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RODENT Newsletter

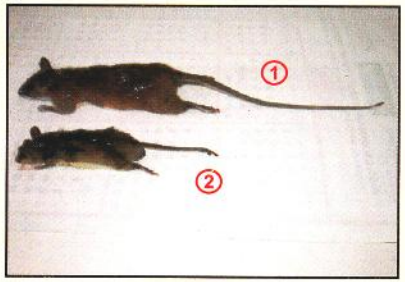
Vol. : 28 (3-4) 2004

All India Network Project On Rodent Control
Central Arid Zone Research Institute
Jodhpur - 342 003, India

Important Rodent species of NEH Region

Rattus nitidus

Berylmys sp.



1. *Leopoldalmys* sp.
2. *Niviventer* sp.

Cannomys badius

Rattus norvegicus
(Laboratory / Norway Rat)

Bandicota bengalensis

Photo Courtesy : Director (Agril.), Government of Mizoram, Aizawl

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AINP on Rodent Control
Central Arid Zone Research Institute
Jodhpur - 342 003, India

FEATURE ARTICLE

CROPPING PATTERNS AND RODENTS

Agroecosystems harbour and support diversity of prey and predatory animals and their interactions. Consequently their populations depend upon the biodiversity of crop plants and associated agrotechnologies. Populations of herbivorous animals largely depend upon the crop and weed plants and wild vegetation within any agroecosystem. Generally the rodents are omnivorous, but for most part of their food they rely on the crop plants and other vegetation and occasionally feed on insects and other invertebrates.

Agricultural developments in India during the last 4 decades beginning from the period of green revolution of 1960's involved introduction of large scale monocultures particularly of rice and wheat mainly in the Indo-Gangetic plains. Planned and managed agroecosystems based on crop monocultures provides identical niche characteristics - microclimate and nutrient sources - to the animal species depending upon the crop land ecosystem. The monocultures, which are conducive to certain species of insects and rodents, also affect and natural prey-predatory interactions as prevalent in polyculture and traditional agriculture. Unlike in the monocultures, the biodiversity of crop plants in polycultures sustain different species of animals and their ecological inter-relationships. Elimination of natural biodiverse barriers formed by wild vegetation, forest strips and intercrop uncultivated patches which generally support the populations of reptilian, avian and mammalian predators of rodents have resulted increased rodent populations in crop fields.

Diversity of ecological niche disappeared with introduction of large scale monocultures of particular crop along with the removal of biodiverse barriers during the period of green revolution. Consequently, populations of certain species of rodent pests increased with decreased predatory control. For example, population of the lesser bandicoot rat *Bandicota bengalensis* increased in Indo-Gangetic plains related to large scale rice and wheat monocultures with simultaneous decrease in the populations of other rodent species like *Tatera indica* and *Rattus meltada* which generally occur in crops like groundnut and other crops requiring lesser irrigation. Data from centres of AINP on Rodent Control clearly showed the

abundance of *B. bengalensis* in rice and sugarcane growing regions of India and of *T. indica* and *R. meltada* in groundnut, cotton and vegetable crop fields. Rice crop provides suitable ecological niche for breeding and survival of *B. bengalensis*.

Changes in cropping patterns related to agricultural development with monocultures of wheat and rice earlier and now crop diversification plans bring considerable changes in microclimate of rodents which affect their relative populations. Another major problem is the elimination of biodiverse barriers between crop interfaces affecting the predator populations. Population of predators of rodents have declined in several parts of India due to habitat changes related agricultural developments.

Though rodents are highly adaptable but are sensitive to subtle changes in their food and environment. Changes in cropping pattern drastically affected the distribution and abundance of rodents and damages by them to the crop. In India, 18 species of rodents have been identified as pests; their populations and distribution differ in different agroecological conditions which in turn are determined by the cropping patterns and related agrotechnologies.

Generally monocultures offer few biocontrol options and more biodiversity introduces more alternatives by enhancing interspecific competition permitting a reinforcing approach. Ecological based rodent control programmes emphasize the need to protect and provide favourable habitat for prey-predator dynamics to force pest reduction. Reductional strategies of rodent control using chemicals are generally used throughout India for protecting crops from rodents but their reinforcement with biocontrol options are limited in crop monocultures in which one or two species of the rodent pest often become predominant.

