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भाकृअनुप
ICAR

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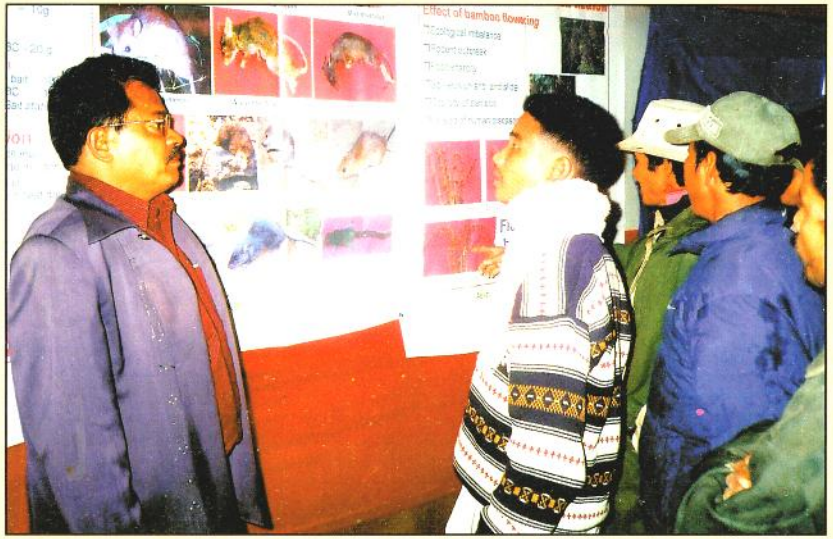
All India Network Project On Rodent Control

Central Arid Zone Research Institute
Jodhpur - 342 003, India

Dr Mangala Rai, Secretary DARE (Govt of India) and Director General, ICAR at Rodent Management Stall in North East Agri- Fair at Pasighat, Arunachal Pradesh



Farmers visiting Rodent exhibition during North- East Agri- Fair-2009 at Pasighat, Arunachal Pradesh

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AINP on Rodent Control

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Observations on post natal growth in lesser bandicoot rat, *Bandicota bengalensis*

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The lesser bandicoot rat, *Bandicota bengalensis* Gray and Hardwicke, 1833 is the most predominant and wide spread rodent pest of agriculture in wet and irrigated crops in India. High rate of reproduction and growth has made it a highly successful vertebrate species. Postnatal growth patterns of individuals are important for understanding the population dynamics of the species.

Since age specific growth patterns are not readily obtainable from field populations, the data on postnatal growth of the lesser bandicoot rat was collected from pups delivered and reared in laboratory. Four pregnant females of *B. bengalensis* were live trapped from the crop fields and kept separately in rearing cages each of size 76 x 40 x 40 cm. A wooden nest box containing cotton as the nesting material was provided in each cage. Food and water were provided *ad libitum*. Food consisted of cracked wheat, powdered sugar, groundnut oil and milk powder in ratio 85: 5: 5: 5, respectively. In addition to this, fresh green food brought from crop fields was also offered. The young ones delivered by the four females were observed starting from their birth till the age of 9 months to record the time of appearance of different morphological characteristics, their body weights (g) and body dimensions such as length (mm) of head, body, tail, fore limb (fore arm and hand), hind limb (hind leg and foot) and ear at different intervals.

All the four females delivered pups at night at different times in the rearing cages within the wooden nest boxes provided in each cage. The average number of pups delivered were 10.00 ± 2.04 with a range of 6 to 14 and male to female ratio varying from of 1 : 0.71 to 1 : 2 (Table 1). The newly born young ones were of pink colour, devoid of hair with eyes tightly closed. The body of young ones started turning gray from day 4 after birth and became completely covered with fine hair within 12-14 days. All the young ones opened their eyes on day 17. Due to cannibalism the number of young ones decreased with time. An increase in average body weight was observed with age of the animals. The gain in body weight was found to be more in the initial periods of growth, which slowed down with the increasing age of the animal (Table1).

