ISSN 0972 - 2939

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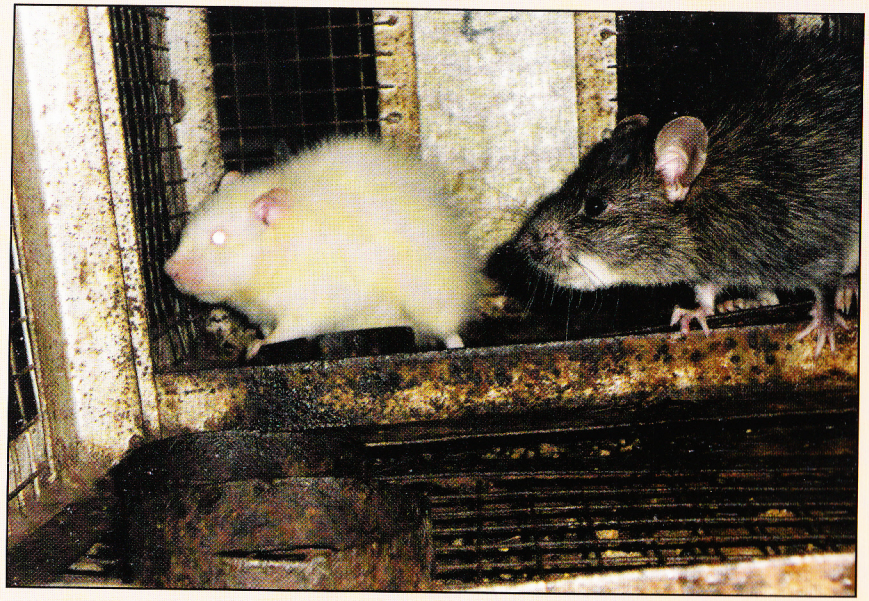
RODENT Newsletter

Vol. : 37 (3-4) 2013

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

Albino *Bandicota bengalensis*



Pairing of Albino & Normal *B. Bengalensis*

ISSN 0972 - 2939

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AINP on Rodent Control
Central Arid Zone Research Institute
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Rodents from Pune and Satara districts of Maharashtra State

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The Pune and Satara districts are located in the western region of Maharashtra State. South boundaries of Pune and north boundaries of Satara districts bound together. Geographically most of the part lies under range of mountains (Sahyadri) of northern part of Western Ghats. Faunistic surveys of both the districts including conservation areas was conducted and collected rodent specimens were preserved at Zoological Survey of India, Western Regional Centre, Pune. Specimens available at Zoological Survey of India, Kolkata, National Institute of Virology, Pune and Bombay Natural History Society, Mumbai were also studied. Present communication reports occurrence of 20 and 18 rodent species/subspecies from Pune and Satara districts (Maharashtra), respectively (Table 1).

Table 1. Rodents of Pune and Satara districts, Maharashtra

Sl. No.	Name of species / subspecies	Pune District	Satara District	Remarks
Family : Sciuridae				
1	*Funambulus tristriatus tristriatus* (Waterhouse)	+	+	-
2	*Funambulus palmarum bellaricus* Wroughton	+	+	-
3	*Funambulus pennantii pennantii* Wroughton	+	+	-
Family : Muridae				
4	*Tatera indica* (Hardwicke)	+	+	-
5	*Vandeleuria oleracea oleracea* (Bennet)	+	+	-
6	*Rattus rattus rufescens* (Gray)	+	+	-
7	*Rattus rattus wroughtoni* Hinton	+#	+#	Found throughout the Western Ghats
8	*Rattus satarae* Hinton	+	+	-
9	*Madromys blanfordi* (Thomas)	+	+	-
10	*Millardia meltada meltada* (Gray)	+	+ #	Found throughout Maharashtra
11	*Millardia kondana* Mishra and Dhanda	+	-	Reported only from type locality "Sinhgad", Pune
12	*Mus musculus castaneus* Waterhouse	+	+	-
13	*Mus booduga booduga* (Gray)	+	+	-
14	*Mus cookii nagarum* (Thomas)	+	-	Reported from Pune (NIV collection) appears to be an isolated record, needs confirmation through field surveys
15	*Mus platythrix* Bennet, 1832	+	+	-
16	*Mus saxicola saxicola* Elliot	+	+ #	Found throughout Western Ghats in Maharashtra
17	*Golunda ellioti ellioti* Gray	+	+	-
18	*Bandicota bengalensis bengalensis* (Gray & Hardwicke)	+	+	-
19	*Bandicota indica malabarica* (Shaw)	+	+	-
20	*Bandicota maxima* Pradhan *et al.*	+	+ #	Throughout the Maharashtra
	Total	**20**	**18**	