By:

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Some of the common rodent species of Mizoram

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A periodical rodent outbreak during the gregarious flowering of *Melocanna baccifera*, (called Mautam in Mizo), at the intervals of 48 (+ 1) years, has been observed in Mizoram since 1911. The next gregarious flowering is expected during 2006-2007. Therefore, in order to combat the expected rodent outbreak the Government of Mizoram by following guidelines of the Government of India, conducted survey of rodents and rodent population in the state since the year 2001. During these surveys following common rodent (murids) species were found in Mizoram :

1. The House rat, *Rattus rattus*: These rats are found in the urban and rural localities. They are also reported from the wet rice cultivation areas (WRC). They were trapped from bunds around WRC in Serchhip district. Jhum fields also contain burrow systems that were most likely occupied by this species. It probably moves into jhum fields after the crops has been established sufficiently to provide cover and departs for adjacent bamboo forest or scrub areas after harvest.
2. The Himalayan rat, *Rattus nitidus*: This rat appears to be a dominant rodent species in the fields and rural (villages) localities. They are also found in the houses in urban areas.
3. The lesser bandicoot rat, *Bandicota bengalensis*: They are found in all the major towns. Their presence is concentrated around godowns, stores and residential places where availability of food is abundant. Their presence have been observed in the WRC areas of Bukvannei village, Kolasib district, bordering Assam State.
4. The white bellied rat, *Niviventer niviventer*: This species is one of the common rodent pests found in the jhum lands. It probably lives in the forest and enters rice fields in night. It settles under pile of haystacks after harvest of the rice crop in the jhum lands.
5. The House mouse, *Mus musculus*: The house mouse is found in houses, damaging household articles (e.g. clothing, books etc.). They are present throughout the Mizoram.
6. The Nagarum mouse, *Mus nagarum*: This mouse species is one of the important pest in the WRC areas. Numerous burrows were observed in the bunds around rice fields in Serchhip district, from where the adults and pups were collected.
7. The bay bamboo rat, *Cannomys badius*: It is not a murid but belongs to family of Rhizomydae of Rodentia. These rats are highly specialized fossorial and are considered as significant pest in crop fields, orchard and plantation areas, including tree crops. They are found throughout Mizoram.
8. The Mackenzie's Rat, *Berylmys mackenziei*: This Indo-Chinese element is found in forests adjacent to the jhum fields and also on fallow jhum lands, probably entering rice fields at night.
9. The Edward's Rat, *Leopoldamys edwardsi*: This species probably lives in the forests, adjacent to the jhum lands and was trapped while entering in rice fields at night.
10. The Pencillate-tailed tree mouse. *Chiropodomys gliroides*: This is also called as bamboo mouse found in the bamboo forests, dwelling on the dying bamboo culms.
11. The Norway Rats, *Rattus norvegicus*: Both, the albino 'laboratory' rats and 'black hooded' species were observed as a domestic pets in many towns of Mizoram.

Rodents from Kolhapur district, Maharashtra State

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The district of Kolhapur in Maharashtra state lies between 15° and 17° N latitude and 73° and 74° E longitude in the northern part of Western Ghats. The district exhibits four main types of forests viz., subtropical evergreen, semi-evergreen, moist deciduous and dry deciduous forests. The western part of the district lies in the forested area, while eastern part has agricultural land where crops like rice, jowar, bajra, wheat, maize and cash crop like sugarcane and tobacco are grown. Faunistic surveys were conducted in Kolhapur district including conservation areas like Radhangari and Chandoli wildlife sanctuaries. During these surveys rodent collections were made from different locations in the district. Six species have been

collected from varied habitats whereas five species were actually sighted at different places by one of the authors (MSP) during these surveys. Table 1 gives an account of species collected and/or sighted, their methods of collection and the habitats from where the specimen were obtained/sighted.

Table 1. Rodents of Kolhapur district, Maharashtra.

