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RODENTS

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Rodents-

- Rodents are an ever present problem; They are unwelcome associates of mankind as they cause serious damage to **agricultural crops, grain**, **commodities and the household articles**.
- Their seriousness is further enhanced because of high rate of **multiplication** and **transmitting** various **diseases viz.,**
    1. **Bubonic plague,**
    2. **Rabies,**
    3. **Rat bite fever etc**.
- To man as well as **domestic** and **wild animals.**
- They cause losses to stored produce every years .
- The loss to stored produce is more a problem of contamination rather than actual consumption.
- However, rodents may also cause losses to storage facilities through damage to **electrical circuits, building material or packing material.**
- There are **6410 valid** forms of rats in the world.
- Rats are **cosmopolitan** in distribution and. exhibit a wide range of adaptations from **arboreal ,aquatic snowy heights of 19,000 feet above sea level,arid,deserts ,shore line of various sea coasts**.

Domestic or commensal rats are :

1. **Rattus rattus Linn.,**
2. **Mus musculus Linn**,
3. **Rattus norvegicus**

- Occuring particularly throughout Indian territory**, Yamen, Formosa, Indochina, Malaya State, Siam, Sumatra, Jawa, Sri Lanka, Burma and Nepal**.

❖ **Habit and habitat**:

- Rats and mice are generally **herbivorous** and **versatile** in feeding behaviour and choice of food.
- They are also known as **gnawing animals**.

- They have **chisel like teeth** at the front of their mouth.
- They use them to eat food and gnaw at materials.
- They have rather poor vision but the sense of **smell, taste, hearing and touch** are highly developed in them.
- They can squeeze through opening half their size.
- They can readily **jump 60 cms** high.
- They live in-

1. **Burrows,**
2. **In fire wood,**
3. **In stores**
4. **And stored equipments,**
5. **In all types of buildings,**
6. **In sewers,**
7. **Compost,**
8. **Double walls,**
9. **Weeds;**
10. **In areas' under floors and porches,**
11. **In any sheltered place close to their food or in fields.**
12. **Usually they are abroad at night .**

- Several species are found in our country out of which

1. **Bandicoot rat,**
2. **Mole rat,**
3. **Short tailed mole rat,**
4. **Bush rat,**
5. **Brown spiny mouse,**

- **C**ommon Indian field mouse and **Indian gerbil** are usually met.

Nature of damage

- On an average a single rat can **consume 10—15 gms** of flour **(soaked wheat upto 30 gms)** and **10 ml of water within 24 hours**.
- Mice and rats cause harm in many ways viz.,

1. Eat almost all **edibles**.
2. Destroy much more property and food than they actually consume and contaminate enormous quantities of food .
3. Burrow field bunds, channels and canal **embarkments** there by causing huge wastage of irrigation water.
4. Damage **clothing**, **books** and other valuable items .
5. Burrow and weaken the foundation of buildings and damage public works such as **sewers** etc.
6. Carry harmful parasites which transmit deadly diseases in human being and live stock .
7. Chew almost everything.

- They damage practically all orchard trees, forest and field crops.
- **Rats** are serious pests of paddy and their outbreaks have occured in Phillipines, Indonesia, Sri Lanka, Malasia, Taiwan, Fiji,; Vietnam, Guana, Columbia, Sierra Leone, Spain, U.S.A., Japan and India resulting in extreme losses.
- **Rattus rattus** has been responsible for causing significant **losses** to coconuts due to climbing ability .
- They fed on =

1. **Vegetables,**
2. **Stored food**
3. **Snails,**
4. **Cream,**
5. **Meat,**
6. **Fish and its products**
7. **Cooked and fried rice.**

- Total annual **economic losses** due to rats are over **20 million tons**
- the damage to various crops in India are

1. **Barley—5.4—12.4 per cent,**
2. **Wheat 2.9 per cent,**
3. **Groundnut—1.7—7.3 per cent,**
4. **Coconut trees and nuts—6.24—28.3 per cent,**
5. **Sorghum 17.43 per cent, paddy—5.7—16.7 per cent,**
6. **Paddy grain—1.14—3.7 per cent,**
7. **Arhar—6.6 per cent, sugarcane 5.29 par cent cocoa 1.4—5.9 per cent,**
8. **Palm oil 3.1 per cent.**
9. **Nearly 11 million tons of all type of edible and non-edible crops are lost by rats in india.**

❖ Classification—

➢ **Rats can be broadly divided into two main groups these are as follows**.,

(a) HOUSE RATS

(b) FIELD RATS.

