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Authors

Saxena, Y.
Sharma, P. P.
Zutshi, M.

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STUDIES OF THE TOXICITY OF VACOR (RH-787) ON THE REPRODUCTIVE BIOLOGY OF *Rattus rattus rufescens*

Y. SAXENA, P.P. SHARMA and M. ZUTSHI, Department of Zoology, University of Rajasthan, Jaipur, India

INTRODUCTION

Investigations on damage, losses and diseases attributed to rodents in India are well documented by Barnett and Prakash (1975), Fitzwater and Prakash (1973). The toxicity of rodenticides on the rodents have been studied by several investigators such as Cowan (1978), Marsh and Howard (1975, 1977). Some rodenticides are less potent and induce overall deleterious effects on biological systems but not on mortality. Therefore, studies on the effects of these agents on the reproductive biology would be of significance as reported by D'souza and Batra (1975). Srivastava et al. (1979) investigated the bait shyness as shown by rodents in case of zinc phosphide; it does not appear to be present in Vacor since the rodents continue to feed throughout the course of investigation. However, in contrast to zinc phosphide, Vacor acts relatively slowly.

Rattus rattus is one of the most common agricultural, commercial and domestic pest, ranging over almost the whole of India. Despite recognition of the serious losses caused by this species, little information is available on its susceptibility to rodenticides.

Studies on the effects of Vacor on the reproductive biology and post-natal development to understand the expression of these effects were conducted.

MATERIALS AND METHODS

Healthy adult rats of both sexes weighing in between 140-220 gm were experimented upon. The animals were kept in cages under laboratory conditions for fifteen days, prior to the treatment to acclimatize them to the laboratory conditions. Animals were provided with water and food such as wheat flour mixed with 1% vegetable oil and 1% molasses.

After 15 days, animals were divided into three batches of twenty each (10 males and 10 females) and each pair was kept for fifteen days in metal cages 60x30x30 cms. with a single door. After consumption had stabilized, rats were weighed, starved for 30 hours and then Vacor was added to the food (35 gms) in concentrations of .05%, .025% and .0125% to 1st, 2nd and 3rd batch respectively. Fresh food was given daily. Consumption for spillage was measured each day and was converted to gms/kg. body weight for analysis. The control experiment was also run. Results on the toxicity of Vacor are summarized in Table 1. Longevity and mortality rate were also recorded.

Table 1. Effect of Vacor (RH-787) on the longevity of *Rattus rattus*.

Conc. of Vacor (%)	Total No. of rats		Weight range (gms)	Longevity up to		Mortality (%)	Food consumption gms/kg body SE ₊
	Male	Female		5 days	15 days		
.05	10	10	185 (160-220)	Nil	Nil	100	156 ± 4.0824
.025	10	10	180 (140-210)	70	30	70	166 ± 4.3944
.0125	10	10	160 (140-180)	20	80	20	200 ± 4.9306
Control	10	10	180 (160-200)	100	100	Nil	210 ± 5.9142

In the 2nd experiment, animals fed with .0125% Vacor, the dose was repeated for 3 times further after an interval of 15 days. Six healthy pairs from this batch were selected and kept for further observations, such as total number of litters born, average number of litters per female, mean weight of litters and mortality rate were recorded as evident from Table 2.

RESULTS AND DISCUSSION

The deleterious effects of rodenticides were reported by Brooks (1978), Jackson et al. (1978) and Peardon and Ware (1977). According to Prakash et al. (1978) bait with 1% RH-787 killed all the species of rodents in a mustard field in the desert.

Table 2. Effect of Vacor (RH-787) on the fertility of Rattus rattus.

