For its pelt and meat, certain amount of hunting pressure exist almost in all the forests. However, legal and illegal felling leading to the destruction of dreys along with the young ones and fragmentation of forest block appear to be the major factors responsible for the population decline of this very significant species.

## The Population Structure, Damage and Control Measures of Rodents in the Poultry Farms

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The studies were carried out in different poultry farms around Hisar. Four rodent species viz. *Rattus rattus*, *Mus musculus*, *Bandicota bengalensis* and *Tatera indica* were observed. *R. rattus* was found to be the predominant species while *B. bengalensis* and *T. indica* were found to be casual visitors.

Various types of damages observed included contamination because of hair and faecal matter, damage to the eggs and the egg trays, damage to the gunny bags and also the structural damage.

The mechanical method i.e. the trapping with wonder traps resulted into 67.96% reduction in the bait intake and 63.64% reduction in track marking census whereas the chemical method i.e. the trapping followed by zinc phosphide resulted into the reduction of 88.32% and 86.61%, respectively. The intergrated approach i.e. the treatment with zinc phosphide followed by bromadiolone proved to be the best one for the management of rodents as it resulted into a reduction of 95.09% in bait census and 94.05% in track marking census.

## Rodent Damage to Sericulture in Gujarat

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During the course of rearing of silkworm (*Bombyx mori*) in sericulture laboratory, mature larvae, fresh cocoons and moths seem to be reduced number, in the rearing trays during January, 1996. A lot of cocoons damaged by rats were seen in between the laboratory materials. It was further confirmed by trapping the rats (*Rattus rattus*) in wonder trap and observing their feeding habit on the silkworm. Rat completely fed the fresh pupa developing inside the cocoon by making an oblong big hole in the central portion of the cocoon. The damaged cocoons were accounted to be 70% of the PM X



NB<sub>4</sub>D<sub>2</sub> strain and 30% of the pure NB<sub>4</sub>D<sub>2</sub> strain of the silkworm. It was evident that the rats preferred the big sized cocoons (PM X NB<sub>4</sub>D<sub>2</sub>) more than the small sized cocoons (NB<sub>4</sub>D<sub>2</sub>). It was noted that approximately 10% of larvae and 15% of cocoons of the silkworm were lost due to rodent in our early silkworm production. Earlier workers have reported also the rodent behaviour of feeding insects.

### **Incidence of *Rattus rattus* on Pumpkin, *Cucurbita moschata* Poir**

MONI THOMAS

Krishi Vigyan Kendra, Shahdol, Madhya Pradesh

Pumpkin (*Cucurbita moschata* Poir) is one of the important cucurbitaceous vegetable grown throughout India. In Shahdol district, tribals grow *C. moschata* in their backyard. The growing vines of *C. moschata* climb the roof of the huts.

During a survey of insect pests of vegetable crops in Shahdol, a pumpkin with a hole was noticed on the rooftop. On close observation, eight such damaged pumpkins were noticed out of the eleven i.e. 72.73% damage. All the pumpkins bore typical teeth marks of rodents. Hair in the pumpkin and faeces further confirmed the damage done by rodents. Zinc phosphide baiting after days prebaiting resulted in the death of *Rattus rattus*. This confirmed that the *R. rattus* was damaging pumpkin.

### **Rodent Damage to Waterchest nut *Trapa bispinosa* Rox**

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Waterchest nut, *Trapa bispinosa* Rox, is an important annual aquatic warm season crop cultivated in Madhya Pradesh. The crop occupies over 2,500 ha. In Jabalpur district (M.P.) producing nuts worth over Rs. three million

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per year. Rodents play a major role during the production and post-harvest handling of *T. bispinosa* nuts. While in ponds, *Bandicota bengalensis* Gray, cut nuts from the clumps and eat the fleshy content by removing its hard epicarp. *B. bengalensis* makes its access to nuts in the pond by moving over the floating crop. After the harvest, nuts are spread in the sun for drying, prior to marketing or storage. Squirrels, *Funnambulus pennanti* Wroughton carry nuts, that are spread out for drying. Dried nuts are filled in sacks and stored for marketing. Both *B. bengalensis* and *Rattus rattus* were found to damage the stored nuts. Farmers cultivating *T. bispinosa* thus suffer severe loss due to rodents.