+ Present; # No collection record

Incidence of rodent pests in Rice-Vegetables cropping systems in Assam

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Regular monitoring of rodent incidence in the farmers' field of village 36 Ghoria, Bekajan, district Jorhat (Assam) in an area of 10 ha was carried out from 2009 to 2012 during Rabi and Kharif season. The predominant cropping system in the area was rice-vegetables. Live Burrow Count (LBC), Trapping Index (TI) and Rodent Damage (% cut tillers) were recorded at maximum tillering, panicle initiation (PI), flowering, dough and ripening stages of sali rice crop. *Bandicota bengalensis*, Rattus sikkimensis and *Mus booduga* were the major rodent species infesting the rice crop. Further live burrow count, trapping index and rodent damage at different crop

stages increased with the advancement of the crop stage in all the three years (Table 1). Highest LBC (33.70/ha), TI (13.10) and cut tillers (16.30%) were recorded at ripening stage of the crop followed by dough stage with LBC, 25.50/ha, TI, 11.64 and cut tillers of 14.40 per cent. The lowest LBC (7.90), TI (3.10) and cut tillers (2.71%) were recorded at the maximum tillering stage.

Table 1. Live burrow count, trapping index and damage percentage of rodents in rice (kharif, 2009-2012)

Stage of the crop	Live burrow count(No./ha)	Trapping Index (TI)	Rodent damage (%cut tillers)
Max. tillering	7.90	3.10	2.71
Panicle Initiation	15.90	6.00	8.99
Flowering	23.60	9.60	12.54
Dough	25.50	11.64	14.40
Ripening	33.70	13.10	16.30

In vegetable crops viz., beet, cauliflower, cabbage, brinjal, pumpkin, potato, pea, carrot, knolkhol and raddish incidence of *B. bengalensis*, *R. sikkimensis* and *Dremomys lokriah* was observed. The maximum live burrow count (LBC/ha) was recorded in pea (17.20), followed by potato (14.39), pumpkin (11.70) and beet (10.22). In other vegetables like radish, knolkhol, carrot, cabbage, brinjal and cauliflower, the LBC/ha were comparatively less ranging between 3.38-8.29/ha (Table 2).

Similarly, the extent of damage was also maximum in pea crop (16.44%) followed by potato (16.27%), pumpkin (13.0%), beet (10.12%), whereas other crops such as cauliflower, brinjal, cabbage, carrot, knolkhol and radish recorded rodent damage between 3.66 to 7.76 (Table 2).

Table 2. Live burrow count (LBC) and rodent infestation in different vegetables in rice-vegetable cropping system (2009-2012)

Sl No.	Crops(vegetables)	Live burrow count (No./ha)	Damage (%)
1	Beet	10.22	10.12
2	Cauliflower	6.11	3.66
3	Brinjal	5.80	4.87
4	Pumpkin	11.70	13.00
5	Potato	14.39	16.27
6	Pea	17.20	16.44
7	Cabbage	4.65	6.10
8	Carrot	6.26	5.75
9	Knolkhol	3.38	3.78
10	Radish	8.29	7.76

Critical Timings of rodent control in wheat crop sown under rice residue management

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A rodent control experiment was conducted in wheat crop sown under residual moisture of rice using Happy Seeder. A total of nine fields, each of 0.4 ha area were selected (three at main (PAU) campus and six at Ladhowal Seed Farm, PAU, Ludhiana) for the study. Three fields each at PAU campus (Block I) and Ladhowal Seed Farm (Block II) were sown with Happy Seeder and remaining three fields at Ladhowal Seed Farm (Block III) were sown with conventional tillage. Live burrow baiting with 2% zinc phosphide was carried out in fields of Blocks I and II, sown with Happy Seeder in the month of October-November, 2011 i.e. after sowing of crop and no further rodenticide treatment was undertaken afterwards. Block III sown under conventional tillage was kept as untreated control. In the month of April, 2012, pre-harvest rodent damage was recorded. From each field, five samples of $1m^2$ were taken covering all the four geographical sides and the centre of the field. From each sample, healthy as well as cut tillers were counted to determine rodent damage as per the formula given below.

