

## Insight into Management of Rodents in Storage Grain

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### **Abstract:**

Rodents are more notorious pests belong to family Muridae, the largest of all mammals' family. A rats and mouse have no biological difference, but in common usage the larger species is generally considered rats smaller as mouse/plural mice. Rodents not only eat that food grains but also destroy and hoard them in the burrow. In addition, rodents also destroy other household materials like clothes and book etc. in houses. There are more than 500 species of rats in the world and the rats population has been estimated to be above 2600 million which is regularly increasing. Rodents are found on every portion of the land throughout the world and are known as polyestrous animals. Long term attacks by these rodents inevitably leads to significant quantitative losses about 34% of the stored products. Therefore, good storage management and preventive control measure should be taken in pests management practices can help to deal with rodents problems.

**Keywords:** Rodents, Storage grain, Management

### **Introduction:**

Rodent comes from the Latin word "raudare", which means "to bite" or to gnaw. Among all mammalian species (monkey, nilgai, deer, jackal, rabbit, squirrel, bat, rat, porcupine and wild boar). Approximate 40 per cent are rodents. Rats not only eat grain, but also contaminate more than 20 percent of their diet with faces, urine, and hair, so rats are of the greatest economic importance among food pests. According to the National Rat Eradication Committee in India, about 36-40 million tonnes of food grains are destroyed by rats every year. About 240-250 crore rats are found in our country, while their number in the

world is about 7 billion. These rats cause immense damage to crops like Paddy, Wheat, Maize, Jowar, Bajra, Gram, Groundnut, Sesame etc.

#### **Interesting future and their characteristics:**

Rats are clever and suspicious in nature. When there is a slight doubt, they stop eating a particular commodity or substance. Their front gnawing teeth are sharp and strong. They mostly come out at night. Their power of smelling, tasting and hearing is very intense and they hide immediately after hearing a slight sound. They can also jump high from 120 cm<sup>2</sup>.

Rodents can consume about 10 kg food grains every years but can survive up to seven days without food and three days without water. They are good swimmer and can swim up to 1 km. Rodents live with family and do not feel shy of the bats, but become worry as and when a single member of the family died. A hole of 1.25 cm diameter is sufficient to entry of a rats, where as a mouse can enter through 0.6 cm diameter whole or gap between door and wall of godowns.

#### **Habitat:**

Rats mostly live in burrows under the ground, under the roofs of thatched houses, drains, godowns, houses, household items and garbage dumps etc. The structure of bills depends on their species only.

#### **Bionomics:**

Rats keep giving birth to children throughout the year. The female rat reproduces 10 times in a year and gives 6 to 12 young at a time and sometimes 20 to 22 in favourable conditions. Four generations are found in a year. That is, after 3 months the female rat starts giving birth to children. Their children's ears open in 2 days and eyes in 5 days. The front teeth come out in 8 days and the last inner teeth in 1 month. They start running fast after 2 days. It has been estimated that a pair of rats (male and female) can increase the number to 1,000 to 1,500 in a year. Rats usually live for one year.

#### **Major Species of Rats:**

Based on the habitat of rats can be divided mainly into two parts:

(1) Domestic rats

(2) Field rats

#### **Domestic rat:**

Under this the following species are prominent: -

- (a) House rat (*Rattusrattus*)
- (b) House mouse (*Musmusculus*)

**Field Rats:**

The following species of rats are included in this:-

- Small bandicoot rat (*Bendicotabengalensis*)
- Mole rat (*Nesokiaindica*)
- Indian gerbil (*Tateraindica*)
- Field mouse (*Musbooduga*)

**Rats of fields and houses (both places):**

The following rat species are found in both the places:-

- *Rattusnorvegicus*
- *Rattusrattusrefurjibius*
- *Bendicotaindica*

Among the above-mentioned species of rats, the domestic rat, brown rat, domestic mouse (domestic rat) and bandicoot rat are prominent. There are considered to be the most important of the rats causing harmful in India. It is found almost everywhere, such as in the stores of cities, towns and villages.

**House Mouse:**

The house mouse consumes about 25 grams of food grain/day. It eats 7-15 percent of its weight per day and 6 rats together eat the food of a human every day. It wastes many times more grain than it consumes. These rats like to live in populated areas. Their colour is dark-brown and the lower part is light colour. The tail is longer than the body and weighs about 350 grams. They are easily mounted on roofs, walls etc. The female rat gives 4-6 times a year and 6-8 children at a time, which become capable of producing children themselves in 3-5 months.

**Domestic rat (domestic mouse):**

It often lives by making burrows around the houses. It usually eats 3-4 grams of food in a day. It is 10 to 15 cm long in size and weighs 15 to 25 grams. The tail is longer than the body and the colour is beige-brown. The eyes are outward and the ears are clean, transparent and relatively large. On teasing it, it runs very fast from one place to another and

likes to take support of a wall. The female rat gives 8-12 times in a year and 6-10 children at a time, but only a few of these children survive till the reproductive age.

