

Rodents and its management

Rodents are the most populous kind of mammal; approximately 42% of all mammals are rodents. They belong to family Muridae of order Rodentia and class Mammalia. Rodents are economically important, as they are agricultural and domestic pests, and also serve as carriers of many human diseases. They have highly developed senses of smell, taste and hearing. With the help of their chisel like teeth, they gnaw everything that comes on their way such as grains, vegetables, fruits, meat and other products in the houses and in the field.

All rodents possess one pair of upper and one pair of lower incisors, which grow throughout life. In order to keep the incisors short they spend a considerable amount of time gnawing hard objects thus preventing themselves for being killed by their own teeth. Rodents have high reproductive rates and their young develop rapidly. Females remain pregnant for only 19-21 days and can give birth every three weeks. The young reach maturity at around six weeks of age. Average litter size is around 12. One female can potentially produce 36 young in one rice season. Extension in the duration of the cropping season has a profoundly positive influence on population size. Heavy bamboo flowering is one of the most important factor for the out-break of the rodents, which being highly nutritious for them and reduces food competition among themselves and initiates famine in the region for the humans.

Economic Importance

Rodents cause significant losses to most kinds of crops in the fields, storage areas as well as at home. Besides feeding on these products, they destroy a substantial quantity by spillage and contamination with their droppings, urine and body hairs. They damage about 20 times the amount they actually consume by their gnawing activities and by polluting the food

Human Disease Carrier

Rodents can transmit approximately 60 different diseases to humans. They are also carriers of a number of diseases that affect domestic animals. In some cases they harbour arthropod parasites that transmit diseases when rodents bite humans. The major infectious diseases transmitted by rats in tropical areas are:

- Bubonic plague or black plague
- Salmonellosis
- Leptospirosis
- Rat-bite fever
- Tsutsugamushi disease or Scrub typhus
- *Angiostrongylus cantonensis*
- Oriental schistosomiasis, etc.

Ecological Importance

Rodents are an integral part of their ecosystem. They serve as an important food source for predators such as owls, snakes, cats, dogs, and others. Some rodents feed on insects and contribute to pest management by acting as predators. Rodents also act as scavengers of human garbage and take part in nutrient cycling.

Important pest species

Distribution of other rodent species in the region is somewhat limited. On the basis of damage inflicted by rodents to crops and stored food materials about 10 rodent species are of major economic importance. Important pest species of rats and mice in this region are:

- Soft-furred field rat - *Rattus melta* (Gray)
- House or Black rat - *Rattus rattus* Linnaeus
- Indian field mouse - *Mus booduga* (Gray)
- Rice field mouse - *Mus cervicolor* Hodgson
- House mouse - *Mus domesticus* Schwarz & Schwarz

Lesser bandicoot or Indian mole rat - *Bandicota bengalensis* (Gray)

Great bandicoot - *Bandicota indica* (Bechstein)

Management

Effective rodent pest management involves strategic actions that limit population growth so that damage is minimal, below an economic concern. There

the escape of rodents.

iv. Use of frightening devices such as rat flags and scarecrows are common in many places.

B. Cultural method

i. Weedy rice fields in surrounding areas are suitable for nesting and breeding of rodents. Piles of rice straw or stubble, and weeds, or other rubbish in and around the rice field harbour rodents. Clean cultivation can foster unfavourable conditions for rodents.

ii. Wide and high rice bunds or water retaining dikes are suitable places for rats to make burrows and live inside. Narrow (<20 cm) and low bunds are less suitable.

iii. Rice crops that mature earlier or later than most of the surrounding fields often suffer severe rat damage due to the concentration of rats in a few fields. Synchronous planting and harvesting can dilute rat damage.

C. Biological method

Rodents are subject to predation by various natural enemies such as snakes, birds such as owls, hawks, kites, falcons, eagles, and carnivorous mammals such as mongoose, cats, dogs, foxes, jackals, etc. Among them cats are effective in reducing the rat population in the houses and storage. These predators play an important role in natural population control of rodents.

D. Chemical method

The most widely used method for rodent control is the use of rodenticides. A rodenticide is a lethal chemical that is used to kill rodents.

Rodenticides can be grouped under four broad groups viz. acute poison, chronic poison or anticoagulants, poisonous gas or fumigants, and repellents.

i. Acute poison

Acute poisons are applied in a single dose for killing the most rodents in the shortest time. These are highly toxic and rodents usually die within a few hours after consumption of a small amount of bait. The zinc phosphide is the most widely used throughout the world. It is also a most widely used

bait shyness does not develop. By the time the symptoms of poisoning appear the rats have already ingested a lethal dose. Bromadiolone, Warfarin and fumarin are some of the effective rodenticides used.

iii. Fumigants

Fumigants are chemicals that at the required temperature and pressure produce gas that is lethal to a target organism. The fumigants are calcium cyanide, ethylene dichloride, carbon tetrachloride, ethylene dibromide, methyl bromide, and aluminum phosphide. These are effective only in airtight locations. Most require special equipment for application and should be handled by trained personnel. Fumigants are generally not suitable to use in the field. However, aluminum phosphide pellets offer potential use in rat burrows. Placement of aluminum phosphide pellets in the active rat burrow and sealing of all openings of the burrow system has been effective.

iv. Repellents

Chemical repellents are substances that repels pests' form entering an area and may be used to protect food and other commodities. Malathion, an organophosphorous insecticide, may act as repellent against some species of rodents. Rats avoid areas that contain Cycloheximide spread area.

Special notes and precautions for rodenticide use

1. Humans and rodents belong to the same class (both groups are mammals). Rodenticides are lethal to humans and other mammals. Therefore special precautions are needed while using rodenticides.

2. To protect the poison baits from rain, sun, and moist or wet soil, baits need to be placed inside a baiting station. Coconut shell, bamboo, plastic, or metal containers, tin sheet, and others can be used to make inexpensive baiting stations.

3. Baiting in and around the household present a potential threat to domestic animals. It is advisable to place bait after