Table 1. Postnatal age versus body weights of young ones of *Bandicota bengalensis*

Female	Litter size (sex ratio)	Day after birth	No. of pups	Body weight (g) (Mean ± SE)
I	7 (1:0.75)	13	7	15.28 ± 1.13
		91	6	77.50 ± 3.09
		258	3	143.33 ± 16.67
		279	3	140.00 ± 17.51
II	14 (1:1)	8	6	10.67 ± 0.49
		86	4	53.75 ± 3.15
III	6 (1:2)	6	6	12.33 ± 0.61
		84	4	79.50 ± 12.89
		251	2	217.50 ± 37.50
		272	2	232.50 ± 37.50
IV	13 (1:0.71)	2	8	1.87± 0.22
		71	2	77.50 ± 2.50
		238	2	200.00 ± 20.00
		259	2	221.00 ± 1.00

A strong parental care was witnessed is lesser bandicoots. Mothers showed aggressive behaviour and started picking-up the pups in their mouth whenever the youngs were taken out for various observations.

Morphometric measurements also increased with increasing age of the animals (Table 2). Two days after birth, the average length of head and body, tail, fore limb, hind limb and ear was found to be 47.81, 17.91, 10.00, 12.50 and 3.44 mm, respectively which increased to 92.14, 44.64, 20.71, 23.57 and 10.00 mm, respectively at the age of 13 days and 192.00, 137.50, 44.50, 37.50 and 23.00 mm, respectively at the age of 272 days.

Table 2. Age specific post natal morphometric measurements of *Bandicota bengalensis*

Age (days)	No. of animals observed	Length in mm (Mean ±± SE)						
		Body	Head	Body + Head	Tail	Fore Arm + Hand	Lower leg +foot	Ear
2	8	30.63± 0.41	14.38± 0.41	47.81± 0.87	17.91± 0.57	10.00± 0.47	12.50± 0.47	3.44 ± 0.46
6	6	39.58± 0.30	24.17± 1.00	63.75± 0.53	31.67± 1.41	23.75± 1.05	24.58± 0.72	6.25± 0.42
8	6	40.42± 0.77	26.25± 1.25	66.67± 1.39	33.75± 1.19	13.75± 0.56	18.75± 0.56	7.50± 0.00
13	7	55.71± 2.09	36.43± 1.53	92.14± 3.55	44.64± 1.49	20.71± 0.71	23.57± 0.74	10.00± 0.00
259	3	142.50± 1.00	53.00± 12.50	195.50± 1.00	125.00± 13.50	40.00± 10.00	39.00± 0.00	20.00± 1.00
272	3	137.50± 7.50	54.50± 5.50	192.00± 13.00	137.50± 12.50	44.50± 0.50	37.50± 0.50	23.00± 1.00

Rodent problem in cocoa plantations in Western Ghats of Karnataka

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Cocoa, *Theobroma cocoa* L. is an important plantation crop of Dakshin Kannada (12° 27' and 13° 58' N latitude and 74° 35' and 75° 4' E longitude) in coastal Karnataka. The crop is grown in Western Ghats region of Karnataka, Tamil Nadu and Kerala in South India. Surveys of cocoa grown areas in five districts of Karnataka viz., Chickmagalur, Kodagu, Shimoga, Dakshina Kannada and Uttara Kannada revealed that squirrels and rats are the important rodent pests damaging cocoa pods .It is very difficult to distinguish the damage done by the different animals in cocoa plantations. However, depending on the nature of damage based on visual observations, one could distinguish the damage. Squirrels are diurnal and feed on fresh pods in day hours. They make a cut with irregular scratches on any portion of the pod preferably at the center. Rats are the main

rodent pests of cocoa and cut holes mainly at chalazal end of the fruit i.e., towards the end attached to branches leaving no irregular scratches around the hole. Rats also burrow at the base of seedlings, often causing death of the plant.

Squirrel damage commences at the beginning of the fruiting season (July-August) whereas rat damage persists throughout the season (July-December). At Charmudi, 20% and 9% damage to pods was estimated due to squirrels and rats, respectively. In the season the damage may go up to 50%. Pod damage by squirrels and rats in May-August may go as high as 95,000 pods /four months/100 trees. The jungle cats, monkeys, and stags, were the other vertebrates causing serious damage to cocoa in this region.

