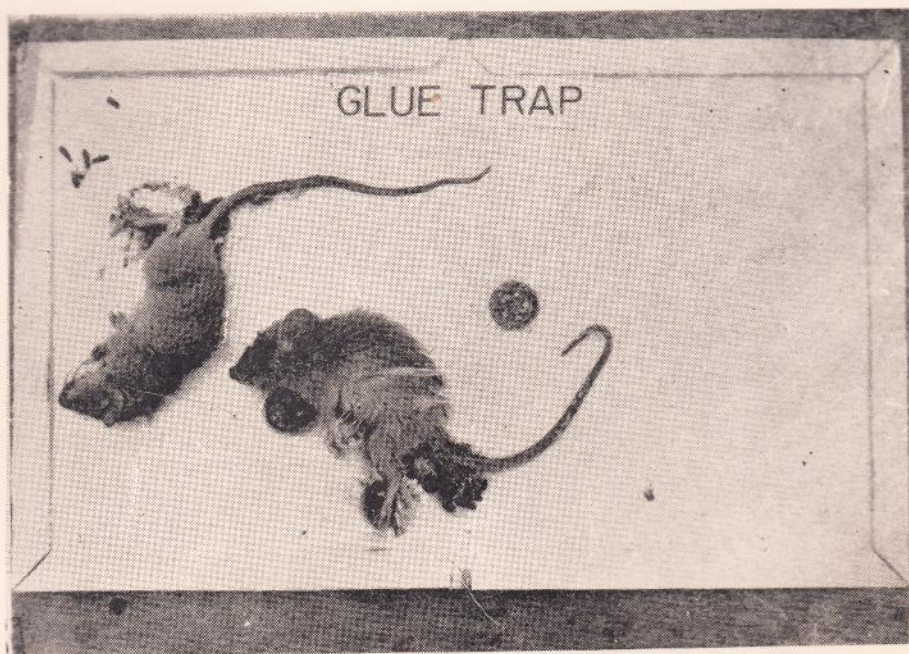


GLUE-TRAP : AN EVALUATION REPORT

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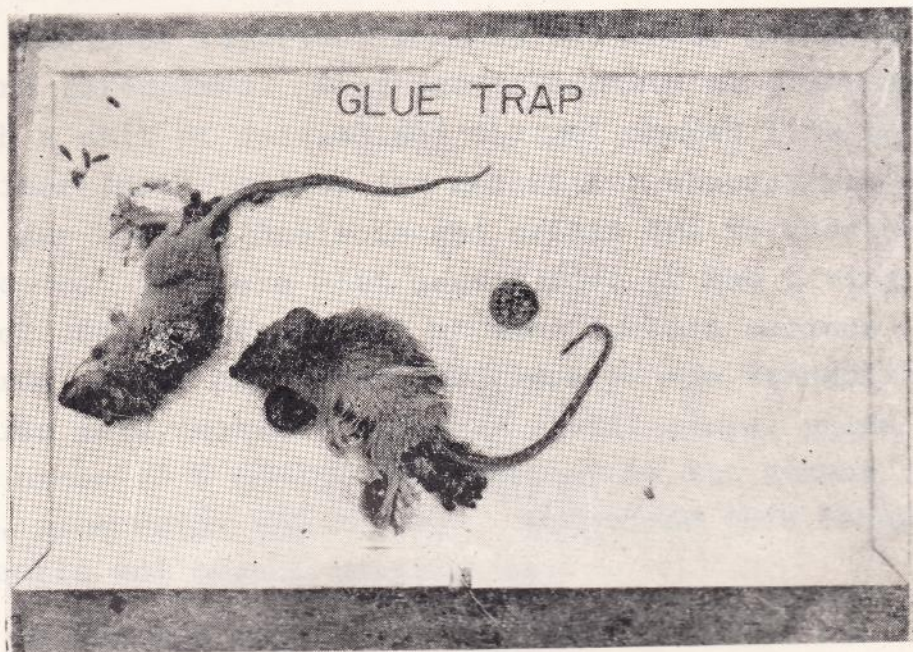
**PROJECT CO-ORDINATING UNIT
ALL INDIA CO-ORDINATED RESEARCH PROJECT
ON RODENT CONTROL**

