

Effects of Non-Insect Pests on Crops

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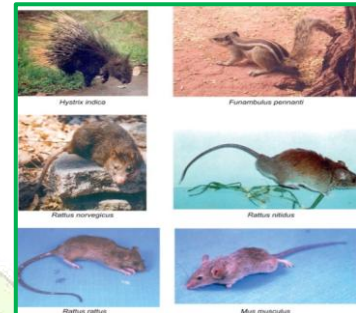
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Non-insect pests can have significant effects on crops, causing damage and reducing yields. These pests include various organisms such as fungi, bacteria, viruses, nematodes, mites, rodents, birds, and other animals. The impact of non-insect pests on crops varies depending on the type of pest, the crop species, and environmental conditions. Here are some common non-insect pests and their effects on crops:

1. Rodents

Rodents are omnivorous and feed on grains, vegetables, fruits, meat and other products in the houses or in the field. Rodents are responsible for causing enormous losses to crops and stored grains. Besides feeding on these products, they destroy substantial quantity by spillage and contamination with their droppings, urine, body hair, etc. Rats daily consume food equal to about 10 per cent of their body weight, damage about 20 per cent of their body weight, damage about 20 per cent of their body weight, damage about 20 per cent of their body weight. It has been estimated that there are about 2500 million rats in India. They cause a 10 per cent loss in food production alone. Of the 84 species of rodents in India, 10 are of major significance. The most commonest rats found in our houses are *Rattus rattus* and *Mus musculus* which along with *Rattus norvegicus* and bandicoots are instrumental in spreading every year.



2. *Rattus rattus* L.

It is the commonest house rat distributed all over India and the world. Its body (head and trunk together) measures 10-12 cm, tail slightly longer and weigh 150-200 g. Its colour has shades of brown and black on the upperside and off-white to grey on the underside. It is nocturnal in habit, does not burrow but can make its home on trees. It can occur in fields, coconut field in particular, and has a denser population in villages because of the availability of harbourage,



3. *Rattus meliada* Gray

It is the common field rat found all over India, Nepal and Sri Lanka. It is 12-15 cm long with equal or shorter tail and about 60 g in weight. It bears large rounded ear lobes and soft coat of fur which is light brownish-grey on the upper side and greyish-white on the underside. It is mostly found in irrigated fields, bund hedges and grasslands. Nocturnal in habit, it lives in simple burrows whose opening are often hidden in bushes.

4. *Rattus norvegicus* (Berkenhout)

Called brown or Norway rat, it is found mainly at ports in tropical countries and a cities and farmlands in temperate (European) countries. Its body measure 18-20 cm with 16-18 cm long tail and 200-450 g weight. Its dorsum is brown to dar brown and venter greyish, occasionally black. It is distinguished from R.. rattus by t blunt muzzle, smaller ears and tail shorter than the body length. It is predominantly burrower and in big cities, it is specially found in sewers and so often called sewer rd

5. *Mus musculus* L.

The common house mouse and a miniature replica of R. rattus in looks, measures 5-7 cm with an equally long tail and 18 g weight. Its dorsum is dark browns on sandy brown and venter off-white, grey or dark brown. It is cosmopolitan distribution, nocturnal and fossorial (burrowing) in habit, can live indoors and fields and is a close associate of R. rattus in houses and godowns, and a great destroge of textiles, sacs, paper, etc.

6. *Mus booduga* Gray

It is the common Indian field mouse found in Peninsular India to Kutch Punjab, U.P., Bihar, Orissa and Bhutan. It measures 5-7 cm with slightly ahorter tail. Its colour varies from pale-sandy in desert zone to brown dark greyish-brown in moisture regions with off-white venter. Nocturnal habit, it dwells in shallow burrows with 1 or 2 openings, the main openin sometimes plugged with earth. It lives in association with R. meltada and Tatera indica.

7. *Bandicofa bengalensis* Gray

This Indian mole rat is distributed all over India (except perhaps the desert a Rajasthan, Nepal, Burma, Thailand, Sri Lanka, Java and Sumatra, and Vietnam Nor is a he a the pile ext. open fux robust rodent measuring 15-22 em with and 12-15 em tail, 300 g weight, rounded od and broad muzzle. Its fur is coarse, dark greyish brown speckled with buff on the top and pale on the underside. Liks bandicoots, they have the habit of erecting long hairs and grunting on being excited. Nocturnal and forial, they live in burrows which may lie at a depth of 1 m and may have as many as 12 It is a great destroyer of crops at every stage of their growth nings

8. Gerbils

Gerbils, also called antelope rats differ from rats in having their tails clothed in fr (not naked like rats) and ending in a tassle. Their hind feet are much longer than of equal size that enable them to run by bounds. There are two species of gerbils Patera indica (Indian gerbil, 15-18 cm long tail and reddish-brown to fawn or greyh w dorsum and white underside, it is nocturnal in habit and lives in simple burrows 5-10 openings, a central chamber and a few bold runs), and Meriones hurrantar the Indian desert gerbil, 17-18 cm long with equally long tail. 65 g weight and sandy ow to brownish-grey dorsum and dirty white venter, it is diurnal in habit and lives extensive but unplanned burrow)

9. Squirrels

There are a number of genera of squirrels found in India but the genus ambular with two species F pennanti (five-striped palm squirrel) and F palmarum three-striped palm squirrel) are important from our (control) point of view Five- aped squirrels are predominant in the North and three-striped ones are predominant the South. Both are diurnal and arboreal with their peaks of activity in the morning and early evening depending on man for food but also supplementing it with fruits, , vegetables, crops, occasionally insects (acridids in particular) and eggs of birds. Their damage to fruit gardens is severe.



