

# EFFECT OF ACUTE AND CHRONIC RODENTICIDES IN RESIDENTIAL HABITATS

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## **Abstract**

*Rodent infestation in residential and nearby areas and damage in stored food material in various premises, assessment of losses and evaluation of acute and chronic rodenticides in residential habitats were studied.*

*The rodent population in different types of premises like brick houses, mud houses, shops, godowns, small storage rooms and nearby open areas vary significantly. The rats collected from houses were mainly *Rattusrattus* and *Mus masculus* and few were *Rattusmeltada*. The anticoagulant rodenticides like Bromadiolone and Difethialone were found more effective as compared to acute rodenticide like zinc phosphide.*

## **Introduction**

The problem of rodents has become acute in developing and under developed countries because of the availability of optimum conditions for their multiplication. Various methods have been used for the control of rodents but control through rodenticides is most expedient and immediate means of reducing rodent pest to tolerable levels. Anticoagulant rodenticides have been evaluated and found effective (Greaves and Rehman 1977 and Prakash and Mathur 1979). For this reason, it is the most widely used method followed by trapping and fumigation (Hopf et. al. 1976). The purpose of the present investigation is to assess the rodent population in residential and nearby areas, factors affecting the population, type of damage and evaluation of acute and chronic rodenticides to control the commensal rodents.

## **Material and Methods**

Three villages i.e. Rajota, Beelwa and Papurna of District Jhunjhunu, Rajasthan were selected for studies. For Estimation of house rat population, two methods were adopted.

First method applied was CMR (Capture/Marking/Recapture). Three traps were set in each house in different premises. Pre-caging for three days was done to overcome neophobia. Bread smeared with butter were kept as bait in each cage. On 4<sup>th</sup> day the cages were set and left over night. On 5<sup>th</sup> day morning all the trapped animals were counted, marked by white colour and released, after proper washing, the cages were again set at the site with bait materials. Pre caging was again done on 5<sup>th</sup> and 6<sup>th</sup> day. For second trapping the cages were set on 7<sup>th</sup> day. On 8<sup>th</sup> day, all the trapped rats, including the marked ones were counted. Lincoln index, was calculated by applying the formula suggested by Wood, 1984 and Anonymous, 1981.

In the second method ten percent of the total houses were selected by random sampling technique in village Beelwa. Three to four rat traps (Wander Traps) were set in each of the house. For the first three nights, the traps were kept open and the bread pieces smeared with butter and sugar were placed as bait to overcome neophobia. On the fourth night the cages were closed to catch rats. On the fifth day morning the rats were counted, identified, sexed and weighed. Again on 5<sup>th</sup> and 6<sup>th</sup> day pre caging was done. The cages were set on 7<sup>th</sup> night and the trapped rats were counted on 8<sup>th</sup> day in the morning. The total rats trapped on 5<sup>th</sup> and 8<sup>th</sup> morning gave the total rodent population.

## **Toxicity Studies**

The study was carried out by using Zinc phosphide (2%) as acute and Bromdiolone (0.005%) and Difethialone (0.00125%) as chronic rodenticides. All the three rodenticides were applied in three different villages i.e. Beelwa, Rajota and Papurna. In each village a complex of 40 houses was selected for treatment. The poison bait prepared in wheat flour with 2% sugar and 2% groundnut oil as additives.

## **Results and Discussion**

The rodent population in different types of premises vary significantly. The rodent number increases once more during rainy season, this may be probably to seek protection from rain

water. The rats collected from houses were mainly *Rattusrattus* and *Mus musculus* and few were *Rattusmeltada*. The order of rodent population in different types of premises was shop/godown/small storage room > mud houses > brick houses.

The studies on commensal rodents indicate that their population density depends upon many factors like sanitary conditions, type of habitat, storage condition etc. The improved sanitary and hygienic conditions, provision of scientific storage structures alongwith poison baiting only could help in the reduction of rodent population. Saxena et al. (1990) reported similar finding in rural areas also.

### **Evaluation of acute and chronic rodenticides in residential areas**

The results of study indicate that the absolute mortality was recorded with both the anticoagulants i.e. Bromadiolone and Difethialone while only 62.50 percent control was obtained with Zinc phosphide. The consumption of Zinc phosphide bait was observed less as compared to Bromadiolone and Difethialone baits. The baits of anticoagulants were more palatable as compared to acute rodenticide.

On the basis of above findings it may be stated that the use of single dose second generation anticoagulant rodenticides are more effective as compared to acute rodenticides because they are effective in very small amount and rodents are unable to detect poison in baits. High efficacy of anticoagulant rodenticides as compared to acute rodenticide in rural habitats is also reported by Saxena et al (1990).

In case of Zinc phosphide, less consumption of bait may be due to the bait shyness showed by rodents .

Idris et al. (2009) also reported that rodents avoid zinc phosphide after sub lethal administration of the dose. Poison shyness is the major problem with acute rodenticides. Prasad and Kochar (1995) reported that poison rodents also eat sufficient poison bait for complete kill, as they do not develop aversion to it.

If the houses treated with Zinc phosphide (2%) were again treated with Bromadiolone (0.005%). An absolute control was recorded in houses and other premises. It clearly shows that the single dose second generation anticoagulants are also capable to control bait shy population of rodents. Kumar et al.(1995) were also reported Similar findings in their studies.

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**Table –Effect of Acute and Chronic Rodenticides**

<b>Rodenticides (Conc.)</b>	<b>No. of Premises Treated</b>	<b>Mean Population of Rats per habitat before treatment</b>	<b>Mean Population after treatment</b>	<b>Total control (%)</b>
Zinc phosphide (2%)	40	12.32	7.70	62.50
Bromadiolone (0.005%)	40	14.53	-	100
Difethialone (0.00125%)	40	10.45	-	100

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