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Survey on rodent species composition in high altitude and tribal zone (HAT) of Andhra Pradesh

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Abstract

The survey conducted in five locations of High Altitude and Tribal Zone revealed that there was low incidence of rodent pests with respect to Live Burrow Count per ha and also damage incidence. The rodent species, *Rattus rattus* was found to be predominant in all the five locations of High Altitude and Tribal Zone with 90.25% and mostly confined to storage structures, buldings and houses followed by *Bandicota bengalensis* with 6.66%. The trap index for *R. rattus* was found to be high with 0.18 in Regional Agricultural Research Station, Chintapalli, and low with 0.08 trap index in Kokkirapalli village. For *B. bengalensis* the trap index was calculated and found to be medium with 0.01 in Regional Agricultural Research Station and Horticultural Research Station, Chintapalli and Rinthada village and 0.006 in Asaraada and Kokkirapalli villages. The trap index for *M. booduga* was very low in all the villages. The overall trap index for all the three rodent species was high in Regional Agricultural Research Station, Chintapalli with 0.19 trap index, and low in Kokkirapalli village with 0.10 trap index. The trapped *R. rattus* species were sexed, weighed and observations were taken on different morphological parameters like weight of the animal, tail length and body length. The mean weight of the male and female were 185.35g and 121.04g respectively. The tail length and body length of the males were 18.98cm and 14.00cm respectively, whereas in case of females it was 17.14cm and 13.86cm respectively. The mean sex ratio of Male: Female is 1: 0.61.

Keywords: High altitude and tribal zone, survey, *Rattus rattus*, rodents

Introduction

Rodents are mammals of the order Rodentia, characterized by a single pair of continuously growing incisors in each of the upper and lower jaws which must be kept short by gnawing. Forty percent of mammal species are rodents, and they are found in vast numbers on all continents other than Antarctica. Rodents are one of the important vertebrate pests (Advani and Mathur, 1982) directly related to destruction of crops utilized by man and livestock. Their habitat, distribution, abundance and economic significance varies in different crops, seasons and geographical regions of the country. They show a wide range of adaptation, enabling them to successfully colonise and inhabit almost any type of habitat (De Graaf 1981) [2]. Ecological distribution of rodent species and their damages were reviewed by (Parshad, 1999) [3]. In Andhra Pradesh, *Bandicota bengalensis* and *Mus booduga* on rice, *B. bengalensis* on Bengal gram (Ranga Reddy, 1994) [5], *Rattus rattus* on coconut (Rao and Subiah, 1982) [6] were observed as predominant species. With changes in agro climatic conditions and cropping patterns, rodents are showing changes in the distribution and abundance of different species (Parshad and Ahmad, 1996) [4]. Rodent species composition was investigated in Krishna zone, Godavari zone, Scarce rainfall and Southern zones of Andhra Pradesh with most of the surveys confined to rice- rice and rice-pulses cropping systems. *Bandicota bengalensis* followed by *Mus booduga* were predominant species associated with rice crop in Godavari and Krishna zone. The present study was carried out in High Altitude and Tribal Zone of Andhra Pradesh to understand the species composition of rodents for developing forewarning systems and for preparing action plans for effective management of rodents.

Materials and Methods

The survey was conducted in five locations of High Altitude and Tribal zone Viz., Regional Agricultural Research Station, Chintapalle, Horticultural Research Station, Chintapalle, Asaraada, Kokkirapalli and Rinthada villages. The High Altitude and Tribal zone lies between 17°13' to 19°09' North latitude and 80°22' to 84°33' East longitude.

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A majority of the soils are red sandy loams with 58.86% forest coverage. The highest altitude in this zone is 1400 m. The zone receives an average annual rainfall of 1235 mm and temperature range of 9.3–22.3 °C (minimum) and 25.8–36.3 °C (maximum), and relative humidity of 42.7–90.6%. During winter, particularly in December, the temperature drops as low as 3 to 5 °C.

Species Composition: The rodent species and their composition was observed by setting 100 number of multi catch rat traps in the field, storage godowns, buildings and houses for 3 days during night in *Kharif* 2017. The trapped animals were collected in the next morning from the traps and rodents of different species were distinguished based on their morphological characters. The number of animals trapped were recorded and percent species composition was calculated by using the formula.

$$\% \text{ Percent Composition} = \frac{\text{Species rodents trapped}}{\text{Total number of rodents trapped}} \times 100$$

Trap Index: The assessment of rodent population was done by using trapping index method Multi catch traps were laid for continuously three nights and the trapping index is computed as follows:

$$\text{Trap Index} = \frac{\text{Total number of rodents trapped}}{\text{Number of traps used} \times \text{Number of nights}}$$

Morphological Parameters: The predominant species in the trapped animals were killed by drowning them into water for 5 minutes and classified based on the sex. The observations on different morphological parameters like weight of the animals, Tail length, body length were recorded for both of the sexes and Male: Female ratio was arrived.

