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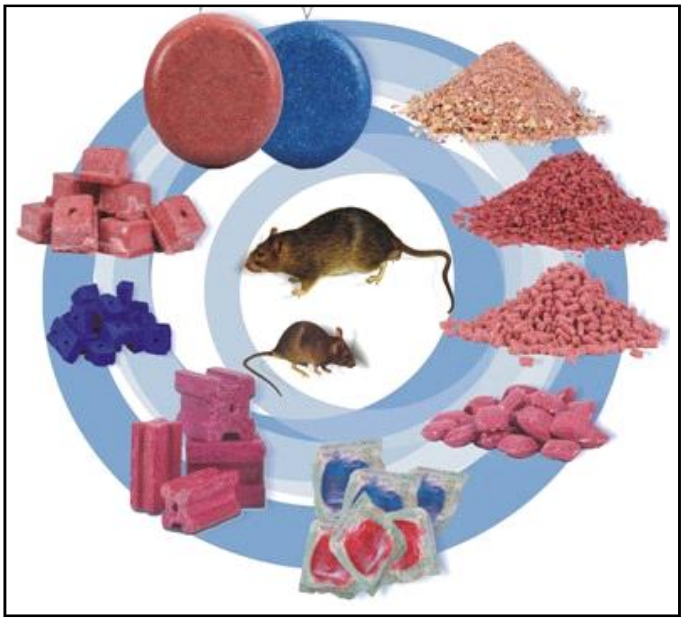
Rodenticides

Kavita M. Beeraganni and M.G. Kitturmath[1]
Department of Agricultural Entomology, N.M. College of Agriculture, Navsari Agricultural University, NAVSARI (GUJARAT) INDIA (Email : kvbeeraganni@gmail.com)
[1]Department of Agricultural Extension Education, Navsari Agricultural University, NAVSARI (GUJARAT) INDIA

The poisons used for the control of rodents are either acute poisons (single dose and quick acting) or chronic poison (multiple dose and slow acting). Scientific work on the evaluation of rodenticides and systematic application of scientific methods for rodent control began in Britain at the Bureau of population, Oxford. The results of these studies still remain a major source of information on control of rats and mice (Chitty and Southern, 1954). In chronic poison, only anticoagulants are listed which accounts for more than 90 per cent world rodenticides usage. A rodenticide must have three ideal attributes- toxicity, acceptability and safety in use. The acute poisons are better for giving a quick knockdown, but they have little selectivity and poor efficacy. They require pre baiting as rodents develop bait shyness for them. Anticoagulants have advantage as for as efficacy and safety are concerned, but are slow in action, more laborious and hence the treatment cost comparatively higher. The problem of resistance to some anticoagulants is also increasing. For the latter problem new 'single dose or second generation anticoagulants' have been evolved.



Acute rodenticide:

Zinc phosphide: It is a grayish black powder having garlic like odour of phosphine. Its toxicity is due to the evolution of phosphine gas from the molecue. Zinc phosphide baits are stable in air and non- acidic media, but when ingested, the acid present in stomach releases phosphine gas which produces necrotic lesions and kidney damage causing death from heart failure. Death may occur within two hours of bait intake. It should not be used at a concentration above 2 per cent that may reduce the bait acceptability and increase poison aversion. Zinc phosphide is equally toxic to man, animals and poultry. Hence dead rats should be removed from the field immediately.

Anticoagulant rodenticides: Anticoagulant rodenticide was first developed by Wisconsin Alumini Research Foundation from spoiled sweet clover which caused hemorrhage in cattle when fed by them. Warfarin was the first compound developed. Due to its excessive and frequent use rodents developed warafarin resistance. To overcome this problem second generation anticoagulants like Difenacoum, Bromadiolone, Flocoumafen and Difenthalione were developed. Bromadiolone was first registered in India and is in use since 1988. Anticoagulants constitute more than 95 per cent of total rodenticide usage.

Multidose anticoagulants : Warfarin and Fumarin are used at 0.5 per cent concentration as fresh baits. It is also available as ready to use baits (0.025%) and bait embedded in paraffin wax. Coumatetralyl should be used at 0.75 per cent as fresh bait and is available as tracking powder (0.75%) and ready to use bait (0.0375%).

Singledose anticoagulants (Second generation anticoagulants): Bromadiolone and Brodifacoum are used as fresh bait (0.25%), ready to use bait (0.005%) and bait embedded in paraffin wax (0.005%). Flocoumafen is the latest to registered and marked in India.

Categories of anticoagulants:

Most toxic: Brodifacoum, Bromadiolone and Flocoumafen are single dose anticoagulants. They require shortest feeding time, lowest lethal dose and least concentration.

Intermediate toxicity: Cholorophacinone and coumatetralyl are intermediate in toxicity and require more

dose. Less toxic: Warafarin and Fumarin are comparatively less toxic and require more dose.

Less toxic: Warfarin and Fumarin are comparatively less toxic and require more feeding period and lethal dose.

Plant products: Certain plant products were known to cause anti fertility effects (*Gloriosa superba, Cannabis sativa, Calotropis gigantia, Azadirachta indica*).

Traps and trapping: Trapping has been a very old practice to contain the rodent menace in India. Live catch traps are commonly used for trapping rodents and kill type traps are often used for managing field rodents. However, various types of sticky materials have also been used. Rodents are able to identify the odour of members of their own speices that have previously occupied the traps and avoid such traps on subsequent occasions. Even wild rodents responded to the odours of human beings and there by develops trap shyness.

Trap placement and concealment: Traps are placed where rodents are frequently encountered (run- ways), presence of urine marks, faecal pellets, food consumed are observed, not very close to the burrow as rodent shovel sand upon them due to neophobic behavior. Bright and shiny traps should be concealed by covering with sand or vegetation to minimize trap shyness.

Behavioural response of rodents : The behavioural response of rodents depends on (1) Size of the trap with respect to size of the rodent, (2) Trap spacing and placement (to be kept 60cm away from the entrance), (3) Pre baiting period, (4) Kind and time of baiting, (5) Utilization of various cues by rodents (visual, sound and olfactory).

Bandicoot rats are nocturnal hence avoid metallic traps reflecting moonlight. *Rattus rattus* species move around the trap for 15 minutes and slowly approaches the trap. Then stretches the body to explore the bait for smalling through olfaction.

Factors influencing rodent management:

(a) Availability of food *vis-à-vis* cropping patterns, (b) Harborage, (C) Home range of migration, (d) Assessment of damage thresholds (damage appraisal), (e) Monitoring rodent population to decide the timing of control measure, (f) Role of predators (providing owl perch), (g) Placement of baits and timing of control, (h) Use of non chemical measures and rodenticides.

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