(a) House rats

- The house rats and mice mostly dwell in houses and cause greater damage to stored products. They breed all the year round.
- There are two species of house rats—

  (j) ***Rattus rattus*** .—**BLACK RAT**

  (ii) ***Rattus norvegicus*** —**BROWN RAT** Besides there is another species Mus musculus Linn.
- Commonly known as house mouse found in India.

(b) Field rats

- The field rats live in fields and damage standing crops, fruit plants etc.
- There are two breeding seasons in field rats coinciding with maturity of two crops (**summer and winter).**
- In U.P. five species of field rats viz**.**

1- **Bandicota bengalensis** (Indian Bandicoot Rat)

- A large rodent known for damaging crops and stored grains. It burrows extensively in fields and is one of the most destructive species in India.

2- **Rattus rattus** (Black Rat or Roof Rat)

- Smaller than the bandicoot rat, it is an opportunistic feeder found in fields and human habitations. It tends to climb trees and structures.

3- **Rattus norvegicus** (Norway Rat or Brown Rat)

- Common in urban and rural areas, this species is larger and more robust. It often digs burrows and is known for feeding on crops, especially in storage areas.

4- **Millardia meltada** (Soft-furred Field Rat)

- This species inhabits open fields and agricultural lands, feeding on seeds, crops, and other plant material. It is smaller and more elusive.

5- **Tatera indica** (Indian Gerbil or Antelope Rat)

- Found in dry regions and open fields, this rodent burrows and feeds on crops and seeds. It is smaller and more agile compared to bandicoot rats.

House rat—Rattus rattus Linn.

- There are two races of this rat found in India.
- One with black above and smoky grey belly and other with yellowish or reddish brown back and pure white or pale-lemon belly.
- The ear is large naked and translucent reaching or covering the eyes when pressed forward.
- Tail is slender at least as long as and often considerably longer than the head and body length.
- Fur is soft but usually intermixed in adult with many slender grooved bristles.
- The size is smaller, general built elegant and slender.
- The head and body measures about 115 mm and tail about 115—283 mm.
- It is typically a climbing rat although it is able to burrow,

House mouse—Mus muscidus Linn

- It is a common house mouse generally inhibits in houses but sometimes in gardens and fields near villages and towns.
- The ear is rounded and extends up to the eyes when pressed forward.
- The tail is almost naked generally longer than the head and body length.
- The fur is short having no spines.
- The colour varies from dark to light brown, paler from below.
- It is a very active animal arid can feed almost anything which comes in its way.
- The head and body length measures about 52—116 mm and tail 32—106 mm.
- Albino rat is commonly employed in experimental laboratories.

Rodent Control

Natural—

- The natural enemies of rats are- **CATS, DOGS,OWL,MANGOOSE, , SNAKES, REPTILES AND BIRDS**.
- The rains are natural method of reducing the rat population by drawing the young ones.
- Similarly artificial flooding of infested fields with water acts in the same way.

- Deep ploughing helps in exposing the rat burrows with the result that the adult rats run away and the young ones are picked up by birds or eaten away by other animals.
- Resistance has appeared to rodenticides particularly warfarin in rat population in Scotland, Wales, Denmark, Netherlands, various parts of England, Guyana, Liverpool, U.S.A. and other countries.
- In area resistance of field rats of zinc phosphide has been detected in one area

Physical—

- In the houses, main roads and godown heaps of trash, garbage and sweepings should not be kept for a long period.
- There should be clean up programme enforced in the rat infested localities, the rats are bound to be reduced in numbers.
- The stored materials should be kept on racks about 45 cms. above the ground but should never be allowed to be piled on floor.
- The edibles should be kept as far as possible in metal.
- Rodent proofing checks the movement of house rats and mice into or outside a house and building.
- The rat proofing can be done by sealing all openings and covering the edges of doors, windows and other inlets with metal sheets.
- Metal sheets of 12 inches height should be smoothly inserted on all corners above the floor or ground level to prevent climbing.
- Traps are ineffective to catch rats particularly in the dwellings, though their application requires great skill and much time.
- They are recommended for small infestation where chemical control like poison baiting or gassing are hazardous or impracticable.
- Cage, wooden pot, bamboo bow arrows, wire and snap traps are employed in various Asian countries.