**CENTRAL ARID ZONE RESEARCH INSTITUTE
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INTRODUCTION

Rodents have always been with man, mostly as pests, ever since man became an agriculturist and started having graneries. The most important rodents are rats, gerbils, squirrels and porcupines. They are recognised as placental mammals with a pair of specialised Chisel shaped life long growing incisor teeth in each jaw and with a characteristic diastema, a gap between incisors and molars due to absence of Canine teeth. They are most destructive of the living mammals. Collosal losses caused by them include serious health hazards, i.e., more than 130 diseases are transmitted to man and its pets, besides ravaging cereal crops, pulse and oilseed crops to a considerable extent at all stages of crop growth, processing and storage. Sometimes this damage is unbelievable and beyond imagination.

Rodent management has been recognised essential for minimising these losses. The problem is multifaceted in our country because of vast geographical area, varied species occuring and limited use of rodenticides. Different management strategies prevalent in the country usually include:

1. Preventive measures, eg. sanitation and clean cultivation.
2. Rodent proofing
3. Curative measures e.g., trapping and use of rodenticides.

Amongst the curative measures the use of traps has an edge over the use of rodenticides ^{because rodenticides} pose other serious threats, like secondary poisoning, environmental pollution and undesired kill of non-target animals.

The rodent traps are useful in two ways.

1. For estimation of rodent population in a habitat.
2. For rodent control where the use of rodenticides^{is} considered undesirable.

The use of rodent traps in the houses, stores, godowns and fields have been an age old practice in our country. There are certain tribes who catch the rodents with their traditional traps for their consumption (Whitakkar, 1987). Further various types of indigenous traps are used for trapping live or dead rodents both in the fields as well as in houses in different parts of the country. Some commonly used traps are based on two principles, a- ~~kill~~ type and b - li^{ve} trapping type. These include : Wonder trap, Snap trap, Bow trap, Conibear-trap, steel jaw trap, pot trap, Sherman trap, Wooden box type trap etc. (Fitzwater and Prakash, 1978). These traps may prove quite effective in managing the rodents, but their repeated use may pose some problems. The frequent use of some traps for several days makes them ineffective, because of development of trapshyness behaviour in rodents (Rana, 1982). However the trap success largely depends upon several other factors like type and size of trap, trap spacing, trap placement, baiting and immediate behaviour of rodents towards them (Sealander and James, 1958; Stickel, 1965; Rowe, 1970; Gurnell, 1976 and Rana 1985). Moreover, most of the traps catch one rodent at a time, with the result that a large number of traps are to be employed for effective management of the rodent. The small traps are often taken away by predatory animals or damaged by them making the trapping programme uneconomic. But all these factors can not be kept in mind by general public who are the end users of the traps. Therefore, there is a need to find a trap which is most simple, easy to handle and possess high trapping success and non-hazardous to non-target species.

The Glue Trap : The glue traps are of disposable type. The main principle in such trap is the use of highly viscous and sticky substances (Polybutanes) which can be produced from the by-products of petroleum and plastic industries.

The glue is spread on a surface (Card board) and when it is placed on the rodent runways the moving rodents get stuck up on these glue boards. The principle was adopted by M/s Sankyo Shodoku Co. Ltd. Tokyo, Japan in the form of one touch rat catcher. These were supplied by the company through M/s Gujarat Petrosynthese Ltd., Bombay to the coordinating unit of AICRP on Rodent Control, Central Arid Zone Research Institute, Jodhpur and Directorate of Plant Protection Quarantine and Storage (Govt of India) Faridabad - through the Pest Control (India) Pvt. Ltd., Bombay for preliminary efficacy evaluation under various rodent habitats.

The trap is made up of folder type card board of size 22 x 35.5 cm. (Fig.). The glue is uniformly plastered (2-3 mm. thick) on the inner side of the board. It can be stored in the original folder condition and at the time of use it can be unfolded. The strong adhesive strength can be maintained even through low to high temperatures (5°C to 45°C).