Results and Discussion

Species Composition: From the survey, it was revealed that in all the five locations the rodent species, *Rattus rattus* was found to be predominant followed by *Bandicota bengalensis*. The total number of rodents trapped were 58 in Regional Agricultural Research Station, Chinthapalli, 34 in HRS, Chinthapalli, 41 in Asaraada, 30 in Kokkirapalli and 32 in Rinthada villages with *Rattus rattus* species being the predominant one in all the locations viz., Regional Agricultural Research Station, Chinthapalli (53), HRS, Chinthapalli (34), Asaraada (41), Kokkirapalli (26) and Rinthada (28) mostly confined to storage structures, buildings and houses. The *Bandicota bengalensis* and *Mus booduga* found to be very less with negligible damage to the field crops. The total number of rodents trapped were 195 in number with *R.rattus* (176), *B. bengalensis* (13) and *M.booduga* (6) in number. The percentage of different rodent species was *R.rattus* (90.25%), *B. bengalensis* (6.66%) and *M.booduga* (3.07%). (Table 1).

Trap Index: The assessment of rodent population was also done by using trapping index method. The trap index for *R. rattus* was found to be high with 0.18 in Regional Agricultural Research Station, Chinthapalli, 0.10 in Horticultural Research Station, Chinthapalli, 0.13, 0.08 and 0.09 in Asaraada, Kokkirapalli and Rinthada villages

respectively. Similarly for *B.bengalensis* the trap index was calculated and found to be medium with 0.01 in Regional Agricultural Research Station and Horticultural Research Station, Chinthapalli and Rinthada village and 0.006 in Asaraada and Kokkirapalli villages. The trap index for *M. booduga* was very low and it was nil in Horticultural Research Station, Chinthapalli, 0.003 in Asaraada and Rinthada villages and 0.006 in Regional Agricultural Research Station, Chinthapalli and Kokkirapalli village. The overall trap index for all the three rodent species was calculated and it was high in Regional Agricultural Research Station, Chinthapalli with 0.19 trap index, followed by Asaraada village with 0.13 trap index and Horticultural Research Station, Chinthapalli and Rinthada village with 0.11 trap index and 0.10 in Kokkirapalli village (Table 2).

Morphological parameters

Weight of the animals: The weight of the males were more when compared to that of females with 187.75g in Regional Agricultural Research Station, Chinthapalli, 210.07g in Horticultural Research Station, Chinthapalli, 200.12, 157.52 and 171.28g in Asaraada, Kokkirapalli and Rinthada villages respectively. The weight of the females was found to be 100.51g in Regional Agricultural Research Station, Chinthapalli, 110.34g in Horticultural Research Station, Chinthapalli, 150.74, 125.36 and 118.29g in Asaraada, Kokkirapalli and Rinthada villages respectively. The mean weight of the male and female was found to be 185.35g and 121.04g respectively (Table 3).

Tail length: The general observation in the *R.rattus* species was the length of the tail is more than the body length. The length of the tail in males was 20.1, 17.6, 19.4, 17.5 and 20.3cm in Regional Agricultural Research Station, Horticultural Research Station, Chinthapalli, Asaraada, Kokkirapalli and Rinthada villages respectively. Whereas in females the tail length was found to be 16.6, 18.2, 18.3, 17.4 and 15.2cm in Regional Agricultural Research Station, Horticultural Research Station, Chinthapalli, Asaraada, Kokkirapalli and Rinthada villages respectively the mean tail length in males was 18.98cm whereas in case of females it was 17.14cm (Table 3).

Body length: The length of the body was also more in case of males when compared to females. In case of males it was found to be 16.5cm in Regional Agricultural Research Station, Chinthapalli, 12.3cm in Horticultural Research Station, Chinthapalli, 14.8cm in Asaraada, 12.2cm in Kokkirapalli and 14.2cm in Rinthada village. In females it was 13.0, 14.1, 14.7, 15.2 and 12.3cm in Regional Agricultural Research Station, Horticultural Research Station, Chinthapalli, Asaraada, Kokkirapalli and Rinthada villages respectively the mean length of the body of *R.rattus* was found to be 14.00cm whereas in females it was 13.86cm (Table 3).