$$\text{Percent cut tillers} = \frac{\text{Cut tillers}}{\text{Cut tillers + Healthy tillers}} \times 100$$

Average cut tillers/m^2 was calculated for all the fields. For calculating yield loss due to rodents, ten tillers were taken from each field and their grain yield per tiller (g) was worked out. Percent yield loss was determined by multiplying percent cut tillers with yield loss per tiller. Yield loss (g/m^2) was determined by multiplying average cut tillers/m^2 by yield/tiller. The data was extrapolated to calculate yield loss in Kg/0.4 ha. The rodent species responsible for the damage was *Bandicota bengalensis*, its population as revealed from burrow density (Fig. 1) and trap index (11.115) was more in the sandy plains of Ladhowal Seed Farm, near Satluj river. Results (Table 1) revealed no rodent damage in wheat crop

fields sown with Happy Seeder at PAU main campus (Block I), however, in fields sown with Happy Seeder at Ladhowal Seed Farm (Block II), 8.81% cut tillers were observed leading to an yield loss of 18.24% or 193.75 kg/0.4 ha. In the untreated control fields (Block III) 1.91% tiller damage was recorded which resulted in 4.26% yield loss leading to a loss of 32.02 kg/0.4 ha. There was a significant difference ($P<0.05$) in damage and yield loss among all the three blocks of wheat crop.

Table 1. Rodent damage in wheat crop sown under rice residue management

Block	Location	Sowing practice	Percent cut tillers	Percent yield loss	Yield loss (Kg/0.4 ha)
I	PAU campus	Sown with Happy Seeder	0.00 ± 0.00^{a}	0.00 ± 0.00^{a}	0.00 ± 0.00^{a}
II	Ladhowal Seed Farm	Sown with Happy Seeder	8.81 ± 3.47^{b}	18.24 ± 7.18^{b}	193.75 ± 76.16^{b}
III	Ladhowal Seed Farm	Sown with conventional tillage	1.91 ± 0.86^{c}	4.26 ± 1.92^{c}	32.02 ± 16.06^{c}

Values are Mean ± SE, Values with different superscripts in a column differ significantly at $P<0.05$

Fig. 1. Burrow complex of *Bandicota bengalensis* in wheat crop sown under rice residue management in flood plain area at Ladhowal Seed Farm of PAU, Ludhiana

The studies thus indicated that in the wheat crop sown with Happy Seeder, it is necessary to undertake burrow baiting in the months of October-November (after sowing) as there is an increased rodent infestation due to the availability of food and shelter at this stage. However, need based second poison baiting (in the month of February) may be undertaken depending on the rodent infestation. Present studies therefore suggest symptomatic rather than prophylactic control measures in such crops.

Studies on rodent and flea surveillance in Cumbum valley, Theni district of Tamil Nadu

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Plague has ravaged many countries of the world including India in the past century and enzootic foci exist in some parts of the country resulting in its periodic outbreaks. The Cumbum valley situated in Uthamapalayam Taluk of Theni district in Tamil Nadu is one such erstwhile plague endemic area. The Cumbum valley lies at latitude 9°44'N and longitude 77°17'E and is situated at 4,000 ft above mean sea level (MSL) with peaks reaching to 6,000 ft or more. The center of the valley is wet and fertile being irrigated by perennial streams, whereas the high sides of the valley consist of dry red soil and is partly cultivated through well irrigation.

The Cumbum valley receives rainfall from both southwest (SW) and northeast (NE) monsoons (annual average rainfall: 791.2 mm). More than half of the average rain occurs by the NE monsoon in October to December. The mean minimum and maximum daily temperature varies between 29.7°C (December) and 37.5°C (May). The climate is therefore favourable for plague transmission.

Human plague in Cumbum valley area, Theni district, Tamil Nadu: Human plague cases were recorded in some of the districts of the Tamil Nadu state since 1889, however in the Cumbum valley, first human plague infection was recognized only in 1920. During the period of 1926- 1933, this area was devastated by plague and a total of 11,191 cases were

reported, out of which 4,365 (30%) died. Rat Flea Survey carried out during 1928-1929 showed that in Uthamapalayam (Cumbum Valley area) the specific flea index of *Xenopsylla cheopis* and *X. astia* were 4.69 and 2.30, whereas in Theni (Other areas) it was 2.0 and 4.87, respectively. The Specific flea index of *X. cheopis* in Cumbum valley was high round the year. The laboratory observations showed that the rats from Cumbum valley were highly susceptible to plague infection than the rats from other areas. Climatic, social conditions, rat susceptibility and specific flea population were all favourable for the spread of human plague in Cumbum valley (George and Webster, 1934). In addition to intensive studies on the epidemiology of plague by the Director of Public Health, Madras anti-plague measures were continued during the period of 1930-41 mainly by undertaking cyanogas fumigation in rodent burrows, which resulted in successful control of plague from the area.