Sugar as additive in zinc phosphide bait for improving acceptance by *Rattus rattus*.

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Rodents possess acute sense of smell and taste and are very sensitive in food choice. For the control of rodents, baiting with acute and/or chronic rodenticides is recommended but there is remarkable variability in the acceptance of their baits and mortality caused. Zinc phosphide is in use for a number of years as acute rodenticide but it has poor bait acceptance problems (neophobia or taste rejection), sub-lethal dosing effects (taste or odor aversion) and subsequent conditioned aversion leading to bait shyness. Thus for higher acceptance and palatability there is a need for a taste enhancer in zinc phosphide baits. During present investigation an attempt has been made to reformulate zinc phosphide bait using sugar which may reduce bait rejection by rats in the presence of abundant alternate food in their natural habitat.

Adult house rats *Rattus rattus* trapped live were weighed, sexed and caged individually for acclimatization to laboratory conditions with food and water provided *ad libitum*. Animals were divided into three groups G1, G2 and G3 with 7 animals in each group. Animals in group G1 were provided bait, B-1 containing cracked wheat mixed with oil in the ratio of 98:2 in no-choice feeding test for 5 days while animals in group G2 were provided bait, B- 2 containing cracked wheat mixed with

oil and sugar in the ratio of 96:2:2 again in no-choice feeding test for 5 days and animals in group G3 were provided both baits B-1 and B-2 without and with sugar in bi-choice feeding test for 5 days. The position of feeding bowls was altered everyday to overcome place preference. Consumption of baits was recorded after every 24 hours. After 5 days zinc phosphide (2%) was mixed in both kinds of baits and given in above fashion to all the three groups of animals for 5 hours. Consumption of baits and mortality were recorded after 5 and 24 hours respectively.

In no-choice feeding test (G1 and G2), consumption of plain bait B-1 and B-2 did not differ significantly while in bi-choice feeding test (G3), consumption of bait B-2 (with sugar) was significantly more than bait B-1 (without sugar) with 35.78% more acceptance of plain bait with sugar. Short exposure to 2% zinc phosphide for 5 hours resulted in quick mortality of *Rattus rattus* both in no-choice and bi-choice feeding trials due to acute lethal action of zinc phosphide but zinc phosphide bait with sugar both in no-choice and bi-choice feeding test showed more acceptability or higher ingestion of active ingredient resulting in earlier and higher mortality (100%) than animals provided poisoned bait without sugar (Table 1).

Table 1: Acceptance of bait by *Rattus rattus* with and without sugar

Parameters	No-choice		Bi-choice	
	Bait B-1 (G1)	Bait B-2 (G2)	Bait B-1 (G3)	Bait B-2 (G3)
Body weight (gm)	164.28±3.42	151.67±6.05	161.43±7.21	161.43±7.21
Plain bait consumption (g/100g bw)	6.82±0.46	7.37±0.44	3.68±0.55*	5.73±0.52
Treated bait consumption (g/100g bw)	0.76±0.15	1.19±0.23	0.47±0.08*	1.51±0.32
Active ingredient of poison consumed (mg/kg bw)	1.90±0.37	2.98±0.58	1.18±0.20*	3.78±0.81
% Mortality	71.43	100.00	100.00	
% Acceptance of plain bait with sugar	7.46		35.78	
% Acceptance of treated bait with sugar	36.13		68.87	

** Significant difference between consumption of B-1 & B-2 in bi-choice feeding test at 1% level of significance*

Percent mortality within 24 hours was high (100%) using poisoned bait with sugar. This occurs due to the increased consumption of rodenticide bait in the presence of sugar as taste enhancer generating higher toxicity. Increased consumption of zinc phosphide bait with sugar may lead to lessened time to leave bait exposed to non-target animals. Moreover bait prepared with taste enhancer, would reduce quantity of baits needed thereby minimizing environmental contamination and ecological imbalances that otherwise might be created by excessive use of rodenticides. The results therefore revealed that zinc phosphide bait with sugar is highly effective, fairly acceptable and palatable causing cent percent kill of house rats.

