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RICE FIELD RAT CONTROL TRIALS – A PRELIMINARY STUDY

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ABSTRACT

Field trials were conducted to evaluate the comparative effectiveness of two acute rodenticides, i. e. zinc phosphide (2%) and pyriminyl (2%) against rats damaging paddy crop. pre- and post-treatment tiller damage and population indices were recorded. Three months trials indicated that both zincphosphide and pyriminyl were effective in reducing damage and rodent population. In case of zinc phosphide the reduction in tillers damage and population was about 90 per cent while in case of pyriminyl the reduction in population was 80 per cent. Damage reduction data were not obtained from fields treated with pyriminyl.

INTRODUCTION

High levels of rat damage to paddy crop was reported from Sheikhupura district in a questionnaire survey conducted through the Agricultural Extension Officials in 1975 (Greaves and Khan, 1975a). The survey response which was 33 per cent indicated 3 per cent damage to the crop. The mean reduction in yield due to rodent damage was in the order of 6 per cent. Again in 1977, the Vertebrate Pest Control Centre conducted a survey for rodent abundance, distribution and damage to the paddy crop in the major rice producing tracts of Punjab Province. Trapping indicated that *Bandicota bengalensis* was the most abundant in the three districts of Sheikhupura, Gujranwala and Sialkot but did not indicate such a serious infestation level as existed in Sind (Greaves, *et al.*, 1975b and 1977).

Traditionally, the farmers in Pakistan use 5 per cent or more of zinc

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phosphide bait in the shape of balls made of wheat flour, raw sugar and some sweet oils for the control of rats in the paddy and also, in other crops. The use of zinc phosphide with such high concentration is unlikely to give complete control of rats because of the development of bait shyness (Rozoska, 1951 and Fernando, *et al.*, 1967). The present study was conducted to evaluate h e comparative effectiveness of another candidate acute rodenticide for controlling field rats as an alternate to zinc phosphide. Therefore, a recently developed acute rodenticide, pyriminyl, also known as Vacor (Peardon, 1974), was evaluated to control rats in paddy fields.

MATERIALS AND METHODS

i) *SELECTION OF EXPERIMENTAL SITES*

Three sites were chosen after taking into account visible signs of rodent damage before the pre-flowering stage. The size of the sites depended partly upon the compact nature as well as farmers overall area under rice cultivation. The sites selected were as follow :

	Site	*Total area of paddy*	*Location*
1.	Herdeo village (Sheikhupura District).	80 acres	13 Km North of Sheikhupura on the Sheikhupura-Gujranwala road.
2.	Baigpur (Gujranwala District).	14 acres	14 Km North of Sheikhupura on the Sheikhupura Gujranwala rood.
3.	Jogiwala (Gujranwala).	75 acres	15 Km North of Sheikhupura on the Sheikhupura -Gujranwala road.

On site 1 and 3, 40 and 35 acres were allocated for zinc phosphide treatment while the rest of the area was kept untreated for comparative data collection. On site 2 pyriminyl was used. However, for comparison, data for this site were used from untreated area for sites 1 and 2.

ii) *PREPARATION AND APPLICATION OF BAITS*

Zinc phosphide bait was prepared by mixing broken rice (46%), wheat

flour (46%), cooking oil (2%) with zinc phosphide powder (2%) as described by Smythe and Khan (1980). Using a wooden spoon, paddle or stick, mixed the broken rice and flour together, added and mixed the zinc phosphide in a steel bucket till the mixture loocked of even grey colour. After this, mixed the cooking oil for 5 – 10 minutes. This helped in protecting the active ingredient from deterioration from atmospheric humidity and rain. While mixing the oil, added just enough water to produce a stiff dough. Rolled and flattened this dough on card board or plastic sheet till it was 3/4 cm thick. This flattened bait was then cut with knife into 2 cm squares. This was then air dried in a place with good air circulation for 3 – 4 days, turning daily after breaking the bait up into squares. Then completely dried bait was stored in a safe place in air tight plastic bags marked "rat poison, zinc phosphide, 2%."

Priminyl or Vacor (2%) bait was made in the same manner as described above for zinc phosphide. However, this bait was prepared from 10% Vacor tracking powder while 97% active ingredient was used for zinc phosphide bait.

In both cases, the bait was applied along the bunds after every 10 – 15 meters intervals. At each point 2 pieces of bait were placed. The bait was checked after 4th day of application and where ever needed it was replenished. Altogether, three replications were made. This baiting was stopped two weeks before the irrigation water was drained out from the fields. Baits of zinc phosphide and Vacor were used at the rate of 1½-2kg/hactare.

Before the start of each treatment, damage to tillers was estimated and the population of rodents determined on all sites as described by Greaves, *et al.* (1977).

RESULTS AND DISCUSSION

The results of these trials are summarised in Table 1, where it is shown that reduction in the two important parameters such as tiller damage and population was significant as a result of the use of these two acute poisons.

When these trials were initiated, the crop was at the pre-flowering stage when the incidence of damage by rodents might be usually confined to the edges of the fields (Fulk, *et al.*, 1981). Trapping transects and visual surveys showed

Table 1. *Summary of rodenticides trials near sheikhupura and Gujranwala*

Site	Location	Treatment	Damage (Tillers cut counts) (%)	Reduction in damage after treatment (%)	Rodents trapped	Reduction in rodents (%)
1.	Herdeo (Distt. Sheikhupura)	Zinc phosphide (2%)	Pre-treatment 2.9 (0.1)*		10 (7)	90.0
			Post-treatment 0.3 (0.88)	89.6	1 (9)	
2.	Baigpur (Distt. Gujranwala)	Vacor (2%)	Pre-treatment	—	5 (–)	80.0
			Post-treatment	—	1 (–)	
3.	Jogiwala (Distt. Gujranwala)	Zinc phosphide (2%)	Pre-treatment 3.1 (0.9)		7 (4)	—
			Post-treatment 0.3 (0.6)	90.3	17 (8)	

* Figures in parantheses relate to non-treatment

a restricted or limited activity of rodents inside the fields. *Bandicota bengalensis* was the most abundant rodent followed by *Millardia meltada* and *Mus* spp. *Suncus* was trapped but not accounted for over all population levels. Most of the time it appeared that bandicoots remained on or in the embankments and they were subsisting on weeds and partly on rice which was contray to findings of Fulk, *et al.* (1981). This was confirmed by the animals caught during the trials where only 11% to 28% reproductive fragments of rice were counted in the stomach contents. On the other hand, the present reduction in animal numbers was quite high, e. g. 90% on site 1 and 80% on site 2. The data from site 3 were not analysed due to change in trap lines.

As far as the reduction in animal number was concerned, the effectiveness of zinc phosphide (2%) and Vacor (2%) baits could be described as positive. The bait intake for zinc phosphide was 90.2% and 83.3% on sites 1 and 3, respectively. The bait intake on site 3 was low because it deteriorated rather rapidly and became mouldy due to flooding of bunds at certain points. The intake of Vacor on site 2 was 87%. These bait intake data indicated high acceptance of these bait formulations (Smythe and Khan, 1980).

The results of these trials are indicative of the fact that both these acute rodenticides are effective in reducing the damage as well as the numbers of animals trapped before and after baiting.

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