

**WORLD HEALTH  
ORGANIZATION**

**Regional Office  
for the Eastern Mediterranean**



**ORGANISATION MONDIALE  
DE LA SANTÉ**

**Bureau régional  
pour la Méditerranée orientale**

SEMINAR ON PUBLIC HEALTH AND ECONOMIC  
ASPECTS OF RODENT CONTROL

Alexandria, 2 - 8 December 1974

EM/SEM.PH.EC.ASP.ROD.CTL./11.5

4 December 1974

ENGLISH ONLY

**RODENTS AND THEIR ECONOMIC IMPORTANCE TO  
AGRICULTURE IN PAKISTAN**

by

Dr Mian Muhammad Shafi\*

---

\* Project Director, Vertebrate Pest Control  
Centre, Karachi, Pakistan

The term rodent means simply a "gnawer" and all rodents have single pairs of upper and lower incisors separated from the cheek teeth by a large gap or diastema and this tooth arrangement is one of the chief features that separate the Rodentia (rats, mice, squirrels, chipmunks, voles, etc.) from all other classes of mammals.

The incisors are used for gnawing and nibbling food into suitable sized fragments before it is ground into finer particles by the cheek teeth. They are also used to gnaw through and remove non-food particles that may intervene between the rodent and its food or that may obstruct its way, particularly perhaps while it is digging its burrow.

Rats are the most notorious members of the order Rodentia and are the most cunning and adaptable of man's companions on the face of the earth. There are over 2000 species of rodents known to science and over 500 species of rats are known to occur in the world. Beg (1969) recorded 41 species of rodents from Pakistan.

Rodents can gnaw at anything and no materials are safe from their destruction. They attack our food in the fields, in warehouses, in factories and in houses. Field rats are much more serious as agricultural pests. They inflict heavy losses in fields by eating seeds and seedlings and damage crops at all stages. They spoil more through pollution and contaminate with their droppings and hairs than what they actually consume. According to Madsen (1971) a house rat (Rattus rattus) eat about 10 grams of food per day and contaminate and waste an estimated ten times that amount, which means that rodent take heavy toll of our food reserves and inflict colossal losses, both in the fields and in godowns. These animals are also responsible for breaches in canal banks and irrigation channels.

They also cause untold damage to wood works, water pipes, electric cables, and hundred of articles of all kinds ranging from paper to tablets of soap. They frequently cause roads to collapse and have been known to cause fires and break-downs at power stations by cutting through the insulation on wires. They

are carriers of infectious diseases such as plague, jaundice and murine typhus fever, as well as dangerous parasites like tape worms and trichomonasomes. They are also believed to play a part in the dissemination of foot and mouth diseases.

In view of the urgent need to reduce losses in agricultural crops and stored food special surveys were organized by the staff of the Vertebrate Pest Control Centre as a first step to ascertain what species of rodents occurred, their distribution and the crops which were damaged in Pakistan. As a result of these surveys 30 species of small mammals, mainly rodents, have been collected and efforts to collect the remaining species are still continuing.

Out of the 41 species of rodents found in Pakistan, 12 species are considered to be most important as agricultural pests, which are summarized as follows:

1. Giant flying squirrel (Petaurista petaurista)

This squirrel is found in the districts of Hazara, Rawalpindi, Azad Kashmir, Swat, Dhair and Chit-ral from 5000 feet to 10 000 feet elevation. In summer it gives birth to one or two young ones in 1 litter. The damage is mainly done to fruits, walnut and the seeds of timber trees of economic importance.

2. Northern Palm Squirrel (Funambulus pennanti)

This species is found throughout Pakistan and is a minor pest of agricultural crops and stored grains. In a year it gives birth to 2-4 young ones in one litter. It is diurnal in habit and prefers to stay near human habitations. Generally it damages fruits, vegetables, seeds and food grains. Some times it may be serious pest in nursery plantations.

3. Indian Crested Porcupine (Hystrix indica)

It is found throughout Pakistan. It is nocturnal in habit and gives birth to 2-4 young ones during spring and summer seasons. It is a serious pest of vegetables, but likes carrot, reddish, brinjal, sweet potato, potatoes, turnip, maize and sugar cane. It also does considerable damage to fruit trees by cutting their roots.

#### 4. Indian Gerbil (Tatera indica)

This rat is found in Punjab, Sind and Baluchistan. It breeds throughout the year except in very cold season and gives birth to 4-8 young ones in one litter. It is nocturnal in habit and makes burrows generally two to three feet deep. It is a minor pest of agricultural crops. It also feeds on seeds, roots of wild vegetations and insects.