Porcupine damage to cashew in coastal and hill regions of Karnataka

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Cashew (*Anacardium occidentale* Linn.) is highly preferred by many vertebrate pests like birds, bats and rodents. Among rodents, porcupine, *Hystrix indica* Kerr has been reported to cause serious damage to cashew nuts. Porcupine damage to cashew plantations was recorded during 1998-2004 by collecting the number of chewed apples of cashew found at the base of 25 randomly selected trees at Subramanya, Dakshina Kannada. Porcupines with their sharp incisors made irregular splittings of the cashew nut shell and gained an access to feed on the nutritious cotyledons of the nuts. Scattered nutshells under the trees and the footprints clearly indicated the movement of porcupines and their numbers.

In Cashew orchard, on an average, there were 20 apples / tree during May –June months. On an average five fallen apples and 15 nuts shells were observed at the base of a tree. A close examination of damaged nuts and pugmarks revealed that an individual porcupine devoured /destructed about 15-20 nuts/ night. Whether the fruit is ripened or raw, the porcupines damaged the fallen cashew nuts. Management practices adopted by farmers included timely and regular harvests of nuts, timely picking of fallen nuts and providing alternative foods like *Alocasia, Diascoria*, Agave, *Colacasia, Gloriasesa* etc in the open space surrounding the cashew plantations.

Rodent problem in rice based cropping systems in Assam

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Field surveys conducted in five villages viz, Raidangoni, Jengri, Naganchuk, Sriluit and Pohardia of Majuli subdivision, District Jorhat during November 2008 - March 2009, revealed predominance of lesser bandicoot rat, *Bandicota bengalensis* in the crop-fields. The cropping systems followed in the region include Rice-vegetables and rice-mustard. These villages are experiencing sporadic flowering in a variety of bamboo species, viz., *Bambusa balcooa*, *B. nutans*, *B. tulda* and *B. pallida* since 2007-08 with no record of any rodent outbreak.

Table 1. Incidence of rodent pests and its damage to crops in Assam

SNo	Crops	Live Burrow density/ha	Trap index	Crop damage
1.	Rice (*Sali*)	29.6 ±3.36	9.44 ± 1.52	9.02 ± 0.92
2	Rice (*Bao*)	37.8 ± 1.92	11.67 ± 2.32	13.75 ± 4.66
3	Pea	27.0 ± 4.10	8.89 ± 1.24	9.43 ± 2.17
4.	Toria Mustard	3.2 ± 0.84	1.67 ± 3.18	1.78 ± 1.20
5.	Potato	25.5 ± 4.11	8.89 ± 1.24	8.96 ± 1.96
6.	Black gram	11.2 ± 1.30	2.23 ± 1.24	4.33± 1.49
7.	Green gram	13.4 ± 1.14	4.45± 1.52	5.67 ± 0.92
8.	Sugarcane	35.8 ± 0.84	12.79 ± 1.52	11.33 ± 1.82
9.	Pumpkin	22.5 ±5.30	7.42 ± 1.52	7.39 ± 1.26

The incidence of rodent pests in terms of trap index, live burrow counts and extent of damage to various crops was studied. *Bao* rice was found to be most preferred crop for rodents with 37.8 burrows/ha closely followed by sugarcane (35.8 burrows/ha) and *Sali* rice (29.6 burrows/ha). The trap index (rodents/100 traps/night) in these crops ranged between 9.4 (sali rice)-12.8 (sugarcane). *Bao* rice suffered maximum rodent attack with 13.8% tiller damage followed by sugarcane (11.3%) and sali rice (9.0%). Among vegetables, pea, potato and pumpkin recorded 22.5-27.0 burrows/ha with crop damage ranging between 7.4 –9.4 %. Rodent population in kharif pulses was relatively lower 11.2 (black gram) and 13.4 burrows /ha (green gram) with 4-5% damage. Toria mustard fields recording minimum burrow density (3.2/ha) and trap index (1.7) proved least preferred crop by lesser bandicoots (Table 1).