### **Effect of Experimental Zinc Deficiency on the histology of Testes of *Mus musculus***

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Zinc deficiency was created experimentally in the mature individuals of *Mus musculus*. Two principal groups were made. One group was fed with zinc deficient diet, while the other group was fed with zinc adequate control diet.

After forty days Alopecia i.e. the disappearance of hair from the body of the individuals fed with zinc deficient diet was observed. Moreover the size of the seminiferous tubules of the testes of such individuals was greatly reduced. The different spermatogenic cells were lacking. On the other hand testes were quite large in the individuals fed with normal diet and the seminiferous tubules of such individuals clearly exhibited the different spermatogenic cells which included the spermatogonia, primary spermatocytes, secondary spermatocytes, spermatids and the spermatozoa.

The zinc deficient individuals fed with zinc repleted diet showed no recovery morphologically as the alopecia was still there but a partial recovery was however observed histologically.



## Management of Field Rodents in Some Major Crops in and around Hisar

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Four crops viz. wheat, gram, bajra and guar were explored in farmers' fields in and around Hisar. The population analysis of rodents in these crops revealed the co-existence of *B. bengalensis*, *T. indica*, *R. miltada*, *M. booduga*, *R. rattus* and *M. musculus*. Of these *B. bengalensis*, *T. indica* and *R. miltada* were found the major pest species accounting for 78.58-93.44 per cent of the total rodent population in different crop fields. The rodent population was recorded to be minimum at seedling stage of the crops, which increased gradually during vegetative growth and flowering stage; and reached a maximum at maturity stage. This, therefore, revealed an upward trend in the establishment of rodent population with the advancement in crop stage.

Bajra was found to be the most preferred bait for the preparation of poison baits. The deployment of zinc phosphide in two different methods of baiting revealed that uniform placing of zinc phosphide bait in a grid fashion resulted into significantly higher ( $P > 0.05$ ) reduction in rodent population than that in peripheral baiting in all the four crops.

The rodent damage was estimated maximum in wheat crop (8.56%) followed by bajra (7.82%), gram (6.68%) and guar (5.86%). Single baitings with zinc phosphide (2%) and bromadiolone (0.005%) differed non-significantly ( $P < 0.05$ ) in reduction of rodent population at pre-flowering stage of the crops. However, at flowering stage, bromadiolone yielded better results than zinc phosphide. Double baiting treatments, comprising of zinc phosphide and bromadiolone in different combinations resulted in significantly higher ( $P > 0.05$ ) reduction in rodent population as well as crop damage than those achieved with single baiting treatment conducted either with zinc phosphide or bromadiolone. In reference fields the population rebuildup rate was recorded significantly higher ( $P > 0.05$ ) than in the fields treated with various rodenticidal treatments. Amongst treated fields, the lowest population re-buildup rate was observed in the fields treated with poison combination of bromadiolone followed by bromadiolone. The application of different rodenticidal baits accomplished in saving of 53.41-260.77 kg/ha produce in different crops.

Simple trapping of rodents with wonder traps at 15 days interval throughout the crop existence resulted in reduction of rodent population in the range of 49.74 to 58.78%.

Consequently, 168.80, 79.35, 103.60 and 50.60 kg/ha of wheat, gram, bajra and guar crops was protected respectively. Burrow intensity and rodent damage were recorded significantly higher ( $P > 0.01$ ) in unweeded crop fields than in weeded ones. Analysis of data collected on yield loss saved has revealed that 118.21, 54.85, 81.59 and 41.51 kg/ha produce of wheat, gram, bajra and guar respectively could be saved by practising proper weeding in the crop fields.