Sex Ratio: The number of males trapped were more when compared to females in all the locations. The sex ratio of M: F in Regional Agricultural Research Station, Chinthapalli was found to be 1.0:0.70, 1.0:0.63 in Horticultural Research Station, Chinthapalli, 1.0:0.65 in Asaraada, 1.0:0.44 in Kokkirapalli and 1.0:0.64 Rinthada village. The mean sex ratio of Male: Female is 1: 0.61 (Table 3).

Table 1: Species composition of rodents

S. No	Name of the area	Total No. of rodents trapped	Species rodents trapped			Percentage of species composition		
			R.r	B.b	M.b	R.r	B.b	M.b
1.	RARS, Chinthapalli	58	53	3	2	91.3	5.17	3.44
2.	HRS, Chinthapalli	34	31	3	0	91.1	8.82	0
3.	Asaraada	41	38	2	1	92.6	4.87	2.43
4.	Kokkirapalli	30	26	2	2	86.6	6.66	6.66
5.	Rinthada	32	28	3	1	87.5	9.37	3.12
Total		195	176	13	6	90.25	6.66	3.07

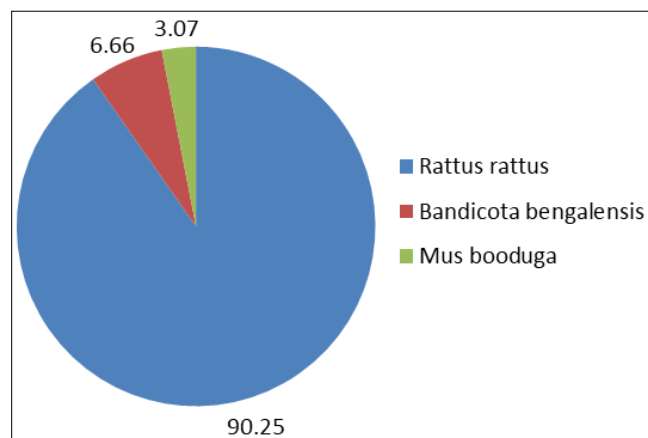
R.r- *Rattus rattus*, B.b- *Bandicota bengalensis*, M.b-*Mus booduga*

Table 2: Trap Index data of rodent species trapped from multicatch rat traps

S. No	Name of the area	Total trap nights	<i>Rattus rattus</i>		<i>Bandicota bengalensis</i>		<i>Mus booduga</i>		Overall Trap Index	
			No. of rats trapped	Trap Index	No. of rats trapped	Trap Index	No. of rats trapped	Trap Index	Overall rats trapped	Overall Trap Index
1.	RARS, Chinthapalli	300	53	0.18	3	0.01	2	0.006	58	0.19
2.	HRS, Chinthapalli	300	31	0.10	3	0.01	0	0	34	0.11
3.	Asaraada	300	38	0.13	2	0.006	1	0.003	41	0.13
4.	Kokkirapalli	300	26	0.08	2	0.006	2	0.006	30	0.10
5.	Rinthada	300	28	0.09	3	0.01	1	0.003	32	0.32

Table 3: Morphological Parameters of *Rattus rattus* in HAT zone

S. No	Name of the area	No. of animals	Males				Females				M : F
			No. of males	Mean wt (g)	Tail length (Cm)	Body length (Cm)	No. of females	Mean wt (g)	Tail length (Cm)	Body length (Cm)	
1.	RARS, Chinthapalli	53	31	187.75	20.1	16.5	22	100.51	16.6	13.0	1.0 : 0.70
2.	HRS, Chinthapalli	31	19	210.07	17.6	12.3	12	110.34	18.2	14.1	1.0 : 0.63
3.	Asaraada	38	23	200.12	19.4	14.8	15	150.74	18.3	14.7	1.0 : 0.65
4.	Kokkirapalli	26	18	157.52	17.5	12.2	8	125.36	17.4	15.2	1.0 : 0.44
5.	Rinthada	28	17	171.28	20.3	14.2	11	118.29	15.2	12.3	1.0 : 0.64
Total		176	108	926.74	94.9	70.00	68	605.24	85.7	69.3	-
Mean		35.2	21.6	185.35	18.98	14.00	13.6	121.04	17.14	13.86	1.0 : 0.61

**Fig 1:** Percentage composition of species.

Conclusion

The stored food in the godowns and storage structures suffer from the rodents mainly with *Rattus rattus* species that cause economic losses to the farmers. Therefore, it is quite essential to create awareness among the farmers and motivate them to take up rodent control in an integral way Integrating the preventive measures with cleanliness and structural improvements coupled with trapping and baiting with different rodenticides are the important tool for the management of rodents.

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