S.No.	Rodent species	Locality	Remarks
1.	House rat, *Rattus rattus rufescens* (Gray)	Kurundwad, Inspection Bungalow	Trapped in wonder traps set in and around forest rest house
2.	Indian mole rat, *Bandicota bengalensis kok (lordi)* (Gray)	Rest house, Pundle	(Tail tip white) Collected from sugarcane fields
		Ghatprabha river Kurtanali Vill. Tal. Chandgad	Caught by excavating the live burrows in the harvested fields near a river bank and forest rest house
3.	Large bandicoot rat, *Bandicota indica* (Bechstein)	Nrusinhwadi, Tal. Kurndwad	Live specimen were seen in cultivated fields
4.	Common Indian field mouse, *Mus booduga* (Gray)	Mathali Saval Talab, Kurndwad	Caught live from the cultivated fields
5.	Indian field mouse, *Mus dunni* Wroughton = *Mus booduga* (Gray)(Agrawal 2000)	30 km NW of near Kumbhoj, Tal. Hatkanagle	Caught live by excavating the burrows in the forested area
6.	House mouse, *Mus musculus* (Linnaeus)	Radhanagari Wildlife Sanctuary	Sighted indoor in the Guest house of Radhanagari Wildlife Sanctuary
7.	Elliot's spiny mouse *Mus saxicola* Elliot	Radhanagari Wildlife Sanctuary	Studied one damaged skull collection from Radhanagari Wildlife Sanctuary
8.	Indian bush rat *Golunda elliotti* Gray	Radhanagari Wildlife Sanctuary	Sighted near hilly forest on the border of Radhanagari catchment area close to the Sanctuary
9.	Indian Palm Squirrel, *Funambulus palmarum bellaricus* (Wroughton)	Ramitirth mandir	Trapped in the dense forested area in Western Ghats. First collection record in the region
10.	Jungle striped / Western Ghats, striped Squirrel, *Funambulus tristriatus* (Waterhouse)	Radhanagari Wildlife Sanctuary and Chandoli Wildlife Sanctuary	Sighted live specimens in forested area of Western Ghats
11.	Indian crested porcupine, *Hystrix indica* (Kerr)	Changad	Sighted live specimen in Sugarcane fields

Exploration and establishment of burrows by *Bandicota bengalensis* in the wheat fields

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A wheat field (one acre) in the vicinity of Fish Farm was selected in the campus of Punjab Agricultural University, Ludhiana. Records of live burrows of *Bandicota bengalensis* starting from its entry in the wheat field upto desertion of burrows was maintained at an interval of 15 days starting from November to May. Upto growth stage, all the openings of the burrows were plugged and fresh openings were recorded after 3 days. From tillering stage of the crop when sufficient number of burrows was available, 10 burrows complexes of *B. bengalensis* were selected for observations.

Observations have shown that the first rodent entrant in the wheat field after sowing was *Mus* spp. *B. bengalensis* started its activity at germination stage but before its entry into the field, it scratched the bunds along the foot paths by forming semicircular structures, a part of the burrow system. It was observed that inside the crop, *B. bengalensis* started dig-

ging burrows at the growth stage of the wheat crop and number of burrow complexes increased continuously up to dough stage (Table 1). Heaps of soils were found in the burrow complexes and clear paths or runways on which these rats were moving to harvest the panicles were found. All the burrow complexes had multiple openings varying from 2-15. After plugging, all the surface openings of burrow complexes were not re-opened (Table 1). Starting from dough stage to post-harvest, panicles of wheat varying in number were found lying near the burrow openings. *B. bengalensis* deserted its burrows after 15 days of removal of harvested wheat bundles from the field.

Table 1. Exploration and establishment of burrows by *B. bengalensis* in wheat field.

Crop stage	No. of burrow complexes/acre	*Plugged surface openings/complex	*Surface reopenings/ complex
Germination	1	-	-
Growth	2	-	-
Tillering	10	5.7±2.1	6.4±2.4
Dough	15	6.9±2.3	5.4±1.5
Maturation	15	7.1±2.8	5.9±2.1
Post harvest bundles in field	15	5.8±1.3	4.6±1.7
Bundles removed from filed	15	4.5±1.8	0.7±0.1

*Obeservation from 10 complexes / acre.

Rodent damage in summer squash vegetable crop fields at seedling stage in Punjab

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Summer squash (Chappan Kadoo) is a common vegetable crop of Punjab. Small sized (0.2-1 hectare) fields of Chappan Kadoo are often located among the fields of wheat and vegetables and also sown along with other vegetables like cauliflower, capsicum and chillies. This crop is frequently attacked by large population of rodents at seedling and fruiting stages. To find out the extent of rodent damage to the cucurbit vegetable crop at seedling stage, three crop areas viz., Dulma and Orae villages of district Sangrur and Saholi village of district Ludhiana (Punjab) were surveyed. At each location three fields of approximately 1 acre area were selected. Trapping of rats was carried out to know the species of rats present at different locations (Table 1). Rodent damage in the form of removal of seedlings was seen just after 10-15 days of sowing. Ten rows per acre were selected randomly for observing rodent damage. Number of seedlings present and number of seedlings removed per row were counted and percent damage was calculated. Our observations at all these three locations indicated that rodents caused more than 20% damage at seedling stage in all the study villages (Table1). This severe damage by rodents to chappan kadoo crop caused serious economic loss to the farmers.