Training-cum-Workshop on Rodent Pest Management at Gandhinagar (Gujarat): A Report

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Training-cum-workshop on Rodent Pest Management was organized at the Directorate of Agriculture, Gandhinagar on 6-7 January 2009. The clientele included senior officers of Agriculture and Health Departments of Government of Gujarat and representatives from rodenticide Industry. The major aim of the Training cum workshop was to prepare Action Plan on Rodent Reservoir/Vector control in South Gujarat in order to prevent the incidence of Leptospirosis during 2009 and also to increase the productivity of crops. The districts included Valsad, Navsari, Surat and Tapi. The Rodent Specialist, National Plant Protection Training Institute, Hyderabad, the Project Coordinator, All India Network Project on Rodent Control, Central Arid Zone Research Institute, Jodhpur representing Agriculture sector and the Joint Director, Zoonoses Division, National Institute of Communicable Diseases, Delhi representing Health sector were the technical resource persons of this training cum workshop.

The workshop was inaugurated by Hon'ble Minister of Agriculture, Government of Gujarat, Gandhinagar. The Principal Secretary (Health) and Director of Agriculture were also present in the inaugural session. The Principal Secretary (Health) felt that the incidence of Leptospirosis is on increase in South Gujarat and the number of deaths due to this disease is on raise with years. She expressed concern since this disease has spread to newer villages and adjoining Bharuch district also during 2008. Multiple reasons were attributed for increase in the incidence of this disease, among which role of rodent vectors in spreading the disease was also stressed. Hon'ble Minister stressed the need for concerted efforts by both Agriculture and Health departments to contain the disease through inter-departmental

collaborative actions. He requested the participants to prepare a realistic action plan which will yield field results in not only reduction of incidence of leptospirosis, but also boost the productivity of agriculture crops. The Director of Agriculture requested the participants to take all measures to fulfill the aim of the training cum workshop.

Technical sessions followed the inaugural session i : The ICAR Project Coordinator presented to the house the importance of rodents in Gujarat in Agriculture sector and also role played by rodents in spreading leptospirosis. The technological development efforts of ICAR project including distribution of rodent species in Gujarat and recommendations on rodent control were elucidated. The NICD Joint Director presented history of zoonoses diseases in Gujarat. He traced the efforts of NICD in the diagnosis and management of both Plague and Leptospisosis in South Gujarat districts. The Deputy Director (Epidemic), Commissionerate of Health, Gandhinagar, Gujarat gave details of the disease with newer manifestations and its surfacing at newer areas. He wished that rodent vector control might prevent the disease incidence in the state. The Joint Director, Inputs, Department of Agriculture gave presentation on the efforts of the department in rodent control activities from 2001 onwards. The District Agriculture Officers also presented the district level information on the rodent control activities conducted by them for the last 4-5 years. The Rodent Specialist, NPPTI, Hyderabad presented constraint analysis in the management of rodent pests in South Gujarat districts. He stressed the need of identifying strategies as well as management plan to implement the strategies during 2009 to achieve tangible results and to prevent the incidence of this disease.

The role of rodenticides in rodent management was stressed by Project Coordinator. The representatives of rodenticide industry gave presentations on their role and preparedness in the efforts to combat rodent pests/vectors. The Rodent Specialists gave broad guidelines in developing the Action Plans by respective District Officers on rodent control campaigns to be organized during 2009. District wise discussions were held involving representatives of Agriculture and Health Departments in preparing action strategies for their respective districts. The Macro Level Plan of Action were reviewed and finalized after detailed discussions. It was decided that Micro Level Plan of action with specific dates to implement various actions would be worked out in the district level capacity building programmes in due course of time.