Since the pre-requisite for usage of these glue traps is safety from dust or any other exotic material that would retard the efficacy of glue, these traps were not kept in the field for visualising the trappability of field rodents. However, when kept in orchards, vegetable fields, squirrels usually avoided them and the traps become ineffective due to dust, leaves and other non-target insects being inadvertently trapped. Therefore, these traps were evaluated under indoor conditions in two habitats :

1. Houses & stores : C.A.Z.R.I., Jodhpur & Dept. of Plant Protection Quarantine and Storage, Faridabad.

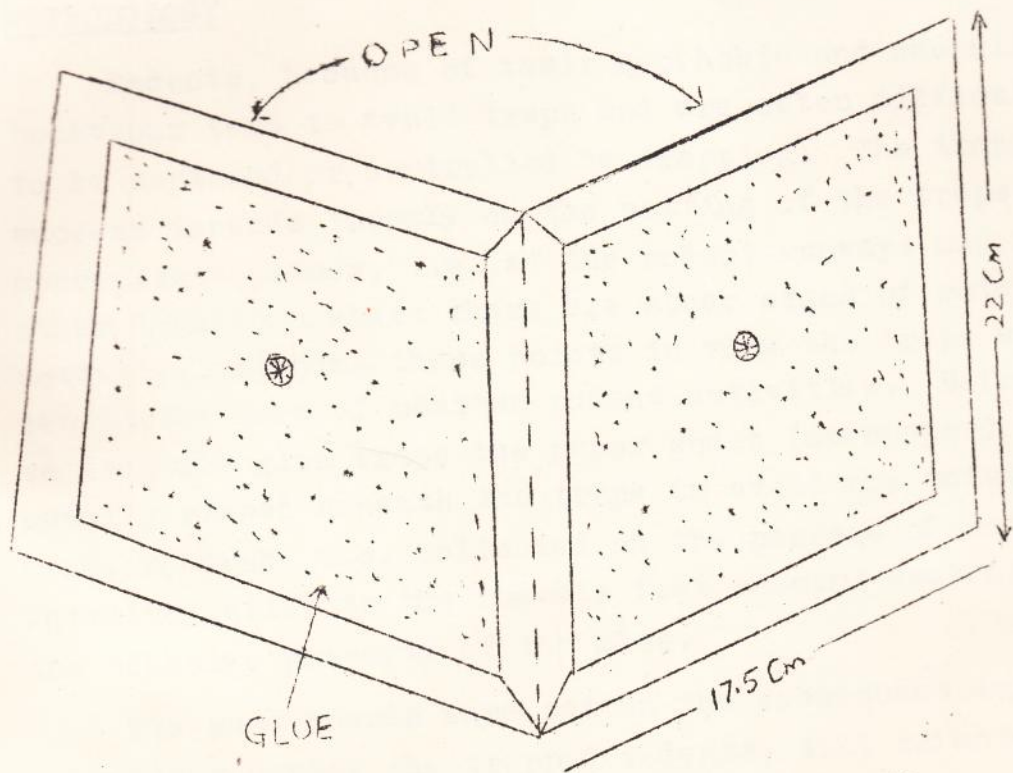


FIG: DIAGRAMATIC SKETCH OF THE GLUE TRAP

2. Poultry farms : C.A.Z.R.I. Jodhpur.
(In feed godowns and outside poultry sheds)
3. Grain Godown in Krishi Mandis : C.A.Z.R.I., Jodhpur

METHODOLOGY

Rodents, because of their neophobic and neophilic behaviour tend to avoid traps and are often difficult to be captured or controlled by trapping. The trapping success depends largely on the setting of the traps at appropriate places, i.e., at the rodent runways and at other locations where there are clear signs of rodent activity. Keeping these points in view the traps were set in the area of maximum rodent activities. Before setting the glue traps the paper sheet (newspaper) were usually placed beneath the traps to avoid any moisture, dust, rubbish etc. collected on the passage of rodents which may stick to the rodents feet causing weakening in the adhesive property of the glue.

The same boards were set on the subsequent days after manually removing the trapped rodents, till rodents were seen in the area. Sherman traps and Wonder traps were also set in the houses, stores, grain godowns and poultry farms for comparing the relative efficacy of these traps. The behaviour of rodents towards the glue traps was also studied by placing these traps in large cages and releasing the house rats.

FINDINGS AND DISCUSSION

(a) Efficacy of glue trap vis-a-vis Sherman trap :

The glue traps were evaluated in residential premises, godowns, stores and poultry farms, where the house rat

(Rattus rattus) and house mouse (Mus musculus) are the major destructive rodent pests causing immense losses. The Coordinating Unit of AICRP on Rodent Control evaluated these traps (at 15 locations) in Jodhpur, where as the Directorate of Plant Protection Quarantine and Storage evaluated the traps at 6 locations in Faridabad, Delhi. It is claimed that the Shelf life of these traps is over 5 years, if stored at temperature up-to 45°C.