10. Porcupines

The Indian crested porcupine, *Hystrix indica* is the largest rodent found in our try It occurs from the Russian Turkestan, Syria to India and Sri Lanka. It ures 65-75 cm, weighs about 10-18 kg and is covered with quills of deep brown Mack and white bands alternating with each other A long crest of bristles in I on the head and white rattling quills on its short tail. It likes to inhabit rocky altars (in caves) but is also found in stabilized sand dunes (in long burrows). from March to October with peak period during monsoon months. Its litter 1-3 It is mostly destructive to tuberous crops like sweet potato, potato, onions, carrot but can also damage forest tree by girdling them.



Management of Rodents

The various techniques to manage rodents include cultural, mechanical, biological chemical control practices Cultural control. Deep ploughing up to 45 cm. reduction of size and trimming fold honed at the time of land preparation would certainly go a long way in ne rodents Weed management and removal of burrows reduce availability of Foot and shelter.

Mechanical control: Guarding of rat attacks by means of rodent-proof containers and plastering storage structures help in checking rodent infestation. Trapping is an economical and effective way of reducing rodent population. Trapped rats should be killed by drowning cages in ponds and dead rats should be buried deep in the soil. The trapped rats should not be released in the fields as they usually come back to their original place.

Biological control: A number of predators like snakes, owls, eagles, mongooses, etc. contribute to natural regulation of rodent population. Keeping cats in houses also checks the rat population.

Chemical control: The two most commonly employed chemical control measures include poison baits and fumigation. (i) Poison baits. The most effective method of controlling rats is the use of poison baits. The poisons used in the baits are of two types: (a) acute poisons which are used in a single dose, e.g. strychnine hydrochloride, zinc phosphide, norbormide (Raticate),sodium fluoro-acetate, thallium sulphate, ANTU (Alphanaphthyl thiourea); and (6) chronic poisons which act as blood anticoagulants and are used in multiple doses. They include hydroxy coumarins (Warfarin, Fumarin, Tomarin, Recumin) and indandions (Pival, Radione, Valone). These poisons are lethal when consumed for several days, as they cause external and internal haemorrhage. The other anticoagulant rodenticides (Brodicacoum, Bromadiolane) are lethal in a single dose but the rats die after several days of poisoning. Zinc phosphide (2% bait) is the most commonly used rodenticide in India. The bait is prepared by mixing 1 part of zine phosphide with 40 parts of whole or cracked grains of wheat, gram, maize, bajra or sorghum smeared with vegetable oil.

Racumin bait (0.0375% bait) is more effective against the bandicoot rat than other species. The bait is prepared by mixing 50 g of 0.75 per cent racumin powder, 20 ml of groundnut or sunflower oil and 20 g of powdered sugar in 1 kg of cracked wheat or any other cereal. Another bait (0.005% Bromadiolone bait) can be prepared by mixing 20 g of 0.25 per cent Bromadiolone powder, 20 g of oil and 20 g of powdered sugar in 1 kg of any cereal flour. The mixture is wrapped in paper packets which are distributed in the field at 10-15 m distance. For better results in the field, the poison operations with zinc phosphide should be preceded by careful probating, i.e. false baiting with non- poisoned bait for 1-2 days. Field operations with zinc phosphide result in 70-80 per cent reduction of rodent population. The rest of the population acquires bait shyness after a single exposure to the bait. Poison baiting

with zinc phosphide should not be repeated within 2-3 months. The residual population should be controlled by the fumigation of burrows or by baiting with warfarin.

Fumigation of burrows: Another effective method of rat control is killing them inside the burrows by fumigation. Aluminium phosphide tablets (2 tablets of 0.6 g or half tablet of 3 g per burrow) have been found to be very effective and safe. After introducing a tablet into a live burrow, the opening is closed tight with soil. The chemical reacts with soil moisture and deadly phosphine gas is generated.

Environmental control: Rat infestations get encouragement from several environmental factors such as delapidated conditions of the buildings/godowns, collection refuse on streets, neglect of any patch of land/field, high bunds around fields, etc. If these factors are removed, rats will not find the surrounding congenial for their living and survival. Therefore, new buildings should be designed appropriately, old structures (doors, etc.) repaired, refuse quickly and correctly disposed, bunds made lowest and dinnest, and animal yards kept scrupulously clean.