Table 1. Rodent damages in summer squash crop at seedling stage.

Study village	Adjoining Crops	Rodent Species	%Damage	
			Range	Mean±SD
Village Dulma (Distt. Sangrur)	Cauliflower, chappan kadoo fodder	*B.b., R.m., Mus spp.*	16.40-27.20	20.67±4.69
Village Orae (Distt. Sangrur)	Cauliflower, cabbage, wheat	*B.b., T.i., Mus spp.*	15.00-40.00	25.67±10.53
Village Saholi (Distt. Ludhiana)	cauliflower, sugracane, wheat	*B.b., Mus spp.*	22.97-27.34	24.54±1.98

B.b.- Bandicota bengalensis; R.m. - Rattus meltada; T.i. - Tatera indica

Efficacy and palatability of bromadiolone against house rats, *Rattus rattus*

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Bio-efficacy and palatability of bromadiolone, a second generation anticoagulant rodenticide was evaluated against house rats, *Rattus rattus* in laboratory. The experimental rodents trapped from houses and godowns in Meerut city were acclimatized in individual cages for two weeks. Three test concentrations of the anticoagulant (0.0025, 0.005 and 0.01 per

cent) in bait were evaluated under three exposure periods of 24, 48 and 72 hours in no choice tests. Based on the findings of no choice tests, feeding trials under choice tests were conducted for two concentrations (0.0025 and 0.005%) under one exposure period of 72 hrs only.

In no choice tests, all the test concentration yielded cent per cent kill of test rat under various exposure periods (Table 1) except in one case the mortality was 90% with the lowest test concentration (0.0025%) and exposure period (24 hrs). Mean mortality period for different exposure periods was minimum (6.0 - 6.50 days) at 0.005% concentration. Amongst the three test concentrations, medium dose (0.005%) at 48 hrs exposure was found optimum dosage yielding complete kill of test rats within 2-11 days with a poison bait intake of 18.5 g/100 g body weight.

Table 1. Toxicity of bromadiolone against house rats *Rattus rattus*

S.No.	Conc. in bait (%)	Feeding period (days)	Mortality	Mean mortality period (days)	Range of mortality (days)	Consumption of poison bait g/ 100g body wt (Mean±SE)
1.	0.0025	1	9/10	4.80±0.07	4-16	9.0±0.588
		2	10/10	7.0±0.47	4-13	18.0±0.771
		3	10/10	7.0±0.86	3-12	23.60±0.766
2.	0.005	1	10/10	6.0±0.81	3-9	13.0±0.492
		2	10/10	6.20±0.51	2-11	18.50±1.080
		3	10/10	6.50±0.47	3-11	30.60±0.098
3.	0.010	1	10/10	7.0±0.47	4-14	11.00±0.471
		2	10/10	7.0±0.94	3-13	20.00±0.524
		3	10/10	6.0±0.47	4-10	28.50±0.496

Choice feeding trials revealed fairly good palatability and acceptability of poison bait because no statistical difference was observed between consumption of poison bait and unpoisoned plain bait in both the test concentration (Table 2). However, the poison bait at 0.005% conc. yielded cent per cent mortality of rats in reduced mean period (6.4 days) as compared to the lower test concentration of 0.0025% (8.5 days).

Table 2. Efficacy and palatability of bromadiolone against house rat, *Rattus rattus* under three day choice feeding.

S.no.	Conc. in bait (%)	Mortality	Days to death Mean	Days to death Range	Mean consumption of poison bait (g/100g/day)	Mean consumption of plain bait (g/100g/day)
1.	0.0025	9/10	8.5±0.57	4-12	5.0±0.71	6.8±0.37
2.	0.005	10/10	6.4±0.33	3-12	5.2±0.41	6.8±0.09

Impact of education and training on rodent control in Kalyanpur, Kanpur (U.P.)

