MANAGEMENT OF RODENTS THROUGH DIFFERENT TRAP DEVICES AND POISON BAITS IN WHEAT STORES

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ABSTRACT: *The present research work was carried out on "Monitoring of rodents through different trap devices and poison baits in wheat stores" at the Wheat section, Agriculture Research Institute, Tandojam. Two rat species were identified i.e. lesser bandicoot rat, Bandicota bengalensis, and Indian Gerbil rat, Tetra indica. The result showed that maximum mortality was observed in Indian Gerbil 5.92 ± 0.25 in poison bait followed by sticky trap 4.42 ± 0.44, iron trap 4.25 ± 0.25 and monarch trap 2.08 ± 0.21, whereas, the minimum mortality was seen 1.42 ± 0.32 in poison bait followed by sticky trap 1.00 ± 0.27, iron trap 1.00 ± 0.19 and monarch trap 0.58 ± 0.16. The result further revealed the maximum mortality was recorded in lesser bandicoot rat 4.00 ± 0.27 in poison bait followed by 2.59 ± 0.28, 2.17 ± 0.22 and 1.17 ± 0.10 in sticky trap, Iron trap and monarch trap, respectively. Whereas, the minimum mortality was observed in poison bait 0.83 ± 0.10 followed by sticky trap 0.75 ± 0.08, iron trap 0.58 ± 0.16 and monarch trap 0.33 ± 0.001 in Lesser bandicoot rat. There is significant difference in all treatment, but on non-significant showed in Iron and Sticky trap at (P<0.05). It is concluded that Indian Gerbil rats were found in abundant numbers as compare to lesser bandicoot rat. The poison bait effectively control the rat species followed by Sticky, Iron and monarch traps.*

Keywords: *Bandicota bengalensis, Tetra indica*, Traps and Poison baits.

INTRODUCTION

For the last few decades, the production of food grains has increased many fold throughout the world. Presently new developed techniques are in use for grain storage like piles, containers, bags, warehouses, and silos on the ground. Normally the stored grain pests resulted severe losses during storage of grains [1]. Among vertebrate pests rodents are well known pests, which cause damage to several annual and perineal crops and reduce the cost of production and storage. The rodent's damage to several vegetables, fruits and other cash crops. Therefore, due to the great extent of damage it is necessary to eliminate the rodents in and around crops [2]. In most developing countries of the world rodent pests are serious threat to food security and public health. Due to growth of urbanization, its extent increased day by day. Management practices of these vertebrate pests have been evolved last decade. In the rural areas peoples used rodenticides for the management of rodent pests [3, 4]. Primarily, rural people have several constraints to the usage of rodenticides, many of them not affording these costly rodenticides those are most affected by pests in the areas. Where rodenticides are available in large quantity, but their improper usage, which create the health and environmental hazards [5]. The stored grain products are attacked by both internal and external feeders. Among them rodents are important major pest, they cause considerable damage to gains in storage. Among 136 species of rodents recoded only about 16 percent can be considered economically important. These vertebrate pests are considered as major disreputable pests of agricultural crops and different commodities in storage. About 2.5 percent grain losses are caused by rodents annually [6, 7].

MATERIALS AND METHODS

The study was carried out to determine the "Management of rodents through different trap devices and poison baits in wheat stores" in wheat stores of Wheat section, Agriculture Research Institute Tandojam. Daily monitoring of rat pest through conventional traps as trap cages, sticky/glue traps and rat baits were installed at the entry points of rats in the wheat stores. There were four treatments, T_1= Monarch trap, T_2= Iron trap, T_3= Sticky trap and $T_{4=}$ Poison baits. These traps and baits were used for trapping the rats. The observation was taken twice a week in the morning hours and counting the dead and alive rats trapped in a locally made wire cage single and multiple catch traps measuring 10 cm wide x 10cm high x 32 cm long and 25 cm wide x 21 cm high x 45 cm long respectively. In each trap, a piece of fresh apple, guava, tomato and melon as food were kept for attraction of rats in the evening time. Each experiment replicated three times. Monitoring of old and new burrows surrounding wheat stores was observed. The collected species of rats and mice in wheat stores were identified. The collected data was subjected for statistical analysis by using Student statistics 8.1 software.

RESULTS

Iron snap traps: The results showed that the data in Table.1 revealed that the maximum mean number of *B. bengalensis* (3.67 rats) in 2nd week of September and followed by *T. indica* (1.68 rats) were also trapped in iron trap in 2nd week of September minimum of *B. bengalensis* (0.33 rats) in 1st and 4th week of June and *T. indica* (0.33 rats) in 1st and 2nd week of September were trapped in Iron snap traps.

Monarch traps: The data in Table 1 revealed that the maximum mean number of *B. bengalensis* (5.65 rats) in 4th week of August and followed by *T. indica* (2.00 rats) were captured in sticky trap in 1st week of September. The minimum of *B. bengalensis* (0.67 rats) in 1st and 2nd week of September and *T. indica* (0.33 rats) in 1st week of September were trapped in monarch traps.