#### 5. Indian Desert Gerbil (Meriones hurriane)

This rat occurs throughout Indus basin east of Indus river and below 1 000 feet elevation. It gives birth to 3-7 young ones in one litter and produces several litters in summer season. It is generally diurnal in habit and makes burrows usually underneath the wild bushes or vegetations. More than one animal live in a single burrow. Sometimes it stores food in burrows. It is not usually a major pest of agricultural crops, but damages stored seeds, food grains, leaves and roots of crops.

#### 6. House Rat (Rattus rattus)

It occurs throughout Pakistan and is the most common of the damaging rodents. It breeds throughout the year but mostly in spring and autumn. It produces 4-6 litters in the course of a year, each litter containing 6-8 young ones. The baby rat matures in 3-5 months. It lives in close association with human beings. It is an excellent climber and prefers to live above the ground. It can jump well but probably not more than 3 feet from standing. It is a major pest of stored products and prefers cereal foods and likes fruits. It is also a major health hazard to humans in urban areas.

#### 7. Norway Rat (Rattus norvegicus)

This rat occurs throughout Pakistan and is also called by several other names, Brown rat, Wharf rat and Sewer rat. It lives in burrows, in canal banks, rail-road yards and near shipping godown. It can climb and swim well. It can jump about 2 feet from standing (depending on weight and age). It breeds throughout the year

and gives 7-8 young ones per litter. It has 5-6 litters per year and the gestation period is 21 days. It is omnivorous and is a major pest of stored products. Generally prefers cereal food.

8. Soft Furred Field Rat (Millardia meltada)

It is generally found in the better irrigated regions of Pakistan. It gives birth to 6 young ones in one litter during spring. Generally makes burrows underneath wild bushes and grasses. It is a minor pest of seeds and green vegetations. It has also been found damaging paddy plants in Lower Sind area.

9. House Mouse (Mus musculus)

This species is well distributed in Pakistan and is very capable of hitchhiking to new locations in bags, boxes, ships and airplanes. It breeds throughout the year. Total number of litters per year is 5-10 according to habitat. It gives birth to 5-6 young ones per litter and its gestation period is about 19 days. It can climb easily, especially on fabric and coarse material. It is omnivorous but likes sweets and fats. It is a major pest of stored products.

10. Brown Spiny Mouse (Mus platythrix)

It occurs mostly in Southern Sind and breeds throughout the year. It has 4-5 litters per year and gives 4-6 young ones per litter. It is nocturnal in habit and is not a serious pest in agricultural crops.

11. Short-tailed Mole Rat (Nesokia indica)

This rat is found throughout cultivated areas of Pakistan. It gives birth to 6-8 young ones during summer. It is nocturnal in habit. It generally makes burrows in cultivated fields and prefers burrowing banks of canals and water courses. It makes burrows having several galleries and openings.

This rat has the habit of closing its burrow by pushing up big mounds of soil from inside of the burrow. Sizeable mounds of soil can be easily noticed in areas of infestation.

It is a major pest of agricultural crops and cause serious losses and wastage

of precious irrigation water because of the damage it does to water courses and embankments.

12. Indian Mole Rat or Lesser Bandicoot (Bandicota bengalensis)

It has been collected from the provinces of Punjab (Sialkot) and Sind (Sujawal). It is an excellent swimmer, often lives in flooded rice paddies and bunds. This rat is very aggressive and successful fighter. It is nocturnal in habit. The average litter is about 6, with 10-12 litters per year. This gives a theoretical yearly production of about 70 young per breeding female. It has been recorded as a serious pest of paddy in Sind (Sujawal) and Punjab (Sialkot). It cuts the young seedling of the paddy plants at water surface level and stores the succulent leaves into its burrows as food. When the rice ripens whole earhead of rice plants are severed and are stored in underground food caches. Researchers have reported it "common" to find 6 kgs of stored grain per burrow system. In Punjab it has been also recorded damaging ground-nut.

Rats spread diseases and destroy our food and property. We should never allow them to ravage unchecked but there are still large gaps in our knowledge regarding control of rats, both in field and stores. Information is especially lacking on rodent ecology, biology, population dynamics, habits and behaviour. The species involved in different areas are partly known. Moreover the estimate of losses caused by different species of rodents is purely imaginative and fragmentary. Even in the direct control of rodents, the problem of their resistance to certain rodenticide has been added to the older ones of bait shyness, suitability of carrier in baits and safety considerations. Since all these aspects require detailed research in order to develop successful control techniques, a project on Vertebrate Pest Control has been established by the Government of Pakistan with the assistance of United Nations Development Programme and Food and Agriculture Organization of the United Nations which has since been initiated both fundamental and applied research studies to overcome rodent menace in Pakistan.

REFERENCES

Beg, M.Z., 1969

Mammals of West Pakistan "Published  
by Central Urdu Board, Lahore"

Madsen, C.R., 1971

Rat facts

Agricultural Services, New Delhi, pp.1-16