Plan of Action for Rodent Management

1. Affected villages in clusters with chronic incidence of Leptospirosis adjoining the affected districts were selected to cover for anti rodent activities. The cluster/Blocks includes Valsad with 96 villages, Chikli Block with 89 and Gandevi Block in Navsari district with 59 villages, Bardoli with 82 villages, Mahuva of Surat district with 80 villages and Valod in Tapi district with 40 villages. The unaffected villages in these Blocks will form control to assess the control operations.

2. Surat Medical College, Surat may screen the rodents for sero-positivity on priority. Rodent collection may be made from crop fields and farm houses of affected areas. Species of *Bandicota bangalensis, Millardia meltada, Tatera indica, Rattus rattus, Mus musculus* and *Mus booduga* are to be tested for sero-positivity. Deputy Director, Mobile Epidemic Team, Surat will assist in sample collection in rural areas. Surat Municipal Corporation will contribute by collecting rodent samples in urban areas and also extend assistance in the rural areas. SMC may undertake anti rodent activity since Surat is endemic to this disease and also plague.

3. The District Agriculture Officers of Valsad, Navsari, Surat and Tapi are to get information on village-wise (i) total area for treatment, (ii) cropping system, (iii) village wise demography indicating social status, migratory population, (iv) soil parameters including moisture, (v) analysis of lift irrigation and canal water, (vi) climatic data viz., rainfall and humidity, (vii) irrigation pattern with extent of water use and (viii) microbial chemistry of soil. This primary data may be collected by the end of January, 2009 and provided to the Nodal Officer at the Directorate of Agriculture.

4. Rodent infestation in crop fields should be worked out using the protocol annexed with this report. This activity may be completed by the end of February, 2009 and information may be passed on the Nodal Officer. Both wheat and sugarcane fields are to be covered for measuring the infestation.

5. The District Health Officers may get information on village wise number of Leptospirosis cases, deaths since 2000, particulars of prevailing serovars, changes in disease symptomology and total disease burden. The information may be provided to the Nodal Officer.

6. The Animal Husbandry department may get information on animal census, use of energy pattern and data on Leptospirosis serovars of farm animals. The information may be provided to the Nodal Officer.

7. Bromadiolone 'CB' is identified as safer anticoagulant rodenticide. The rodenticide in 100 g packets may be procured for rodent control campaigns. It will be used at 0.005% a.i. (1:49 in bait) in the proposed campaigns. The requirement of the chemical could be worked out based on rodent infestation as could be surveyed in the fields. However, to start with it may be worked at 10 g per hectare, in the absence of field data.

8. Broken rice will be the bait material and 2% groundnut oil will be used as binding medium. Bait contribution from the individual farmers, Panchayats, cooperatives, dairy units may be taken.

9. Anticoagulant baits will be prepared at village Panchayats on pre fixed dates in the selected villages with rodenticide contribution from the Agriculture Department and bait contribution from various sources. Only prepared rodenticide bait in 10 g paper packets may be given to the farmers based on the infestation in their fields.

10. Capacity building programmes will be organized at Surat and Navsari in the first fortnight of April, 2009. National Plant Protection Training Institute under Ministry of Agriculture, Government of India, at Hyderabad may undertake these programmes in consultation with the Director of Agriculture, Gujarat. Resource persons from ICAR Rodent Project and NICD may also be involved. Apart from the identified technical persons for undertaking anti rodent campaigns, the Sarpanches of the selected villages may also be trained in these programmes to get village level participation and cooperation. Rodenticide manufacturing industry may collaborate in capacity building and anti rodent activities.

11. Anti Rodent activities on campaign basis may be organized in all the villages in the first fortnight of June, 2009. Staggered dates may be given for rodent control campaign to pool up more trained technical manpower in the earmarked villages on those dates. The District Collectors may be requested to issue letters to all concerned departments for coordinated actions.

12. The nodal officer for the identified rodent control activities may be the Deputy Director of Agriculture (Pesticides), Directorate of Agriculture, Gandhinagar. He will coordinate various actions in bringing the campaign activities. The Deputy Director (Epidemic), Department of Health may liaise with Agriculture Department for collaborative actions.