### **Why is rat control important in storage:-**

#### **Eating Stored Grain:**

House mouse can consume about 25 grams of food per day and domestic rats consume about 3-4 grams of food per day. They contaminate much stored produce with urine, feces, hair, and pathogenic agents. Infected produce often has to be declared unfit for human consumption. Since rats mainly feed on the embryo, they cause significant damage to the nutritional value and germination of the seeds.

#### **Material and equipment damage:**

Rats damage tarpaulin, bag, plant, sprayer khund store (cable and doors). These often lead to subsequent damage such as product spillage from bags or containers, bag stacks collapsing, short-circuit sparks or fires, silos and warehouse collapses or even collapses as a result of weakening and a damaged drainage channels around the store can be a major reason.

#### **Most favourable factors for the outbreak of rats:**

- Adequate supply of food
- Protected places in which to build burrows and nests
- A favourable place to hide
- Easy to detect the produce

#### **Integrated Management:**

An integrated management program, good store management and preventive measures help to deal with these factors.

**Keeping out rats:** Whenever new stores/godowns are being built, the requirements of preventive rat control should be kept in mind. Particular attention should be paid to doors, ventilation, paving, junctions between roof and walls. Any damage to the store should be repaired immediately. This especially applies to doors.

#### **Storage Hygiene:**

- The godowns should be kept absolutely clean and the fallen grains should be removed immediately
- Ensuring that there is a space of one meter around the stacks (number of bags) and the bags should be placed in stacks arranged on wooden pallets

- Any empty or old bags and fumigation seats should be kept on pallets and if possible in a separate store
- The store should be kept free of garbage, so that the rats do not have any place to hide or nest (burn or bury)
- The area around the store should be kept free from any standing water and ensure that rain water does not run off as it can be used as a source of water by rats

#### **Monitoring:**

An important aspect of any rat control program. Usually this means monitoring for the presence of rats. Monitoring should be conducted formally and regularly. Monitoring should probably be done once a week.

#### **Collaboration (community effort):**

Control operations should be carried out simultaneously in several contiguous areas. In case of a village the families in all the surrounding houses should be motivated and organized to control the rats together at the same time.

#### **Proofing:**

Since it is not practical to remove all food from homes or stores, it is necessary to restrict access to rats. This is accomplished by proofing homes and buildings or by placing food in rat-proof containers.

#### **Natural Prevention (Predator):**

Arrangements should be made for the arrival and shelter of cats in homes and shelter should be given.

#### **Use of rattraps:**

The use of rattraps to catch rats is very popular in our country. These are available in a variety of markets. In the trap, attractive bait (food) such as a slice of bread, peanut oil, raisins, cottage cheese or sweets etc. is placed to catch the rats. The rat trap should be kept on the permanent routes of their movement and making right angles to the walls, so that rats can enter it from both the sides. Rats should not be left alive after trapping them, because by doing so they return again.

#### **Use of toxic bait:**

This method is used extensively. In these, many types of poisons are used to kill rats, in which zinc phosphide is the main one.

**Method of making and using zinc phosphide bait:**

To kill rats, toxic bait of 2 percent zinc phosphide is made. For this, 1 part zinc phosphide is mixed in 49 parts grains and a little mustard oil is also mixed in it, so that the poison sticks well in the grains. Poisonous bait is put inside the bills of rats at the rate of about 10-15 grams per bill. Later they close the bills. In this way rats die by eating it. Special care should be taken when using it in homes, because it is very poisonous, it should always be kept away from the reach of children. For use in homes, they often make tablets of its flour and make bundles of some paper etc. and keep them near their bills at night and remove them again in the morning.

**Use of fumigation:**

Some chemicals are used to kill rats, from which poisonous gas is released, which kills rats. For this, it is necessary that the rat's burrows should be closed properly only then use them. Some used chemicals such as cyanogen dust, hydrocyanic acid and sulfas tablet. Of these, Sulfas tablet is used at the rate of 0.6 to 0.8 grams per bill.

**Bandhya Rasayana:**

These are such chemicals by eating which rats become impotent. Out of this, Furadantin (0.2 gm per rat) is given to male and Colbicin (0.14 gm per rat) to female. For this, generally 1 tablet Furadantin and 1 tablet Colvicin are mixed with food and feed, due to which impotence is created in both (male and female). Chandra Shekhar Azad University of Agriculture and Technology has taken out a coordinated plan to kill rats, which is mentioned below.

- Day 1 -** Survey and closure of bills.
- Day 2 -** keep plain fodder near the open bills.
- Day 3 -** Repeat the above method.
- Day 4 -** Using 2 percent zinc phosphide fodder.
- Day 5 -** Threshing the bills by placing one or two tablets of 0.3 gm Celphos per bill.

Simple bait is kept in the bills because rats are of suspicious nature, so this is done to make them habituated.

**Conclusions:**

Rodents problems persist and sometimes have catastrophic consequence. Therefore, need for metallic and non-metal murine resistance storage structure and the availability of



rodenticides have done must to reduce this problems. Rodnets can also be effectively control through prevention observation, and intervention.

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