



Integrated Management of Rats in Rice Field

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Abstract

Management of rats emerged to be a serious issue in the farming community cultivating rice. 18 species of rodents were identified, out of which four species are predominant in agriculture sector i.e. Bandicoot rat, *B. bengalensis* (Irrigated and grass lands), Indian gerbil, *T. indica* (Irrigated and dry land farming areas). These cause economical loss in Rice, Wheat, Sugarcane, Maize, Pearl millet, Sorghum, Oilseed, Legume and vegetable crop fields, showing the damage ranging from 2-15% persists throughout the country. In this present article we focused mainly on management strategies to be followed to control (or) manage rat infestation particularly in rice field. In-order to overcome this production constraint there is a need for an integrated approach that proved to be efficient in managing the infestation levels in rats.

Introduction

Rice is the staple food over half of the world population where majority constitute from Asian continent. In India most of the states grow rice but now-a-days pest attack plays a role in reducing the production. Rodents as a pest is one of the serious concerns felt by the farmer in rice field since it is causing more than 40 percent sometimes incurring even 100% losses in rice field. According to conservative estimate about 5-6% of the total food grains being produced are lost annually at a pre harvest stage due to rodents. Only chemical control may not serve the cause, their efficient management is only possible through practising all the rodent control measures in an integrated manner which includes environmental and cultural, physical, mechanical, chemical methods.

Rat species that effect rice crop in India

There are many rats from them the most frequently occurring species that influence the rice production in field:

- Field mouse: *Mus booduga*
- Indian gerbil: *Tatera Indica*
- Mole rat : *Bandicota bengalensis*
- Grass rat : *Rattus (Millardia) meltada*

Characteristics of Field Rats

- Rats are nocturnal animals (i.e., active at night)
- They have a burrowing habit
- The teeth of rat increases 2mm every day to protect itself it sharpens and trims its teeth regularly by chewing various materials available to it.

- They are sexually active
- A female rat can produce its offsprings 3-4 times in a year
- Life span of a rat ranges from 6months to one year (approx.)
- This means in the same year the mother along with its offspring produce further offsprings (approx. 1 pair of rats results in production of 1200 rats a year)
- These rats also feed on frogs, small insects, weeds etc during non-cropping season

Rat infestation in rice field

The rats feed seeds or young seedlings creating patches in nursery and after transplanting they may feed on transplanted seedlings creating gaps in the field which is not clearly visible at lower infestation. The most critical stage is reproductive stage (Y.M. Lam,1988).

<25 burrowing holes / ha	Low level of infestation
25-50 holes/ha	Medium level of infestation
>50 holes/ha	Higher level of infestation

Identification of rat burrowing holes

Close all the holes observed in the field with wet mud and those holes that reappear on the next day are identified as burrowing holes.

Control measures

Cultural methods

- Keep the surroundings of rice field clean
- Keep all drainage channels, ditches etc surrounding the field clean
- Trimming field bunds to reduce opportunity to make burrows(<30 cm)
- Synchronous planting i.e., growing same crop by all farmers in a same cropping system showed reduced infestation than early planting (Lam,1991)

Physical methods

- 10 Kg of cow dung mixed with 10L of kerosene (@ 1:12) make it into small balls dry them up to 75% moisture and then apply them near the burrows at 10 feet interval acts as a repellent .
- If ripened papaya is placed near the rat burrows, papaya feeding will cause injury or irritates the gums of rats and thereby prevents the attack on rice crop.
- Moultings by snakes are kept on the bunds of the rice field. Seeing the moulting of snakes in rice field rats shift their habitat from the rice fields, which ultimately reduce the damage of rice crop by rats.
- Groundnut powder (roasted) mixed with jaggery and cement when placed on field bunds if fed by rats the cement gets solidified and affect the digestive system.
- Use polythene papers and tie them to a support it produces a sound with wind which slows down the movement of rats
- Evening crackers are used to scare the rodents
- Catching them physically from its burrows and killing them.
- Using flame throwers or fumigating the burrowing holes with smoke to suffocate and control the rats
- Plaster or dig all the rat burrows found in the field

Mechanical methods:

- Traps barrier system is one of the latest technologies but it should be used only when there is heavy infestation of rats. It is a costly method hence should not be used until very heavy infestation rates are expected. In this system the place a barrier around the field intermittent with traps by providing a small invagination inside the field and rats move along the barrier and enters into the trap.
- Rat proofing like plastic sheets etc. or other hard structures can be used but only for small areas like nurseries.

Chemical control**➤ Zinc phosphide**

- Mix the flour or farina with oil and zinc phosphide (2%) @ 96:2:2
- Before placing this original bait pre-baiting without zinc phosphide is required
- Then place the original bait either in the burrowing hole or in 10-12 places in the field per hectare.

➤ Bromadiolone

- Mix the flour or farina with oil and Bromadiolone (2%) @ 96:2:2
- No pre-baiting is required
- In some places this medicine is added in potato, tomato @2% and placed in the field

➤ Aluminium Phosphide

- Now a days this practice is being in use
- It is available as tablets and one tablet of aluminium phosphide is recommended in one burrowing hole and plast the burrow with wet mud
- The rats inside the hole are killed due to the release of phosphine gas

Conclusion

In our country majority of farmers are economically poor and are with limited resources, so they should adopt a strategy to control rats depending on level of infestation, availability of resources and their economic status. Indiscriminate use of chemical rodenticides leads to increase in cost of cultivation. Cultural and physical methods are proved to be better alternative to chemical rodenticides when the infestation level is low. Hence farmers should integrate all the methods of control as per the level of infestation.

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