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Relative Efficacy of Glue and Other Traps for Commensal Rodent Management

R S Tripathi, Manju Mathur, A P Jain and Nisha Patel
Central Arid Zone Research Institute, Jodhpur 342 003, India

Abstract Glue, wonder and sherman traps were evaluated against commensal rodent pests (*Rattus rattus* and *Mus musculus)* in houses, godowns and poultry farms in and around Jodhpur. Sherman trap, being single catch type trap, rated lowest in comparison to multiple catch type traps. Among multiple catch traps, glue traps evidently exhibited an edge over wonder traps. Ethological manifestations of rodents towards these traps are also discussed.

Key words Commensal rodents, *Rattus rattus, Mus musculus*, glue trap, sherman trap, wonder trap

Trapping is one of the oldest methods practiced for rodent control in India. It is most useful in the areas, such as houses, poultry and rabbit farms, flour mills, godowns, stores, hospitals, hotels, shops and other indoor rodent habitats where use of lethal chemicals is neither desirable nor recommended due to obvious reasons (Jain *et al.* 1992). Various types of traps are in vogue in India (Fitzwater & Prakash 1978). They are basically of two types : (1) kill type and (2) live traps. The former is mostly placed in fields, whereas, the latter is usually used in commensal habitats. Besides the control of rodents, traps are also useful for survey and monitoring their population (Jain *et al.* 1993). During the eighties several glues were also tried in India to trap rodents (Srivastava & Srivastava 1985). In the same series, a new type of trap, based on polybutane glue, was supplied to us by M/s Ecosafe Traps (India) Pvt. Ltd., and was evaluated for its relative efficacy *vis-a-vis* two commonly used traps, viz., sherman and wonder traps in different indoor habitats. Attempts were also made to study the behavioural manifestation of glue trapped rodents in laboratory.

Materials and Methods

The Glue trap : The glue trap is made of card board (22 x 35.5 cm) and is folder type. The polybutane based glue is plastered (2 to 3 mm thick) on the inner side of the board. The strong adhesive bond of the glue can be maintained at 5 to 45°C with a shelf life of 5 years.

The study sites : The investigations were carried out at 17 locations, of which 12 locations were in residential premises and godowns and 5 were in poultry farms of Jodhpur city (26°18'N-73°08'E).

Setting of traps : The three types of traps were set in the areas of maximum rodent activity at all the study sites. Before setting the glue trap, a paper sheet was placed to avoid moisture or dust on the traps through rodent's feet, which may weaken the adhesive capacity of the glue. The same traps were reused after manually removing the trapped rodents. For sherman and wonder traps, peanut butter was used as bait material.

Observations : Relative efficacy of the traps was worked out on the basis of trap index (no. of rodents trapped per 100 traps per 24 hrs.).

Behaviour of Rattus rattus towards glue traps: For this study, glue traps were placed in large cages and two house rats were released in each cage. Later, the glue trapped rodents were freed and kept individually in wire mesh cage and glass cages with sand on the floor. Various behavioural manifestations of rodents after trapping with glue traps were observed.

Results and Discussion

Efficacy of glue traps vis-a-vis sherman and wonder traps : All the study locations were inhabited by *Rattus rattus* and *Mus musculus*. Frequent observations revealed that in locations with high rodent population, the rodent trapping started within 10 to 15 minutes of glue trap placement. Maximum catches were noticed on the first day, and after 5 days the rodent population dropped to nil (Table 1).

The trap indices for glue trap were 118.8 in houses and 106.6 in poultry farms, which were only 13.3 and 16.5 with sherman traps in the respective sites (Table 1). This difference in the trap indices was mainly due to multi-catch nature of glue traps, the sherman trap being single catch type. A glue trap could trap 6 rodents from houses/godowns and 12 rodents from poultry farms in a single setting during 24 hours. When both the multi-catch type traps were compared in godowns and poultry farms, the trap indices were 16.6 for glue trap and 11.0 for wonder trap in godowns, whereas, in the poultry farms both the traps recorded 44.6 trap indices (Table 1).