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The present study was conducted to quantify the impact of education and training on adoption of rodent management technology by the farming community. The study was conducted in a cluster of villages in Kalyanpur Block, Kanpur (U.P.). Three study areas in the Block were selected as (i) Maintenance area (Vill - Jogarajpur) (ii) Neglected area (Vill - Naramau and N.S.I. (iii) Survey area (Vill. Bagdaudhi kachhar) for a three year study (2000-02). The maintenance area was kept under strict supervision of scientists with respect of education and propaganda on rodent control and organization of rodent control operation before *Kharif* and *Rabi* sowing. Similar activities were done in neglected area also but only once during *Kharif* season. The survey area was kept as check i.e. without any of rodent control activities. Pre and post control census were recorded by trapping rodents in houses and live burrow count (LBC) in fields. The opinion survey was also conducted by interviewing farm families before and after the implementation of the study.

The three years long experiments in rural houses and crop fields yielded excellent insight among farmers regarding rodent pest management in all the three selected areas. The rodent species trapped from the houses included *Rattus rattus* and *Mus musculus*. The crop fields were predominantly inhabited by *Bandicota bengalensis* followed by *Tatera indica*, *Millardia meltada* and *Mus booduga*. The opinion survey conducted at the beginning and the end of the Project regarding socio-religious belief, rodent damage and their interest and experience in rodent control operations clearly envisaged a peculiar change in responses of rural community of adopted villages.

As a result of perpetual anti rodent operations as per technical schedule in maintenance and neglected areas for three years, there was an increase of 26.6 and 24.0% in number of farmers interested in rodent control in maintenance and survey areas, respectively (Table 1). It was interesting to note that farmers of survey area (20.0%) also realized rodent problem and adopted control techniques after learning the practices followed in maintenance and neglected areas. For controlling the commensal rodents use of safer rodenticide, bromadiolone cake received good acceptance by farm women. Use of good quality traps for collecting commensal rodents was also appreciated by 13.3 per cent women to avoid the accidental hazards to non-target organisms.

Tables 1: Response of farming community towards rodent control.

Areas	Beginning of the project (2000)			Termination of the project (2002)			Percent increase
	Families interviewed	Families responded	Percent response	Families interviewed	Families responded	Percent response	
Maintenance	30	15	50.0	30	23	76.5	26.5
Neglected	25	14	56.0	25	20	80.0	24.0
Survey	30	12	40.0	30	18	60.0	20.0

These activities yielded encouraging results so much so that the average decline in rodent population achieved was 85.39% in houses and 91.83% in fields of maintenance area whereas, 65.91% in house and 83.98% in fields of neglected area (Table 2). The farmer oriented efforts of the scientists in maintenance and neglected areas created a new zeal in the mind of farming community regarding rodent control. These observations therefore suggested that rodent control technology imparted by the authors through education, training and demonstrations yielded good acceptance by the farming community of this area.

Table 2 : Success of rodent control operations during the study period (2000-02).

Areas	Pre operational (Mean)		Post operational (Mean)		Percent decrease (-) /increase (+) of rodent population (Mean)	
	Rats/houses	L.B.C./ha.	Rats/houses	L.B.C/ha.	Rats/houses	L.B.C./ha.
Maintenance	3.08	11.76	0.45	0.96	85.39 (-)	91.83(-)
Neglected	3.99	17.48	1.36	2.80	65.91(-)	83.95(-)
Survey	4.65	24.96	5.05	37.36	8.60(-)	49.67(-)

Report on current situation of rodent problem in bamboo flowering areas of Manipur

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Plant Protection Adviser to the Government of India, at the request of Department of Agriculture and Cooperation, GOI, constituted a Central Team of Rodent Experts to visit the rodent affected areas of Manipur. The team consisted of Dr. R.S. Tripathi, Project Coordinator (Rodent Control) as Chairman and Dr. K.A. Pathak, Jt. Director, ICAR Research Complex for NEH Region, Mizoram Centre, Kolasib (Mizoram) and Dr. A.M.K. Mohan Rao, Rodent Specialist, NPPTI, Hyderabad as members. The term of reference alloted to the team was to (i) take stock of present situation of rodent menace in bamboo flowering areas of Tamenglong, Churchandpur and Chandel districts of Manipur, and (ii) to suggest possible control measures. Accordingly the team visited the rodent affected areas of the state from April 5-8, 2004.