Plague Surveillance and Rodent Ectoparasite (REP) survey: The NCDC team carried out plague surveillance activities in February, 2007 in 10 towns and villages of Cumbum valley area by live rodent trapping through wonder traps in domestic, peri-domestic and wild situations. A total of 109 rodents (*Rattus rattus*-102, *Tatera indica*-6, *Bandicoota indica*-1) and four insectivores (*Suncus murinus*) were collected. During the survey trap positivity rate was calculated to be 13.75 percent and the area wise rodent and flea indices computed (Table 1). Blood and organ/ smear samples from all the collected rodents were subjected to serological and bacteriological tests. Besides, a total of 113 human sera samples were also collected from the endemic villages to detect the evidence of plague anti-bodies. The serological and bacteriological investigations on human/ rodent specimens indicated that samples were negative for bipolar organisms and the sera samples showed no evidence of *Yersinia pestis* F1 Antigen by Passive Haemagglutin / Haemagglutin Inhibition tests. Similarly no pathological features suggestive of plague infection in rodent organs could be detected. The ecto-parasitic fleas collected from rodents were identified as *Xenopsylla cheopis* (121) only and the mean flea index (absolute and specific) was 1.17. The areas with relatively higher trap positivity (5 localities) registered a flea (*X. cheopis*) index of more than the critical level.

Table 1. Rodent Ectoparasite (REP) survey in Cumbum valley area of Tamil Nadu during February, 2007

SN	Name of town/ village surveyed	Total traps used[1] (No)	Total rodents collected (No)					Total fleas Collected	Absolute Flea index (AFI)	Specific flea index (SFI) for *X. cheopis*
			Rr	*Ti*	*Bi*	*Sm**	Total			
1	Gudalur	100	11	-	-	01	12	09	0.7	0.7
2	Cumbum	100	22	-	-	-	22	29	1.32	1.32*
3	Uthamapalayam	100	10	-	-	-	10	08	0.8	0.8
4	Oomaiyan Thozuvu	50	-	-	-	01	01	-	-	-
5	Plaiyankudi	50	-	-	-	02	02	-	-	-
6	K.K.Patty	50	03	-	-	-	03	03	1.0	1.0*
7	N.D.Patty	50	02	-	-	-	02	02	1.0	1.0*
8	Chinnamanur	100	33	2	-	-	35	42	1.27	1.27*
9	Periyar lower camp	100	04	3	-	-	07	05	-	-
10	Anumanthapatty	100	17	1	01	-	19	23	1.35	1.35*
	Total	800	102	6	01	04	113	121	1.17	1.17

[1] Wonder traps used; Rr =*Rattus rattus*; Ti = *Tatera indica*; Bi= *Bandicota indica* and *Sm= *Suncus murinus* (Insectivore)

Based on these reports of high flea density in erstwhile plague endemic areas, the State health authorities carried out necessary anti flea measures, viz., Insufflations of rodent burrows with insecticide dusts and residual insecticide spray in such villages. A follow up survey was undertaken by the NCDC team during March, 2009 which indicated drastic reduction of the vector flea index and the specific flea index (below the critical level for the transmission of plague) in the all the localities studied (Table 2).

Various published information on incidence of Plague in Cumbum valley areas during 1930s has revealed incidence of wide spectrum of ecto-parasite fleas' diversity with 4 species viz., *X. cheopis*, *X. astia*, *Ctenocephalides canis*, and *Echidnophaga gallinacean* and rodents. Amongst these flea species *X. astia*, is the indigenous flea of South India and *X. cheopis* appears to have been introduced and spreading into fresh areas chiefly with the help of cotton and grain trade and the plague epidemics are directly associated with its density. Compared to earlier reports, only one flea species (*X. cheopis*) and three rodent species (*R. rattus*, *T. indica* and *B. indica* were observed in the present findings. High

flea index, frequent and unrestricted movement of grains, poor sanitation, abundance of rats and ideal climatic conditions were all conducive factors for the plague transmission in the Cumbum valley area.