Biological

- The villagers put stick near the rat burrows in the fields for owls to catch the rat.
- Rodier method consist of catching alive rats, killing the females and releasing the males in large area.

- Widi this technique the female rats are reduced.

Chemical

- Chemical control operations are fully successful, if they are carried out on an extensive area because of the continuous migration of rats from infested neighbouring areas.
- Systematic and proper planning of rat control goes a long way in getting maximum mortality of rats in different environmental conditions.
- Baits are prepared widi various types of **rodenticides** involving mixing with ground cereals or pulses, cut portions of fruits, vegetables or meat, crushed rans are soaked in water for few hours and men mixed with small quantity of vegetable oil like mustard or groundnut or linseed.
- Rodenticide generally used are-

1. **2 per cent zinc phosphide**,
2. **1-3 per cent Nepthyl thiourea (Antu)**
3. **0.5 per cent Norbomide (Raticate).**
4. **The anticoagulants are Dicoumerol,**
5. **Fumarin (Coumafuryl),**
6. **Diphacine,**
7. **Racuman,**
8. **Rodefin or Ratafin,**
9. **but 0.25 per cent Warfarin is commonly employed.**
10. **Castrix grains** are deposited in mice holes particularly in Germany.
11. **Arsoni trioxide,**
12. **Thallium sulfate,,**
13. **Sodium fluoroacetate or fluoracetamide and elementary phosphorous are banned and restricted purely in the interest of safety.**
14. **A number of chemicals are used to fumigate the burrows and kill the rat inside.**
15. **Calcium cyanide (Cymag) @ 6—10 gms**
16. **Aluminium phosphide (celphos) @ 3 gm per burrow are used.**
17. **Other chemicals used are carbon monooxide,**
18. **Carbon dioxide,**
19. **Petrol chloroform,**

20.Methyl bromide,

21.Ethylene di bromide,

22.EDCT mixture and dust of DDT

Integrated technique—

- A new effective integrated technique has been evolved, developed and standardised particularly for eradicating die field rats in me infested paddy, coconut, sugarcane, wheat and other fields.
- Survey or census of rats can be accurately carried out by multiplying the number of alive rat burrows with the number of rats per burrow.
- The quantity and location of droppings of each species vary in size and shape.
- Similarly rats always leave the marks of their paw on the wet soil or dusty places by the measurement of which we can easily identify the species.
- The rat burrow should be prebaited with any kind of unpoisoned food or grain for two days so that the rats may become familiarised with the latter.
- Poison baiting with 2% zinc phosphide in the same food material with a little vegetable oil may be carried out in the rat burrow opening for two to three days.
- If there is any evidence of bait shyness, 0.025% warfarin bait may be substituted particularly in very dense or unaccessible area, where burrows could not be located.
- Remaining alive burrows may be fumigated for 2 to 3 days with HCN using calcium cyanide or cymag.
- In case the rats-are still alive, a mixture of chemosterilants viz, colchicine 1 part + furadantin 50 parts and wheat flour 20,000 parts is applied.
- 10 gms of wheat flour containing this bait is sufficient for one rat which can be placed in a burrow opening! This bait render the male or female rats completely sterile.

Anti-rodent capsule—break through in protection technology:

- The anti-rodent capsules have been found to be extremely useful and convenient against rats.
- Each capsule contains zinc phosphide in food and these capsules are treated externally with a mixture of attractaments.
- The greatest advantage of the use of anti-rodent capsule is that no bait shyness is developed and the rat is attracted to the capsule and dies outside after eating.