## Role of the Squirrel, *Funambulus pennati* Wroughton as A Predator of the Coconut Leaf Eating Caterpillar

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Role of squirrels as a vertebrate pest of agriculture, horticulture, kitchen gardens etc. is well documented, however, the predating activity of the squirrel *Funambulus pennati* upon the larvae and pupae of the leaf eating caterpillar *Opisina arenosella* Walker, an important pest of coconut was observed at the Coconut Plantation, Mahuva (Gujarat). Its predating activity was observed to be maximum at (noon) during the months of October to March, when the pest population was high.

The coconut palm preferred by the squirrel was frequently visited for predation. The palm near their favourable trees were frequented more. A coconut leaf containing the known number of larvae and pupae of *Opisina* hidden in the galleries, was kept near a wall for observing the predation efficiency of squirrels. It was noted that squirrel fed 187 larvae and 45 pupae of the pest within three hours. It proved that the squirrels preferred the pest larvae more than the pupae. It was also observed that the palm visited by the squirrels were found to be relieved from the pest population to an extent of about 50%. However, there was no squirrel damage to the nuts. Thus the conservation of squirrels in coconut orchard may be enhanced to suppress the *Opisina* population.



## Species Composition of Rodent Pests and Their Management in Coconut in Godavari Delta

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After rice, coconut is the important crop of Godavari delta in Andhra Pradesh occupying an area of 1.20 lakh acres. In this locality, the gardens are being attacked by only one rodent species namely *Rattus rattus wroughtoni*. However, in coconut nurseries four rodent species viz., *Bandicota bengalensis*, *B. indica*, *Tatera indica* and *Mus booduga* were present. The nut infestations are estimated and recorded to a maximum of 21% with an average of 10% to 18%.

To minimize nut damage in coconut orchards, we have screened some rodenticides (Table 1) in central delta. All the three anticoagulants proved better than zinc phosphide with 100% control success when all the plants in the garden were treated.

Detailed studies were undertaken to control nut infestation in coconut

Table 1 Effectiveness of Rodenticides in coconut palms.

Treatment	Rodent infestation (%)								
	Pre treatment			Post treatment			Reduction		
	Plant	Bunch	Nut	Plant	Bunch	Nut	Plant	Bunch	Nut
Bromadiolone 0.005%	64	18.2	12.7	0.0	0.0	0.0	100.0	100.0	100.0
Brodifacoum 0.005%	82	25.0	15.1	0.0	0.0	0.0	100.0	100.0	100.0
Rodafarin 0.025%	48	14.8	9.4	0.0	0.0	0.0	100.0	100.0	100.0
Zinc Phosphide 2% by weight	52	27.8	10.5	16.0	7.6	3.8	69.2	87.2	56.5
Thimet 2% by weight	62	23.5	12.9	22.0	8.5	5.6	64.5	63.8	66.5
Thimet 2% + Fish meal	46	20.6	13.2	16.0	6.9	5.1	65.2	66.5	61.4

with Bromadiolone concentrate. In this garden the nut infestation was upto 10% before treating the plants with bromadiolone concentrate. Two baitings of the infested plants with bromadiolone concentrate reduced nut infestation completely and further checked reinfestation for a longer time.

[Adapted from the Annual Progress Report of AICRP on Rodent Control (ARS, Maruteru), 1994-95]

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1. Choocha Prabandh — Ek Awashyakta, Kyon aur Kaise, 1988 : 1-20  
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and R.S. Tripathi
2. Major rodent pests of agriculture — An illustrated guide, 1988 : 1-14  
A.P. Jain  
and R.S. Tripathi
3. Rodent pest management — A training manual, 1989 : 1-67  
A.P. Jain  
and R.S. Tripathi
4. Rodent management — The State of art, 1993 : 1-38  
A.P. Jain, R.S. Tripathi  
and B.D. Rana
5. Chuhon se Hone Wali Samasya avm Samadhan, 1994 : 1-19  
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and B.D. Rana
6. Fifteen years of coordinated research on rodent control, 1994 : 1-115  
B.D. Rana, A.P. Jain  
and R.S. Tripathi
7. Rodent and other vertebrate pest management in coconut and cocoa. Central Plantation Crops Research Institute, Kasaragod, Technical Bulletin 26 : 1-13  
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and A. Sujatha

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