Table 2. Results of REP survey at Cumbum valley area of Tamil Nadu during March 2009

SN	Name of Village	Total tarps* used (No)	Total rodents collected (No)				Total Fleas collected (No)	Absolute Flea Index (AFI)	Specific Flea Index (SFI) for *X. cheopis*
			Rr	*Ti*	*Bi*	Total			
1	Gudalur	75	1	-	-	01	-	0	0
2	Cumbum	93	12	-	2	14	9	0.6	0.6
3	Chnnamanur	60	3	-	-	03	-	-	-
	Total	228	16	-	2	18	9	0.56	0.56

**Wonder traps used; Rr: Rattus rattus; Ti: Tatera indica; Bi: Bandicota indica*

The present study therefore clearly indicated that presently only one flea species i.e., *X. cheopis* is occurring in the erstwhile plague endemic Cumbum valley areas and the other species has been replaced. This is mainly attributed to changes in the ecology, cropping pattern, insecticide usage and interaction of other governing factors. Since this area is having all the potential factors for the transmission of plague, routine surveillance measures need to be undertaken by the health authorities for the early detection and prevention.

Eucalyptus and citronella oils as potential repellents against house rats

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The house rat, *Rattus rattus*, one of the most common commensal rodent pest worldwide, damages, contaminates and spoils packed food and non-food materials in transit and storage besides being involved in transmission of several diseases to man and livestock. It is the predominant pest species infesting and depredating poultry farms in Punjab, India. Increasing community awareness of the moral and animal welfare issues associated with conventional pest animal control has focused interest on

non-lethal alternatives such as the use of essential oils as repellents. Experiments were conducted in laboratory pens, maze and store houses using two essential oils namely eucalyptus and citronella oils to study their potential as repellents against *R. rattus* of both sexes. In laboratory pens, three different concentrations of the two oils i.e. 5, 10 and 20% were tested. Each concentration was applied as paint, as encapsulated wax blocks and as spray. Further for each concentration and method of application of two oils, the oil was applied daily, once a week, and alternatively in a week. Results revealed repellent effect of both the oils at all the three concentrations tested as indicated by significantly ($P<0.05$) low consumption of food from treated side of the laboratory pen. Significantly higher repellent effect was observed when the oils were applied as spray. The repellent effect of eucalyptus oil was more pronounced against female rats whereas the effect of citronella oil was more against male rats. Multi-choice experiment conducted in T-maze using 5% eucalyptus and citronella oils as encapsulated wax blocks in choice with no treatment revealed significantly ($P<0.05$) higher repellent effect of eucalyptus oil compared to citronella oil. Bi-choice experiment conducted in I-maze using 5% eucalyptus oil as encapsulated wax blocks in choice with no treatment showed significantly ($P<0.05$) reduced movements and activities of both male and female rats in treated zone compared to untreated zone. In store house experiments conducted using 5% eucalyptus and citronella oils as encapsulated wax blocks and as spray revealed more percent repellency and control success with eucalyptus oil as encapsulated wax blocks. Present studies thus reveal the potential of eucalyptus and citronella oils as repellent against *R. rattus* of both sexes.

Pesticidal property of neem formulations against *Mus musculus* albino

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Rodents are amongst the most important competitor with human beings for food and shelter. They are responsible for damaging and destroying more than 42 million tons of food worldwide. Present day rodent control technology is based on use of toxic (acute as well as chronic)

rodenticide, which pose serious hazards to human and other non-targets. Therefore efforts are needed to explore the botanical products which are safe and effective against the rodent pests. The present communication is an attempt in this direction to evaluate the efficacy of neem leaf powder and neem oil against house mouse, *Mus musculus*, which is an important rodent pest in commensal and storage situation.

The experiments were conducted against *M. musculus* (albino) under no choice tests. The experimental mouse (6 male and 6 female) acclimatized in laboratory were fed on bajra flour+sugar+vegetable oil (96:2:2) for 3 days.

In phase 'A' twelve individually caged healthy mice (6 males and 6 females) were provided with the bajra flour, sugar and neem powder leaves 5% and 10% for 3 days (5% and 10% concentration was obtained by dissolving neem leaf powder in propylene glycol). Similarly in phase 'B' 12 healthy mice were taken and experimented with bajra flour, sugar and neem oil 5% and 10% for 3 days. Water was provided *ad libitum* in both the experiments. The difference in the consumption in the food was analyzed statistically.