During the visit, the team held detailed discussion on rodent problem with Mr. Saichuwana, Additional Chief Secretary, Manipur, Director Agriculture and other senior officials of the Department of Agriculture, Conservator of Forests and Head of Dept. of Entomology, Central Agril. University, Imphal. The team undertook extensive field visits of several villages in Tamenglong and Churchandpur district and interacted with District Agril. Officers, extension functionaries and the farmers. Salient observations and recommendations emanated after discussion and field surveys are briefed as under :

1. Manipur has 76% of forest area (3691.77 sq.km) with over 90% representing the bamboo species, *Melocanna baccifera* which has a flowering cycle of 48 years and is likely to flower *en mass* in next 3 years. This species was abundant in Tamenglong, Chandel and Churchandpur districts and Jiribam sub division of Imphal district of Manipur state.
2. Currently another local bamboo species, *Dendrocalamus hamiltoni* with a flowering cycle of 48 years was under flowering. This species is sparsely distributed. It is believed that flowing of *M. baccifera* follows

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the flowering of *D. hamiltoni*. Flowering of this species was mainly responsible for rodent menace during 2003 in the State.

3. Department of Agriculture has identified the vulnerable areas on rodent outbreak in districts of Tamenglong (20526 ha); Churachandpur (5402 ha), Chandel (947 ha) and Jiribam sub divisions of Imphal east district (400 ha). During the year 2003 various sub divisions of Tamenglong district experienced 53.9 - 83% rodent damage to crops, whereas it was 30% in Churachandpur district.

4. Department of Agriculture has included rodent control in the work plan of the Macro management scheme in agriculture. The work plan includes survey and surveillance, Trainers' training, Farmers' training and education and utilization of traps and rodenticides for rodent control.

5. Forest Department of Manipur too has made an action plan for management of gregarious flowering of these two bamboo species. The action plan envisages (a) resource survey and mapping, (b) resource extraction and management through harvesting bamboo on a commercially viable way from about 38000 ha area (c) resource utilization by mechanical pulping mills and encouraging bamboo based industries (d) regeneration of logged over area with 50% regulated natural regeneration.

6. The major rodent pest species in Manipur is Himalayan rat, *Rattus nitidus*. Locally available bamboo traps may prove highly effective in the region. Safety to non target species as well as protection of Rodenticidal baits from weathering in jhum and WRC fields is quite essential. Therefore, bait stations made of bamboo may be popularized. Research support could be obtained from the ICAR Research Complex for NEH Region, Mizoram center, Kolasib (Mizoram). Besides, guidance from Project Coordinator (Rodent Control) may also be sought.

7. Rodent menace related with bamboo flowering may be included as one of the components under NDM scheme of Department of Agriculture.

8. ICAR may consider to organize on priority through Ad-hoc projects, studies on (i) habitat of jhum field rodents for fine tuning the surveillance system of rodent pests, (ii) evaluation of efficacy of indigenous traps, (iii) screening of bamboo bait stations and (iv) evaluation of different formulation of rodenticides.

9. For developing trained manpower in the field of rodent management specialized Trainers' training for District officials be organized at regular intervals. This trained contingent should arrange on farm training for concerned staff and farmer leaders before onset of cropping season. Subsequently Farmers' training may be planned for horizontal expansion of the technology among farmers. Visual media will have more impact in empowering the farming community for initiating appropriate rodent management measures. Hence, efforts in this direction are also required on priority.

NOTES AND NEWS

In -State Training on Rodent Pest Management in Mizoram: In view of the reports about increasing rodent problem in bamboo flowering areas of Mizoram, an In-State Training on State of Art, Technology on Rodent Management was organized at Aizawl and Kolasib on Nov. 5-6, 2004. The training was imparted to 47 officers of Department of Agriculture, Veterinary and Public health. The topics covered during the Training programme included (i) Diagnosis of rodent species in Mizoram (Dr. M.S. Pradhan, Zoological Survey of India, (WRS), Pune) (ii) Principles in Rodent pest management and control tactics to tackle the out breaking rodents (Dr. R.S. Tripathi, AINP on Rodent Control, CAZRI, Jodhpur) (iii) Rodent surveillance and reporting system to prevent major rodent out breaks (Dr. A.M.K. Mohan Rao, National Plant Protection Training Institute, Hyderabad) and (iv) Public health diseases transmitted by rodents and procedures in collecting and screening the samples for rodent borne zoonotic diseases (Dr. S. Biswas, National Institute of Communicable Diseases, Bangalore). Emphasis was given on strict monitoring and surveillance of rodent pests in problem areas using the quadrate and diagonal methods of damage assessment in rice crop in jhum and WRC situations, respectively.