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Table 1 **Weekly efficacy of different traps used for control of rodent pests Lesser Bandicoot rat, *Bandicota bengalensis* and *Indian* Gerbil, *Tetra indica* in wheat store.**

Date of observation		*Bandicota bengalensis*				*Tetra indica*			
		Iron Trap	Monarch Trap	Sticky Trap	Poison Bait Trap	Iron Trap	Monarch Trap	Sticky Trap	Poison Bait Trap
June, 2009	1st week	0.33	0.67	1.0	1.33	0.33	0.33	0.67	0.67
	2nd week	0.67	0.67	0.33	1.0	0.33	0.33	0.67	0.67
	3rd week	1.0	1.33	1.0	1.0	0.67	0.67	0.33	0.33
	4th week	0.33	1.33	1.67	2.33	0.33	0.67	0.67	0.67
Mean ± SE		0.58±0.16	0.33±0.001	0.75±0.08	0.83±0.10	1.00±0.19	0.58±0.16	1.00±0.27	1.42±0.32
July, 2009	1st week	1.0	1.67	1.67	2.0	0.67	1.0	0.67	0.67
	2nd week	1.67	2.67	2.0	3.0	0.67	1.0	0.67	0.67
	3rd week	1.0	2.67	2.0	3.33	1.0	1.33	1.0	1.0
	4th week	1.0	3.33	2.67	4.33	1.0	1.33	1.67	1.67
Mean ± SE		1.25±0.16	0.67±0.001	1.17±0.32	1.83±0.35	2.58±0.34	1.17±0.17	2.08±0.21	3.17±0.48
August, 2009	1st week	1.67	3.67	3.67	5.33	1.0	1.0	1.0	1.0
	2nd week	2.0	3.67	3.67	5.67	1.33	1.67	1.33	1.33
	3rd week	2.0	4.67	5.0	6.33	1.33	1.67	1.67	1.67
	4th week	2.67	5.0	5.33	6.33	1.67	2.0	2.0	2.0
Mean ± SE		2.17±0.22	1.17±0.10	2.59±0.28	4.00±0.27	2.17±0.22	1.17±0.10	2.59±0.28	4.00±0.27
September, 2009	1st week	3.0	5.67	5.33	4.0	1.67	1.67	2.33	2.33
	2nd week	3.67	3.0	3.0	3.0	1.67	1.67	1.33	1.33
	3rd week	2.33	2.33	2.0	2.0	1.0	1.0	1.0	1.0
	4th week	1.67	2.0	1.33	1.0	0.67	0.67	0.33	0.33
Mean ± SE		1.42±0.34	0.92±0.21	1.67±0.53	1.83±0.52	1.42±0.34	0.92±0.21	1.67±0.53	1.83±0.52

Sticky traps: The results depicted in Table 1 indicated that the two species, *Bandicota bengalensis* and *Tetra indica* were trapped in sticky traps. The maximum *B. bengalensis* (5.34 rats) followed by *T. indica* (2.33 rats) were captured in sticky trap in 1st week of September. Minimum of *B. bengalensis* (0.33 rats) in 1st week of September and also *T. indica* (0.33 rats) in 1st week of September were captured in sticky trap. During study it was observed that the small size of rats was trapped in sticky trap and big size rat were not trapped in sticky traps.

Bait rats: The results showed that the mean number of maximum (6.33 rats) of *B. bengalensis* were dead due to eating of bait poison in 3rd and 4th week of August followed by *T. indica* (2.33 rats) in 1st week of September. Whereas, the minimum number of *B. bengalensis* (1.00 rats) killed by poison in 2nd and 3rd week of June and also 4th week of September followed by *T. indica* (0.33 rats) 4th week of September killed in wheat stores.

The monthly results (Table 1) showed that bait poison efficiency was best and killed more number of *T. indica* rats (5.92±0.25 rats) in August. Among the efficiency of conventional traps in sticky trap (4.42±0.4 rats) were trapped, followed by (4.25±0.3 rats) in Iron trap and (2.08±0.21 rats) in Monarch traps in the month of August. The results further depicted that more *B. bengalensis* rats (4.00±0.27) were killed in poison bait followed by (2.59±0.28) in sticky traps, (2.17±0.22) in Iron Trap and (1.17±0.10) in monarch trap in the months of August. The analysis of variance shows that there is significant ($P<0.05$) in different trap devices in wheat stores.

DISCUSSION

The experiment was conducted on the management of rodents through different trap devices and poison baits in wheat stores. The Results revealed that during the trial, the rat bait and iron traps were effective for the management of rodents in wheat stores. The present results showed better efficiency of rat bait than iron traps was observed for the control of rodents in wheat stores. The conventional traps proved knockdown trapping of the rays and baits taken some days after eating the bait. The work on management of rodents in wheat field was recorded from many countries of the world. The results agreed with the others [8] who used the different conventional traps for the management of rodent pests and to determine the efficiency of traps in capturing the rodent pests significantly different in wheat. The results revealed that rodents were trapped in the cage type live trap (41.92%), box type live trap (9.09%), wooden live trap (14.14%), tin made

snap trap (31.82%) and wooden snap trap (21.21%). The highest trapping was obtained 41.92 ± 1.82 % in the cage type live trap and tin made snap trap (31.82 ± 2.62 %). The results were fully supported by the others [9] who described that the use of trap devices are quick suppression of rodent populations. This is safe and economical to be used in the areas where chemical control is not applied. Although, the installation of trap devices can be difficult and time consuming in case of heavy invasion. The results further close with the [10] who introduce the integrated pest management strategy which is economical, most effective and eco-friendly. Elsewhere [11] observed that population of rodent pests in the trap devices round the year, this showed a best quadratic regression in population dynamics in the trap catch. During the survey, it was observed that grain bags and grains were damaged by rats in wheat stores, same observations were recorded by others [12] who reported that the grain dealers have affected economic loss in grain storage significantly in the wholesale markets.

CONCLUSIONS

Two species of rats, i.e. Indian Gerbil and lesser bandicoot were identified. The Indian Gerbil was most common as compare to lesser bandicoot rat in wheat store. Maximum activity was recorded in the month of August, whereas, the minimum in June. Poison Bait Traps effectively control the rat species followed by Iron snap Trap, Sticky trap and Monarch Trap respectively.

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