



RODENTS AND THEIR MANAGEMENT IN STORAGE GODOWNS

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Introduction:

Rodents are vertebrate pests under class Mammalia and have an external covering of hairs. Order Rodentia includes a large number of animals ranging from the smallest mice to as large as porcupine squirrels and beavers, etc. Order Rodentia comprises of more than 2,000 species, which are subdivided into many families. Some of the most common families are Capromyidae, Castoridae, Cricetidae, Erethizontidae, Muridae, Sciuridae and Dipodidae. The Family Muridae is the largest, containing nearly two-thirds of all rodent species. This family includes several subfamilies and includes sand rats, gerbils, crested rats and old world rats and mice.

Sub families of Muridae:

- Plataeanthomyinae - Malabar spiny dormouse
- Rhizomyinae - Bamboo rat
- Crietinae - Little grey hamster
- Gerbillinae - Gerbils
- Microtinae - Voles and lemmings (not found in India)
- Murinae - Rats

Rodents are warm-blooded mammals that, like humans, can be found throughout the world. Rodents are easily distinguished by their characteristic arrangement of their teeth. They have only one pair of chisel shaped incisor teeth in both the lower and upper jaws and no canines. Rats and mice are extremely destructive within agricultural communities. They feed on seeds and grains. The faeces and urine of some rodents may contaminate surfaces with which they come into contact. About 2.5% losses are caused due to rodents in storage annually. They cause both direct and indirect damage to stored grains as well as to human beings.

List of rodent spp.:

House rat or Roof rat	: <i>Rattus rattus</i> (Linn.)
House mouse	: <i>Mus musculus</i> (Linn.)
Norway rat	: <i>Rattus norvegicus</i> (Birhen)
Indian mole rat or Lesser bandicoot	: <i>Bandicota bengalensis</i> (Gray)
Larger bandicoot	: <i>Bandicota indica</i> (Bechstein)

How to detect rodent infestation in godowns:

- a) Visual sighting and typical noise
- b) Open rat burrows
- c) Rat droppings and urine marks
- d) Feet or tail marks on dusty floors, greasy marks left by rats
- e) Gnawed articles (torn bags and spilled grains, etc. or damaged doors and windows)

Rodent control:

I. Non – chemical methods	II. Chemical methods	
Physical control	Single dose poisons	Second generation anticoagulants
Mechanical control	Multiple dose poisons	Fumigation

I. Non-chemical methods:

i. Physical methods

a) Rat proofing

Newly constructed godowns should be taken care of to avoid rat entry. The characteristics of an ideal godown are as follows:

- Godowns should be away from habitation
- Should be of high plinth
- Water accumulation in the nearby places should be avoided
- Cement concrete structures are more preferable
- No tree or branches of the tree should hang over the godowns roof
- All windows, ventilators, gutters, drains should be fitted with metal mesh
- Manholes should be properly covered
- Automatic door closers help in banning rat entry. Doors must be closely fitted.
- All the walls and floors should be plastered smooth with cement
- Rat holes observed must be closed with cement or glass pieces
- Regular inspection and sanitation of godowns is needed.

ii. Mechanical methods

Trapping – using rat cages

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 species that have previously occupied the traps and avoid such traps on subsequent occasions. Even wild rodents respond to the odours of human beings and there by develop trap-shyness. Eg. Back breaking trap, Glue trap, Snap trap, Cage trap, Bow traps under field condition.

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

Precautions to be taken:

- Trap shyness may become a problem after continuous use of traps.
- Cleaning and washing the traps daily and changing the places for keeping the traps frequently etc.

II. Chemical control

Rodenticides:

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 account for more than 90 per cent world rodenticide 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 less selectivity and poor efficacy. They require pre-baiting as rodents develop bait shyness. Anticoagulants have advantage as for as efficacy and safety are concerned, but are slow in action, more laborious and hence the treatment cost is comparatively higher. The problem of resistance to some anticoagulants is also increasing. For the latter problem new ‘single dose or second generation anticoagulants’ have evolved.

i. Single dose poison

They are acute poisons with immediate fatal results. They create poison shyness and bait aversion in rodents. Pre-baiting without poison is important to habituate the rat to feed on the particular food. Eg: Zinc phosphide and Barium carbonate. The ratio for preparation of poison bait is Zinc phosphide: Food grains: Edible oil = 2: 96: 2 parts.

ii. Multiple dose poison

The modern way to kill rodents in houses or godowns is by using anticoagulants. They cause haemorrhage in mammals. These are easy to handle and involve no health hazard to man. They are commonly used as dry baits. Eg: Hydroxy coumarin compounds. Rats do not die immediately. They start dying after a period of 6-7 days. Dead rats should be buried. The baiting should continue for 21 days to get an effective kill. The ratio for preparation of dry bait is Anticoagulant: Flour: Sugar or Jaggery: edible oil = 25: 450: 15: 10 gm.

iii. Second generation anticoagulants

They are single dose anticoagulants. **Eg:** Bromadiolone and Brodifacoum. These are used at 0.005% concentration with 2-3 days feeding period.

iv. Fumigation of rat burrows

- a) **Cyano fumigation:** Eg: Calcium cyanide @10 to 20 gms/ burrow is used as a fumigant. The burrows should be immediately closed tightly to avoid any leakage of fumigant. Next day the fumigated burrows are again examined and any reopened burrows are refumigated.
- b) **Phosphine fumigation:** **Eg:** Aluminium phosphide pellets of 0.6 gm/burrow.

Precautions:

- The poison baits should be placed in the basins during evening hours and removed in the morning.

- Fumigation should be done in the evening or night hours to avoid contact poisoning to the workers at storage godowns
- Dead rats should be buried to avoid secondary poisoning

Conclusion:

Rodents' biology and habits can make them challenging to control. At present they are a serious menace to grain storage. Hence, proper control methods help to manage and safeguard the grains from severe damage.

Reference:

- Agrawal, V. C. and Ishwar Prakash. (1992).** Ecological distribution of Indian rodents. In: *Rodents in Indian Agriculture* ed. Ishwar Prakash and P.K.Ghosh : Scientific publishers. pp. 1-9.
- Chitty, D. and Southern, H. N. (1954).** Control of rats and mice. Vol. 1& 2. Clarendon Press, Oxford. 305p.