Field efficacy of castor based repellent - Ecodon on rodent incidence in rice

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A castor based rodent repellent in granule formulation was evaluated against rodent infestation in Rice fields of Directorate of Rice Research (DRR) located in ICRISAT farm, Pathancheru, Andhra Pradesh during 2007. The rodent incidence was measured using burrow count and damage index methods. Plots of 85 X 30m dimension were taken for the study in 6 replications with 1 control plot, wherein the treatment of rodent repellent granule was not given. The castor based rodent repellent granules mixed in sand @ 800g/5kg sand was broadcasted on the boundary of experimental plots above the grass at 30cm. width. The repellent was applied four times due to incessant rains that have washed away the previous applications, although the repellent can be effective for 45 days on each application.

The experimental formulation was found to be an "Area repellent" showing repellent effect on the field rodents without tasting any bait or seed material. They were repelled from the applied areas and thus could not inhabit inside the rice fields. Average number of burrows in the untreated control plot was 57.8, which was significantly reduced to 15.13 repellent treated experimental plots. Similarly significant reduction in crop damage from 29.4% to 5.51% was also observed (Table 1). There were no observed or reported effects of the repellent granules on the non-target species in the study area.

Based on the extent of rodent damage (Table 1) estimated yield loss comes to 220 and 1176 kg/ ha in treated and untreated control fields, respectively. In economic terms the yield losses due to rodent infestation was significantly lower in treated plots (Rs 3,967/ha) as compared to that

in control (Rs 21,168 /ha). As a result of reduction in rodent damage, the potential increase in rice production is expected as 956 Kg per ha with a net saving of Rs. 17,201 per hectare. The cost of chemical repellent was Rs. 150/- per kg and with labour component the total cost comes to Rs.847.05/ha. Thus, the cost benefit ratio would be 1: 20.

Table 1. Impact of castor based repellent 'Ecodon' on rodent incidence in rice

Formulation	Effect of repellent on			
	Rodent infestation (No of burrows) (Mean ± S.E.)		Rodent damage (%) (Mean ± S.E.)	
	Treated	Untreated	Treated	Untreated
Granule	15.13 ± 4.31	57.8 ± 3.89	5.51 ± 1.58	29.4 ± 0.60

NOTES AND NEWS

Andhra Pradesh includes three more Districts under rodent control programmes: In the delta region of the state, rodents cause havoc in rice crop particularly in *rabi* season. Because of rice-rice-pulse cropping system and occurrence of flash floods and cyclones, the region experiences severe rodent problem and even rodent outbreaks in some years. Department of Agriculture, Govt of Andhra Pradesh initiated anti rodent campaign on community basis initially in three delta districts of Krishna, East Godavari and West Godavari during 2003-04 rabi season. Prior to the campaigns, rodent experts of NPPTI, Hyderabad and AINP on Rodent Control Maruteru center provided training on rodent management to the extension functionaries of these districts. Organization of Apex Level Trainings on Rodent management regularly at Hyderabad and Maruteru has further facilitated creation of trained manpower in State.

A close coordination between rodent experts, Agriculture department and Farmers has made this program a great success. The Scientist provide the technical know how through on farm trainings and State Agriculture Department provides the chemical rodenticide (Bromadiolone CB). To make them feel as an active partner of the campaign, the farmers contribute the bait material i.e., broken rice and oil. The baits contributed by farmers are pooled and poison baits prepared in the villages under the supervision of trained personnel. Farmers applied

the baits at panicle initiation stage of the crop. Panchayats are given the responsibility of treating the common property resources. A repeat application was also done if needed after 10 days. The campaign is being regularly organized now during rabi season every year.