The data confirmed overall superiority of glue traps over other two traps. It was evident by the fact that the glue traps caught both the commensal rodent species whereas, the sherman and wonder traps failed to trap the house mouse (*M. musculus*) probably due to its small size and lighter weight, which is considered as a difficult species from management point of view. Srinath *et al.* (1987) also reported similar results for glue traps.

Dimorphism in trapping behaviour : There was no significant difference ($t = 0.24$) between the glue and wonder traps in respect of same sex, because 12 males each in both the traps and 19 and 17 females in glue and wonder traps, respectively, were trapped. However, in totality, females appeared 12 per cent more prone to trapping than males. Glue traps caught comparatively light weight rodents (males of 32 to 147 g and females of 23 to 144 g of house rats and *M. musculus* weighing 7 to 15 g), as compared to wonder traps (male of 48 to 154 g and females of 45.5 to 168 g of house rats only). No mouse was trapped in wonder traps. Our 25 year experience also confirms that no mice was ever trapped in a wonder trap.

Behaviour of house rats towards glue trap : The house rats reacted sharply as they were released in the cages with glue traps due to neophobic behaviour. After 10 to 15 minutes, they started gnawing the glue board edges and soon their lower jaw got glued in the trap. The rats started producing rescue calls and in the process of rescuing their both legs and gradually their whole body got entangled in the glue. With the passage of time, the rats made louder sounds and became morbid. After 30 to 45 minutes, the rectal excreta, urine and saliva started coming out and they got exhausted. These rats were manually removed from the glue and released

Table 1 *Comparative efficiency of glue trap*

Habitat	Trap	No. of traps used	No. of rodent trapped, on		Trap index
			Ist day	in 5 days	
Glue trap *vis-a-vis* sherman trap :					
Houses & godowns	G.T.	30	76	180	118.8
	S.T.	30	8	20	13.3
Poultry farms	G.T.	15	52	80	106.6
(feed stores)	S.T.	30	10	25	16.5
Glue trap *vis-a-vis* wonder trap :					
Grain godowns	G.T.	9	5	6	16.6
	W.T.	9	4	4	11.0
Poultry feed	G.T.	14	8	25	44.6
& egg stores	W.T.	14	8	25	44.6

G.T. : Glue trap; S.T. : Sherman trap; W.T. : Wonder trap

in wire mesh cages and glass cages with sand. Rats in the former cages got stuck up on the floor and died after 5 to 6 hours, whereas, the rats in the latter set could move their tail and legs slightly because the sand reduced the adhesiveness of the glue to some extent. As the legs were glued with abdomen, it took about 3 hours to reach the water bowl kept inside the cage, but the rats could not drink water because both the jaws were glued together. All the animals in this set died after 10 to 15 hours, probably due to extensive exhaustion, coupled with hunger and thirst.

Sherman trap, a single catch trap, has been reported to be superior over snap traps (Rana 1982). Sharma & Jain (1978) reported that sherman trap caught rodents of all body weights, i.e., from *Mus* sp. to *Bandicota bengalensis*. However, in the present investigation no *M. musculus* was trapped. Similarly, wonder traps have also been reported to be very effective multi-catch trap (Jain *et al.* 1992). The glue traps being a multi-catch trap, may prove revolutionary in trapping because all problems of sherman and wonder traps, especially with respect to behavioural response (trap shyness/avoidance) of rodents are likely to be minimised. Moreover, such a trap is suitable for a wide range of rodent species and their habitats. Further, glue traps can be easily placed everywhere, in the situations where sherman and wonder traps cannot because of their size. Glue traps being flat, cover more effective surface area of the rodent activity as compared to other traps. From behaviour point of view, a rodent has to enter into sherman, or slightly climb into wonder trap, thereby shooting up neophobic behavioural trait. The glue trap is just like a ground surface in this respect.

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