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# **Trap Barrier System: an effective technique for protecting the rice nurseries against *Bandicota bengalensis* in rodent endemic areas.**

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Lesser bandicoot rat, *Bandicota bengalensis* is the predominant pest rodent species in rice ecosystem in the State of Andhra Pradesh and severely infests rice crop throughout its crop growth periods. Rodent problem is endemic to Godavari delta of Andhra Pradesh and rodents often causes 5-10 % yield loss at pre-harvest stage which may be as high as 80-100% during the outbreak years. Early or timely sown rice nurseries often suffers rodent attack by nibbling the seeds and its sprouts and damage to growing seedlings, thus necessitates repeated sowings by the farmers. Therefore, farmers in this area generally prefer to delay or postpone the sowing of rice nurseries to escape/avoid the rodent attack. As a result, transplanting of main crop gets delayed and crop harvestings often coincides with late cyclonic rains and crop loss.

Trap barrier system (TBS) is an ecologically based rodent management method comprises of a physical barrier combined with live-multiple-capture cages to manage pest rodents in rice fields. TBS works on the principle that attracts rodents to the enclosed trap crop which is sown 2-3 weeks earlier. The experiments were carried out to find out the efficacy of TBS in protecting the rice nurseries against lesser bandicoots and its halo protection on the following transplanted crop/ main crop at Research farms of AP Rice Research Institute and farmers' fields during *Kharif* in 2017 and 2018. TBS was constructed on the day of seed sowing and allowed till the pulling of the nursery. TBS of 20 x 5 m plastic fence was laid with 8 multi catch traps inserted intermittently at its base at equidistance. The fence was erected to a height of 2 feet above the ground and approximately 0.5 feet buried underground and fixed upright to the ground with bamboo sticks. Multiple capture traps were placed through the barrier with earth moats across leading to traps. The traps were emptied early in each morning and the polythene barrier was checked daily for holes made by rats and repaired, if found any. The captured rodents were identified species wise and their sex and body weights were recorded

throughout the nursery growth period. The individuals of *B. bengalensis*, the most common rodent species caught by TBS, were categorized into adults (body weight > 150g in males and > 80g in females) and left over population was considered as juveniles. The live burrows were counted around the TBS in 10, 50 and 100 meter radius to ascertain halo protection offered by the TBS. Other two treatments i.e. farmer practice (burrow digging and trapping) and control (nil protection) were also compared to find the relative efficacy of TBS.

The trap catches revealed relatively lower rodent population (7-12 bandicoots) during kharif 2017 than that in 2018 (10-21 bandicoots trapped). The predatory snakes and mongoose also trapped in the TBS might be due to accidental entry in traps while chasing the rodent prey. Analysis of sex wise catches revealed higher catches for males (52) than the females (22). It can be viewed in supporting to the known fact that the females were attracted to the crop more during PI and flowering stages, mostly to acquire/ingest plant sap containing its breeding precursors/ stimulating substances, which needs further detailed investigation. Among the trapped individuals, adults comprised more (16-34) compared to juveniles (7-10) during both the years (Table 1).

**Table.1. Number of lesser bandicoot rats trapped in TBS erected around rice nurseries**

Season and Year and location	No. of animals trapped		Sex of <i>B. b.</i> trapped		Stage of the animals trapped	
	<i>B. b.</i> *	Others**	Male	Female	Juveniles	Adults
<b>Kharif 2017</b>						
APRRI Research Farm	08	02	04	04	02	06
Farmers field (Vill. L.Koderu)	12	01	07	05	02	10
Farmers field (vill. B.Moguturu)	07	-	04	03	03	04
<b>Kharif 2018</b>						
Research Station	16	01	14	02	03	11
Farmers field (vill. K. Chikkala)	10	-	06	04	04	06
Farmers' field (vill. Eletipadu)	21	01	17	04	04	17

\**B.b.*: *Bandicota bengalensis*; \*\* others – snake/ mongoose etc

Data on efficacy of TBS as presented in Table 2 showed that rodent damage at nursery stage was nil in TBS erected plots which reveals that TBS has offered cent per cent protection against field rodents in the rice nurseries. However in other fields rodents inflicted 3.8 and 8.6% damage (in farmer's practices) and 8.4 and 16.8% damage (in control) during 2017 and 2018 respectively. Further, Live Burrow Counts (LBC) were recorded from the surrounding fields at different radius intervals to ascertain its halo protection. In non-TBS fields the LBC were found more or less uniformly distributed (18.6 - 26.4 /ha), however in TBS fields the LBC was lower (6.4 - 12.4/ha). The LBC were in general higher near the TBS, with in the circumference of 10m, than the areas farther from TBS indicating that the rats were attracted to the lure crop present in the TBS and made burrows in the vicinity of the barrier (Table 2). In addition to nursery protection, TBS has also showed halo protection by way of driving and trapping the native and immigrant populations from the surrounding fields, thus reducing the population load in the following transplanted crop.

**Table 2. Efficacy of TBS against rodents in rice nurseries**

Treatment	Nursery damage (%)		Live burrows (LBC/ha) in main field in a radius (m) (mean of 2017& 2018)		
	2017	2018	10 m	50 m	100 m
TBS	0.0	0.0	12.4	6.4	10.8
Farmer practice	3.8	8.6	22.6	21.4	18.6
Control	08.4	16.8	23.8	26.4	21.4

From the above studies it was established that, TBS is one of the best effective rodent management technology against lesser bandicoots in irrigated rice ecosystem, especially in rodent endemic areas. This technology may be promoted by the government agencies by subsidizing the input costs as it is an eco-friendly technique for rodent pest management.