The rodent control success in last five years (2003-04 to 2007-08) has been very spectacular. An average rodent control success of 73.6, 72.7 and 81.2% was achieved in Krishna, East and West Godawari Districts, respectively. Guntur district was included during 2007-08 and an area of 1.63 lakh ha was brought under rodent control treatment, which recorded 74% reduction in tiller damage in rice. The feedback received from the Department indicated that farmers are harvesting an additional yield of 300-500 kg of rice/ha quintals by adopting a community based rodent control strategies. Encouraged with the success of the programme and the reduction in rodent damage, the Govt of Andhra Pradesh has included three more districts, viz., Karimnagar, Nalgonda and Khammam in 2008-09. This year, the rodent population in terms of live burrows was 45-49 burrows/ha in Krishna, East and West Godawari Districts whereas it was 22-28 burrows/ha in newly included districts. The Department has taken up rodent control programme in 8.0 lakh ha area in these six districts during 2008-09.

New centers of AINP on Rodent Control: Indian Council of Agricultural Research has decided to initiate research on rodent management at two centers viz., College of Horticulture and Forestry, Central Agricultural University, Pasighat (Arunachal Pradesh) and Central Agricultural Research Institute, Portblair (Andaman & Nikobar Islands) during Eleventh Five Year Plan.

North-East Agri Fair-2009 at Pasighat: Central Agricultural University, Imphal organized a two day North- East Agri Fair on January 28-29, 2009 at College of Horticulture and Forestry, Pasighat (Arunachal Pradesh). The Fair was inaugurated by Dr Mangala Rai, Sectretary, Deptt of Agricultural Research and Education (GOI) and Director General, Indian Council of Agricultural Research, New Delhi on January 28, 2009. An exhibition on Rodent Pest Management was arranged by AINP on Rodent Control in the Fair. During his inaugural address Director General highlighted the problems of rodents in NEH region in view of gregarious

bamboo flowering and announced the opening of a new center of AINP on Rodent Control at Pasighat. During his visit of the Fair, Director General appreciated the efforts of the Project in developing effective technologies for rodent management. More than 5000 farmers visited the exhibition and showed keen interest on rodent species diversity in the region and management technologies utilizing indigenous traps and bait stations.

Apex level Training at Hyderabad: Twenty-third Apex Level Training Rodent Pest Management was organized from February 25-27, 2009 at Hyderabad by National Plant Protection Training Institute, Hyderabad in collaboration with A.N.G. Ranga Agricultural University (ANGRAU), Hyderabad. The trainee participants were drawn from Deptt of Agriculture, Haryana (2), Andhra Pradesh(3), Madhya Pradesh (2), Tamilnadu (3) and Nagaland (2), Department of Health, Gujarat (1), ICAR Research Institutes (4), ANG Ranga Agricultural University, Hyderabad (3), Haffkine Institute, Mumbai (1), Greater Mumbai Municipal Corporation (2) and Food Corporation of India, Bangalore, Chennai, Hyderabad and Kozhikode (one each) and Rodenticide Industry(1). Dr A. M. K. Mohan Rao, NPPTI, Hyderabad, Dr R. S. Tripathi, Project Coordinator (Rodent Control), Dr N. Sriniwas Rao, ANGRAU, Maruteru and Dr K. Malla Reddy, Dr Sarups Pest Control Pvt Ltd, Hyderabad were the resource persons. The training started with, presentation of feedback about rodent problem in various sector viz., Agriculture, Health, Storage and urban situations by the participants. The trainee officials were explained about (i) Economic importance of rodents in agriculture and storage (ii) Major rodent pest species of the country (iii) Breeding biology of pest rodents and (iv) Role of rodents in public health through lectures. Interactive discussions cum skill development exercises on (i) Diagnosis of rodent species and infestation (ii) Assessment of damage (iii) Choice of control strategies and (iv) Rodenticides. Baiting techniques were demonstrated at farmer's fields in a nearby village. Training on preparation of Crop-rodent calendar and ecological aspects of rodent management was also imparted. Practicals on rodent management in storage were undertaken in a warehouse. The three-day programme ended with a preparation of group wise action strategies in rodent management and group discussion.

Shri Dilipbhai Sanghani, Hon. Minister of Agriculture, Gujarat addressing the officials during Training cum Workshop on Rodent Pest management in Gandhinagar

Apex level Training on Rodent Pest Management at National Plant Protection Training Institute, Hyderabad (Feb. 25-27, 2009)

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

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