Conc. of Vacor (%)	Total No. of breeders		Total No. of litters	Av. No. of litters/female	Mean Wt. of litters in gms (2 days old) SE ±	Mortality (%)	
	Male	Female				Parents (15 days)	Litters (7 days)
.0125	6	6	30	5	2.156 +0.029 P<0.001	16.66	80
Control	6	6	42	7	2.560 +0.175 P<0.001	Nil	7.14

In the present experiment, it was observed that the rats fed with .05% Vacor died within 24 hours. Symptoms noticed after six hours indicated a noticeable reduction in general activity. Sometimes after paralysis of hind limbs, pulmonary distress and diarrhea was also observed. Dead rats often found with fore and hind limbs rigid with swollen abdomen.

Within 5 days, 80% mortality was observed in rats which were fed with .025% Vacor. Out of the 70% individuals which survived, 40% died within a span of 15 days and the rest 30% survived even after 15 days, but these individuals were very weak to maintain their progeny further.

In the second experiment animals treated with .0125% Vacor, only 6 pairs which were found healthy were kept for breeding purpose. The total number of litters born to 6 females were 30 as compared to 42 in case of control. The young ones born were less in weight as compared to the controlled ones as is evident from Table 2. Fifteen-day observations revealed that mortality was 16.66% in parents and 80% in litters. However in control mortality was nil in case of parents and only 7.14% in litters.

The data presented in this paper indicate that the mortality increases with the increase in concentration in Vacor. It was also observed that the female rats fed with .0125% Vacor could deliver litters which were less in weight as compared to the control. The results were found significant. No problems of acceptance of Vacor baits were observed during the tests but by repeating the dose .0125% rats started developing resistance.

SUMMARY

Vacor (RH-787) a relatively new rodenticide was evaluated for the control of Rattus rattus rufescens. The symptoms of paralysis in hind limbs were observed after feeding it to rodents. The susceptibility to this rodenticide in Rattus rattus increased with the increase in its concentration. Experimental observations revealed that RH-787 bait with .0125% concentration affects the reproductive biology of the rats. Bait with .025% Vacor proved sublethal and within 5 days 70% mortality was observed, while 100% mortality was observed when rats were fed with .05% Vacor.

LITERATURE CITED

- BARNETT, S.A. and I. PRAKASH. 1975. Rodents of economic importance in India. Arnold-Heinemann, New Delhi, 1-175.
- BROOKS, J.E. and PETHAN HTUN. 1978. Laboratory evaluation of pyriminyl used as a rodenticide against the lesser bandicoot rat, Bandicota bengalensis.
- COWAN, P.E. 1978. Poison and bait shyness in two species of gerbil, Meriones hurrianae and Tatera indica. Z. Angew Zool. 65(1):57-63.
- D'SOUZA, A.V. and B.K. BATRA. 1976. A study of the effects of DDVP (Propoxure) on Laboratory mouse. Curr. Sci. 45:10, 377.
- FITZWATER, W.D. and I. PRAKASH. 1973. Hand Book of Vertebrate Pest Control. ICAR, New Delhi. 1-92.
- JACKSON, W.B. and B.T. MARSH. 1978. Environmental Control of Rats. Pt. I Pest Control 46(8):12-16, 38, 39, 43 and 54. Pt. II Ibid. 46(9):26-31.
- MARSH, R.E. and W.E. HOWARD. 1975. New perspectives in rodent and mammal control. Proc. III International Biodegradation Symp. Aug. 17-23, pp. 317-329.
- _____, W.E. HOWARD and R.E. COLE. 1977. The toxicity of chlorophacinone and diphacinone to deer mice. J. Wildl. Manage. 41(2):298-301.
- PEARSON, D.L. and J.E. WARE. 1977. Characteristics of DLP-787. Pest Control 45(11):49-52.
- PRAKASH, I., B.D. RANA and A.P. JAIN. 1978. Evaluation of RH-787 as a rodenticide. Z. Angew Zool. 65(1):5-10.
- SRIVASTAVA, A.S., Y.K. MATHUR, and A.S. BHADAURIA. 1979. Vacor (RH 787). An effective rodenticide against field rats. Rodent Newsletter 3(2):10 pp.