Expert Committee Meeting on Rodent Control: The third Meeting of Expert Committee on Rodent Control was held under the Chairmanship of Dr P. S. Chandulkar, Plant Protection Advisor to the Government of India, Dte. of Plant Protection, Quarantine and Storage Faridabad at New Delhi on 28.08.04. The Committee reviewed the current status of

Rodent problem in bamboo flowering areas of North -Eastern Hill States. The Department of Agriculture and Cooperation, Ministry of Agriculture (GOI) requested all the NEH states to monitor the rodent situation periodically and submit the quarterly progress to the Plant Protection Advisor. The Committee also stressed upon the human resource development in the region since the rodent problem is still in initial stages only. Besides the extension approaches for popularization of existing know how of rodent control, the Committee was informed that ICAR has already sanctioned a research project on these lines to ICAR Research Complex for NEH Region, Barapani, Meghalaya for generating research data specific to the region to bridge the knowledge gap and also for refinement of long as well as short term strategies of rodent control bamboo flowering. In addition to the efforts of Ministry of Agriculture (GOI),ICAR and the respective State Govts., the National Institute of Communicable Diseases, New Delhi is also actively associated in this issue. NICD is involved in creating awareness in the region, especially in Mizoram, as this state shares common borders with Mynmar, where the plague foci exists. Other issues discussed by the Expert Committee were (i) Rodent control with relevance to the zoonotic diseases, (ii) Surveillance of rodent pests at National level, (iii) Environmentally suitable rodent management measures and (iv) human resource development.

RECENT PUBLICATIONS

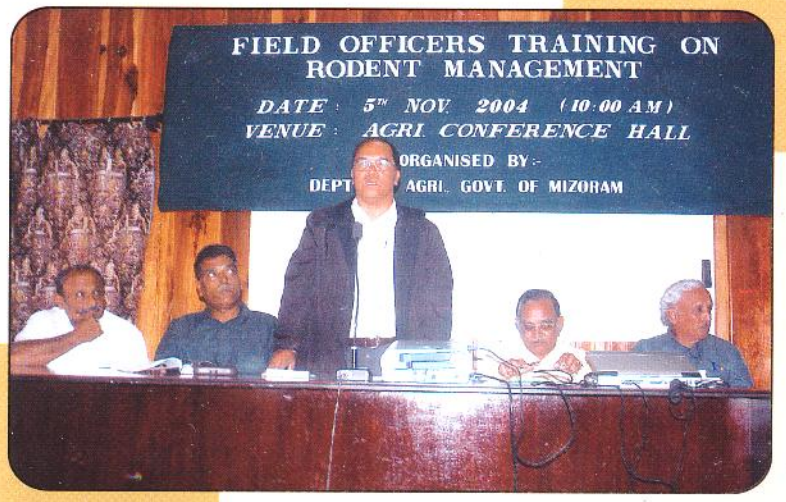
Jacob, J. 2003. Short term effects of farming practices on populations of common voles. *Agriculture, Ecosystems and Environment.*, 95 : 321-325.

Jacob, J. and Hempel, N. 2003. Effects of farming practices on spatial behaviour of common voles. *Journal of Ethology*, 21 : 16-22.

Kaur, R. and Parshad, V.R. 2004. Relationship of burrowing density of rodents in fields of single and multiple crops in summer season. *Environment & Ecology*, 22 : 221-225.

Menon, Vivek. 2003. *A field guide to Indian Mammals*. Dorling Kingsley (India) Pvt. Ltd. New Delhi P. 200.

Rao, AMKM. 2003. Rodent problem in India and strategies for their management. In *Rat, Mice and People: Rodent Biology and Management*. (Eds. G.R. Singleton, L.A. Hinds, C.J. Krebs and D.M. Spratt) 203-212. ACIAR Monograph No. 96, Canberra, Australia.



State Training on Rodent Management at Aizawl on Nov. 5, 2004

Mr. Dipana, 87 year old farmer of Tamenglong district (Manipur) sharing his experiences of rodent out breaks during bamboo flowering years of 1958-59 and 1976-77

Contributions for inclusion in the Newsletter may please be forwarded alongwith 1 - 2 good black and white / colour photographs to :

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