The observations were taken frequently to record the rodent catch. It was noted that in locations where rodent population was high and minimum disturbance was there, rodents were trapped within 10 minutes after setting these traps. The observations at Jodhpur indicated highest catch on the first day of the trapping (76 rodents in 30 traps set at 10 locations and 52 rodents in 15 traps set at two poultry farms). Within 5 days the rodent population in all the locations reached to zero as indicated by trappings.

The catches included both the species of rodents. In case of Sherman and Wonder traps which trapped only house rats, a total of only 118 rodents from all the locations could be trapped. Thus the trap index of the glue traps was $\frac{118 \text{ rodents}}{100 \text{ traps} \times 24 \text{ hrs.}} = 0.49$ as against $\frac{12.3}{100}$ and $\frac{16.5}{100}$ with Sherman traps in houses, godowns, and feed stores in poultry farms (Table 1). As many as 6 rodents from residential premises and 12 rodents from poultry farms were trapped on single glue trap in 24 hrs.

Similar finding were also reported from Faridabad/Delhi locations where Srinath et al (1987) observed that one glue board caught as many as 5 rodents simultaneously in one day and as many as 12 rodents were caught in one trap within a period of seven days. They also reported trapping of both the species of commonly occurring commensal rodent species.

It becomes all the more difficult to catch the mice with the commonly available traps in the market, as they can't either entrap them or withhold them for long. The mice are considered to cause heavy damage to household goods, clothings, and paper material. The use of Wonder traps, Sherman traps has largely failed to trap the mice because of their light weight and small size.

(b) Comparative efficacy Wonder trap and of glue trap :

The wonder trap is traditional multiple catch trap. The comparative study with glue trap conducted at 3 locations in poultry feed store (2) egg store (1) and at one grain godown in Krishi Mandi (Mandore). In one godown, the owner removed the cages immediately after the placement on sentimental and religious attachments. Both types of traps in these locations behaved equally in trapping the rodents except that Mus musculus was trapped on glue boards only. The trap index was 44.6 rodents/100traps/24 hrs. in poultry farm whereas in one godown these figures remained 16.6 and 11.0 respectively for glue traps and wonder traps (Table 2).

(c) Behaviour of house rat (R. rattus) towards glue traps :

As soon as the house rats were released in the large cages with glue traps inside, the animal reacted very sharply. They moved around the board for 10-15 minutes and then put their mouth on one corner of the glue trap for gnawing which got stuck up with the glue. They started producing rescue sounds and in an attempt to detach the mouth the forelegs also got entangled and the sound became louder. Similarly, in the process of rescuing, their hind legs, back also got entangled on the glue, with the result they were unable to move though kept trying for rescue. In this process their rectal excreta,

saliva and urine also came out. Within 30-45 minutes, the rats got exhausted and inactive. Later they were removed from the glue trap and were kept in separate cages (two rats in each). One set in wiremesh cage and the other in glass cage with sand on the floor. Water and bajra grains were placed in the bowls in both the sets. In the former set the rats got stuck upon the floor of the cage and became almost morbid and died on the same day. In the later set the rats tried to move their tail and legs ^{due to presence of sand which} slightly reduced friction of stickiness of the glue. After 3 hours, the animals tried to move on the sand and managed to reach near the water bowl. As their legs were stuck with the abdomen, they could not move properly and fell in the bowl, but were unable to drink as both the jaws were also glued together. All the animals in this set ultimately died probably due to extensive exhaustion and lack of feeding after 10 hours.

(d) Dimorphism in trap ping behaviour in Rattus rattus :

An analysis of rodents trapped in poultry farm and grain godowns revealed no significant difference ($t=0.24$) between the glue trap and wonder trap in respect of same sex, i.e., males and females were trapped equally in these traps, (i.e., 12 males in glue trap and 12 males in wonder trap whereas 19 females in glue traps and 17 females in traps). But when behaviour of sexes is analysed in totality it is evidently reflected that the females are more prone to trapping than the males (i.e., 24 males trapped versus 36 females). Thus, about 12 per cent more females are trapped (55.88%) as compared to males (44.12%). Further, the analysis of body weight exhibited that glue traps caught light weighing rodents (males ranging from 32 g to 147 g and females from 23 to 144 g ;

and Mus musculus 7-15 g) as compared to wonder traps where no Mus musculus was ever trapped and in case of Rattus rattus males weighing 48 to 154 g. and females with 45.5 g to 168 g. body weight.

