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Field trials of the rodenticide 5-*p*-chlorophenyl silatrane against wild rats (*Rattus norvegicus* Berk.)*

By B. D. RENNISON

Pest Infestation Control Laboratory,
Ministry of Agriculture, Fisheries and Food,
Hook Rise South, Tolworth, Surbiton, Surrey

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SUMMARY

Rattus norvegicus infestations on six farmsteads were poisoned with 0·5% 5-*p*-chlorophenyl silatrane and those on another six with 2·5% zinc phosphide. Both poisons were applied in pinhead oatmeal bait containing also 5% corn oil, after pre-baiting. The result of each treatment was assessed by comparing the take of pre-bait with that of a census bait (wheat) laid after the poisoning.

The zinc phosphide treatments were generally more effective than those done with 5-*p*-chlorophenyl silatrane, but the latter were somewhat detrimentally affected by cautious baiting on the part of one of the operators.

The results are discussed and it is concluded that although they indicate that 0·5% 5-*p*-chlorophenyl silatrane may have approached zinc phosphide in effectiveness under the conditions of the trial, it would in most circumstances be significantly less effective and possibly less safe to use than the latter, well-tried poison.

INTRODUCTION

Six trials of 5-*p*-chlorophenyl silatrane for the control of common rats (*Rattus norvegicus*) were carried out on infested farms in Montgomeryshire and Shropshire where resistance to anticoagulant rodenticides is common and where, as a result, field staff were available who were fairly experienced in the use of acute poisons. The results given below have been abstracted from data covering more extensive trials in which the properties of several other acute toxicants besides 5-*p*-chlorophenyl silatrane were investigated and were compared with those of 2·5% zinc phosphide, probably the most effective acute rodenticide in common use in Britain.

METHODS

Following the work of Beiter, Schwarcz & Crabtree (1970) and of Greaves, Redfern & Tinworth (1974), the concentration of 5-*p*-chlorophenyl silatrane used in the six trials was 0·5%. Six control treatments were carried out at the same time with 2·5% zinc phosphide.

Only farmsteads that on inspection appeared to have moderately heavy rat infestations were chosen for treatment. Farms with obviously lightly or heavily infested buildings were excluded because in practice the tendency to underbait

and therefore not kill a proportion of the rats increases with infestation size, particularly when, as in this type of trial, a standardized procedure has to be followed. The poisons were allocated to the farms at random. The two operators who carried out the treatments and worked independently of each other, were also randomly assigned farms to treat so that each used each poison at three sites. The same bait was used for all the treatments to avoid introducing baits as a source of variation in the results.

Each infestation was pre-baited for 5 days with a weighed amount of pinhead oatmeal containing 5 % corn oil. The largest daily amount of bait consumed by rats on either the 4th or 5th day was used as an index of the initial size of the rat population. The same bait base, freshly prepared with poison included was laid on the day that the prebait was removed and left down for 14–24 hr. depending on the conditions on each farm. The shortening of the baiting period in some situations, in the interests of safety, is not thought to have directly affected the results, because rat activity on farms is habitually nocturnal. Eight days later the pre-baiting procedure was repeated using dry whole wheat. As far as possible the wheat baits were laid at different sites from those used during pre- and poison baiting. This time the largest daily take of the 4th and 5th days was taken as the index of the size of the surviving population.

RESULTS AND DISCUSSION

Experience has shown that dry wheat and pinhead oatmeal + 5 % corn oil are consumed by rats in about equal amounts in the type of infestations used in these trials. Thus it may be assumed for each treatment that the weights of pre-bait and census bait eaten are directly proportional to the numbers of rats present before and after poisoning. From each pair of readings the percentage success achieved can therefore be calculated and this is recorded in Table 1.

It can be seen that the treatments done with 2·5 % zinc phosphide were generally more successful than those done with 0·5 % 5-*p*-chlorophenyl silatrane. For example, of the six treatments that apparently gave less than 75 % control, five had been carried out with the latter. However, there are two reasons why the difference in apparent success found here cannot be attributed wholly to the relative effectiveness of the two poisons.

First, it chanced that somewhat larger infestations fell to be treated with 5-*p*-chlorophenyl silatrane than with zinc phosphide. Second and more significantly, it was revealed by analysis of the results (unpublished) of the complete set of trials, of which the above formed a part, that Operator *A* was less successful with the more acutely toxic baits than Operator *B*, probably because he was much more cautious in bait placement. Table 1 suggests that his caution was more marked in the case of 5-*p*-chlorophenyl silatrane than in that of zinc phosphide, possibly because the former poison acted on the target animals much more rapidly. This rapid effect was demonstrated on more than one occasion in the trials by the appearance of dead and dying rats near poison bait only a few minutes after it had been laid in the evening. Both the above effects would tend to favour zinc phosphide.

Table 1. *The maximum weights of pre-bait (pinhead oatmeal and 5 % corn oil) and post-poisoning census bait (dry whole wheat) eaten in one day by rats during trials of the rodenticides 5-p-chlorophenyl silatrane and zinc phosphide on twelve farms*

	Six treatments with 2·5 % zinc phosphide			Six treatments with 0·5 % 5-*p*-chlorophenyl silatrane		
Operators	Pre-bait eaten (g)	Census bait eaten (g)	Success* %	Pre-bait eaten (g)	Census bait eaten (g)	Success* %
A	1100	200	82	3300	1500	55
	700	350	50	3750	1850	51
	2550	300	88	1100	500	55
B	600	150	75	2400	660	73
	1320	240	82	940	440	53
	1380	0	100	2060	370	82
Total	7650	1240	84	13550	5320	61

* Percentage success = 100 (weight of prebait − weight of census bait)/weight of pre-bait.

The main reason why 5-*p*-chlorophenyl silatrane was less effective might be that this same rapid action resulted in a number of rats developing warning symptoms before they had eaten a lethal dose. This might arise as a result of temporary disturbance during the first stages of feeding. Such disturbance may have included the development of overt poisoning symptoms in neighbouring rats that had begun to feed somewhat earlier – an occurrence that is believed not to be of any importance with poisons such as zinc phosphide that take longer to act.

CONCLUSIONS

It had been suggested by Beiter *et al.* (1970) that because 5-*p*-chlorophenyl silatrane rapidly decomposes in the presence of moisture, its use as a rodenticide minimizes the hazards to other wildlife and domestic animals. Clearly this is so if bait residues and dead rodents are not carefully picked up after poisoning; but at the same time the compound's instability in water reduces its potential as a rodenticide by restricting its use to dry environments. More importantly perhaps, the compound cannot be used in damp baits such as soaked wheat, which are generally more attractive to rats and so in many situations more efficient vehicles for acute poisons than dry baits.

The results of this trial therefore indicate that 0·5 % 5-*p*-chlorophenyl silatrane will be less useful for rat control than 2·5 % zinc phosphide except when the risks of secondary poisoning to non-target species are high. In practice, such situations are uncommon and more often it is the danger of primary poisoning that prevents operators from poison baiting effectively.

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