Table 1. Mean daily intake of food g/100g Body weight by *Mus musculus* (albino)

Bait	1st day	2nd day	3rd day	Mean of total daily intake
Plain bait Bajra flour+Sugar + Veg. oil	12.28 ±4.24	13.24±4.24	12.68±4.62	13.72±1.28
Phase A (i) Bajra flour+Sugar + Neem leaf powder 5%	6.42±1.62	5.48±2.62	6.44±1.88	5.88±1.24
(ii) Bajra flour+Sugar+ Neem leaf powder 10%	5.32±1.88	4.42±1.44	3.22±1.68	4.24±1.84 ($P < 0.05$)
Phase B (i) Bajra flour+Sugar+ Neem oil 5%	3.22±1.88	4.12±1.88	2.42±1.88	3.88±1.88
(ii) Bajra flour + Sugar+ Neem oil 10%	3.42±2.4	2.22±2.68	2.12±1.68	2.82±2.4 ($P < 0.01$)

Result of the investigation presented in Table 1 evidently reflects that the mean daily intake of plain food was more than the feed mixed with neem leaves or neem oil. Consumption of treated food with neem

leaves powder was reduced to half 5.88 to 4.24g/100g b. wt. at both the concentrations (5% and 10%) as compared to plain food (13.72 g/100g b. wt.), indicating antifeedent property at these concentrations. Neem oil under no choice condition also showed some adverse effect on the feeding of mice as their intake further declined (3.88 and 2.82 g/100g b. wt.) at both the test concentrations (5% and 10%), respectively. Further animals avoid the smell of the oil and were reluctant to consume the oil treated foods. The results revealed that these two neem formulations may be effectively used for rodent management, however detailed study under field condition needs be further experimented against rodent pests.

Effect of castor based repellent on wild boar damage to maize around Hyderabad

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Due to regulatory measures to protect the Wildlife in different countries, the populations of most wildlife species have increased considerably and in many places, such species have become serious pests of agricultural crops and are also competing for resource utilization with domestic stock. Although a number of wild animals are causing damage to agricultural crops, wild boar (Sus scrofa) damage has been widely reported from all over the country. Due to provisions of Wildlife Protection Act, wild boars cannot be caught or killed leaving few management options like frightening, fencing, trenching, trapping and by repelling these wild animals. All these methods except the last one are labour intensive and expensive. An attempt was made to screen the performance of granular formulation of castor based vertebrate repellent against the wild boars in maize crop around Hyderabad during kharif, 2013.

The study was conducted in the farm areas in Oorella village under Ranga Reddy District, Andhra Pradesh. Castor oil based repellent granule formulation (Ecodon - trade name) was used for the study. The repellent granules of one kg were mixed with 5 kilograms of sand and broadcasted on the bunds around the experimental maize plots at 10 cm width, twice at one month interval. Observations on plant damage were assessed using quadrate method (5x5 m quadrates) with 06 replications.

In the repellent treated plots, the initial mean damage was 12.41 per cent (Table 1) with individual damage ranging from 1.77 to 19.94%. The high variance of wild boar damage may be due to random selection of the plots in the study area. There was no fresh wild boar damage after the repellent application. However, the visits of the wild boars around the fields could be noted through their foot prints adjoining the repellent broadcasted row. It is apparent that they did not enter the plot exhibiting the properties of area repellent, preventing the wild boars to cross the repellent broadcasted bund to enter in the maize crop. Evidence to this extent has been earlier reported in sorghum crop, when sorghum fields were tied with jute rope treated with castor based repellent. Since the Ecodon appears to work basically through emitting odour that repels the wild boars, there exists potential threat of sensory adaptation on continuous exposure and also due to dissipation of the odours with the circulating fresh air in the crop fields. However, absence of any fresh damage in the experimental maize fields after repellent application clearly indicates that the repellent could be a potential tool for wild boar management in maize.