CONCLUSION

The glue traps exhibited higher efficacy in comparison to Sherman and Wonder Traps in both types of habitats under study in following respects :

1. Being very handy in shape (folder type) and size, it can be spread/placed at any site, e.g., below Sofasets, tables, Almarah, T.V., Radio and other places which are inaccessible for Wonder and Sherman traps. It is because of this characteristic it has higher trapability index.
2. This trap is multiple catch type and therefore more than one rodent is always trapped whereas Sherman trap catches one animal in one setting. However, it is comparable to Wonder trap in this respect but the Wonder trap is of very big size and sometimes or often trapped rodent manage to escape after sometime.
3. After removing the trapped animals, the same glue board can be used for subsequent days till the glue is there on the board. Later it can be disposed off.
4. The glue is not poisonous, hence it is very safe for commensal rodent management.
5. As in case of other live traps, the trapped animals are to be dipped in water for few minutes (after removing from glue trap) to ensure death these dead rodents don't pose any secondary hazard to wild life and other animals who feed on them.

6. The glue traps were effective in trapping both the commensal rodent species, viz., House rat Rattus rattus and house mouse Mus musculus whereas Sherman and Wonder traps proved ineffective in trapping the house mouse.

7. Non-burrowing type of rodents (like Rattus rattus and Mus musculus) often avoid entering a new thing like traps. Therefore, Wonder traps and Sherman live traps often trap less number of commensal rodents. Contrarily, flat traps like glue boards do not create avoidance behaviour in commensal rodents (as they have not to enter into a hole like thing) and if kept on runways often entrap these rodents.

Thus the glue traps are quite effective in managing the rodent populations in the residential premises, godowns, departmental stores, poultry farms, hospitals and other such places where use of poisons often becomes undesirable.

Suggestions : Following suggestions if incorporated are likely to enhance the efficacy and use of these glue boards.

1. The colour of board may be of such type which would mixen with the ground.
2. If possible the glue may be coloured dark to warn other people on one hand and would ^{mix} with ground in the dark. The visual avoidance behaviour would thus be minimised.
3. It looks quite inhuman if rodents are seen struggling hard for rescue but simultaneously they appear entrapped more deeply (with urine, faeces, and hairs etc. spreading on board). Particularly it is intolerable under house hold contions. Therefore, instead of putting glue all over the board in continuation, it is placed in strips with slots on board on both the sides of glue and also with a polythene type cover over individual strip. It will be easier for user to remove the polythene cover from desired number of strips while placing the glue board and can also be tear off/cut off the stripes from the slots, on which rodent is sticking for easy disposal.
4. Arrangements for hanging these glue boards on walls may also be provided.

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Table 1. Comparative efficacy of glue trap vis-a-vis Sherman trap

Locations/habitat	Traps	Total no. of traps set	Trapping on first day	Total no. of rodents trapped in 5 days	Trap index (no. of animals/100 trap/day)
1. In houses/ godowns/stores (Total 10 locations)	(a) Glue Trap	30	76	180	118.8
	(b) Sherman Trap	30	8	20	13.3
2. In poultry farms (feed Stores) (Two)	(a) Glue Trap	15	52	80	106.6
	(b) Sherman Trap	30	10	25	16.5

Table 2. Relative efficacy of glue trap and Wonder trap
(multiple catch type trap)

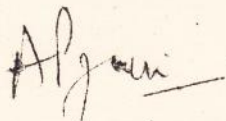
Location	Type of trap	Total no. of traps set	Trapping on first day	Total no. of rodents trapped in 4 days	Trap index (No. of rodents/100 traps/24 hrs.)
1. Poultry feed and egg stores (3 locations)	(a) Glue Trap	14	8	25	44.6
	(b) Wonder Trap	14	8	25	44.6
2. Grain godown (1 location)	(a) Glue Trap	9	5	6	16.6
	(b) Wonder Trap	9	4	4	11.0

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