Table 1. Effect of Castor based Repellent on Wild Boar damage in Maize crop

Repli-cations	Damage at time of application (12.09.2013)			Fresh Damage (%) on	
	Total No of Plants	Damaged plants (Nos)	% Damage incidence	06.10.13	20.10.13 (at Harvest)
1	900	28	3.11	0	0
2	1144	211	18.44	0	0
3	902	16	1.77	0	0
4	1144	211	18.44	0	0
5	1021	132	12.90	0	0
6	1093	218	19.94	0	0
Mean	1034 +10.60	119.33+9.21	12.41+2.84	0	0

Albinism in lesser bandicoot rat, *Bandicota bengalensis*

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Lesser bandicoot rat, *Bandicota bengalensis* a mesic rodent fauna has reached upto gateway of Thar Desert, i.e. Jodhpur city in recent years and is spreading fast in the city area. During our regular survey we have found albino bandicoots on three occasions in the collections. Two complete albino females (278 & 257 g) and one partial albino male (155g) were trapped during 2013. Both females were pregnant. Their body colour was completely white with pink eyes. However, male was black from ventral side and white from dorsal side with white head and pink eyes. The hind legs of male were white except in feet region which was black in colour. Of the two pregnant females one gave birth to seven litters, the skin colour of new born was pink and eyes were closed with no morphological deformity. After 2-3 days mother devoured all the litters in the lot of 1-2 litter each per day and later died. The other albino female also devoured all the litters (05 nos.) soon after their birth. When the albino female was kept with normal male, the breeding attempt was successful as albino female gave birth to six normal young ones. Litters bred in captivity were not different from wild bred litters as their skin colour was also pink with no morphological deformity. They were also devoured by mother within 4-5 days.

Various morphological parameters of albino and normal bandicoots of similar weight were almost comparable, except tail which was longer in female albino bandicoots. Numbers of teats were more (8-9) in female albino than normal female bandicoot (05).

Aran: A festival of rodent hunting in Arunachal Pradesh

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Arunachal Pradesh, situated in Northeastern region of India is mainly a tribal state inhabited by 20 major tribes and more than 100 sub tribes. The *Adi* tribe is one of the prominent communities of central part of the state, popularly known as Siang belt. The *Adis* have a unique socio cultural entity among other tribes of the state. Aran is the one of the most important festival of *Adi* tribes. The festival has an important role in management of agricultural pests.

Aran is a festival of the mythical people called "Koojum Kooja". It came to this world by the grace of 'Kine Nani' (goddess of crop and

prosperity) and 'Doying Bote' (god of wisdom). It is a celebration on account of the wedding ceremony of a great lady of Koojum Kooja known as 'Koojum Nyanyi Mete'. When Koojum Nyanyi Mete's wedding took place, the whole world celebrated it and whenever she visited for enjoying her honeymoon, she received a warm welcome. Therefore in order to receive her in a befitting manner the *Adis* prepare a good quantity of Apong (rice or millet beer), meat and celebrate the festival and make offering. It is believed that the celebration of festival marks the seasonal boundary to drive away the entire injurious and irritating insects that attacks the animals and human beings during the summer and seals them off in the winter.

The festival has a special significance from rodent point of view. Rodents are a delicacy not only in Arunachal Pradesh but whole of Northeast. Besides hunting other animals, rodents are trapped en mass during this festival. For this rodent traps are prepared during September to March. The male members of the villages prepare different traps like, bow shaped bamboo traps for catching rodents and small animals, snares or ring traps for catching jungle fowl and small animals and bows and arrows for hunting etc. Traps are made of locally available bamboos and cane. When the celebration of festival is fixed, the male members of the village go to the forest for hunting and trapping rodents. They set the traps in the hills (forest) on the rodent route/ artificial bridges made for running of rodents across stream or in a narrow gap between the trees. They stay in the forest for 5-6 days and trap the rodents, which are preserved after smoking on the fire for long time.

Local farmers realize that rodents cause severe damage to crops. Thus, other than the religious reasons, the hunting of rodents during Aran festival serves as one of the preventive measures for the rodent attack to the rice crop. In fact at the time of festival (March) no crop is available in the fields and a large number of rodents are removed from the area prior to rice cultivation. The rice nursery is grown (April-May) and transplanting is done (May-June), the locals believe that rodent damage to standing crops is reduced due to mass trapping during Aran festival. Therefore, from agricultural point of view, the Aran festival controls the rodents in the region before the crop is grown.

Activity of Rodent trapping during Aran festival in Arunachal Pradesh

Preparation of rodent traps

Group of rodent hunter

Displaying trapped rodents

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

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

Published by the Project Coordinator, AINP on Rodent Control, CAZRI, Jodhpur and
Printed by Evergreen Printers, 14-C, H.I.A., Jodhpur. Phone : 0291 - 2747767