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Integrated Rodents Management in Direct Seeded Rice Crop

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India's economic growth significantly relies on agriculture, with the country being predominantly agrarian. Today, it is crucial to conserve our natural resources by minimizing soil disturbance and using water efficiently. Direct seeding of paddy, as opposed to the traditional transplanting method, saves nearly 21% of water, conserves natural resources, and requires less labor, facilitating timely sowing of the rice crop. However, the direct-seeded rice method faces a greater rodent problem compared to conventional transplanting.

Four major rodent species inhabit rice crop fields: the lesser bandicoot rat (*Bandicota bengalensis*), the soft-furred field rat (*Millardia meltada*), the Indian gerbil (*Tatera indica*), and the field mouse (*Mus booduga*). Among these, *Bandicota bengalensis* is the most prevalent, causing significant damage to various crops. Its burrows are identifiable in crop fields by loose heaps of soil. Irrigation and puddling of fields for rice transplantation used to destroy rodent burrows which resulted in reduction in rodent population but with the shift to direct seeding, the rodent problem has substantially increased in the rice fields. No single method is entirely effective in controlling the rodents and the remaining population quickly reproduces, returning to its original size in a short period of time. Therefore, it is crucial to adopt an integrated approach by using a variety of methods at different stages of the crop. Therefore, for the benefit of all farmers, here are some essential points for integrated rodents-management in direct-seeded rice crops:

Integrated Rodent Management Strategies

Field Sanitation and Hygiene:

Always keep the field clean by removing weeds, grass, and crop residues that provide shelter and food for rodents. Also, eliminate other crops plants that can serve as alternative food sources for rodents. The old bunds around fields having rodent burrows should be made a fresh after sometime. The height and width of bunds in fields should be less.

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Physical Barriers and Trapping:

Install physical barriers such as rodent-proof fences around the fields to prevent rodent entry of the rodents. Set up mechanical traps like snap traps, live traps, or glue boards along field margins and near burrows. Regularly check and clean these traps. The traps can be placed along the bunds and at rodent activity sites in the fields. Change the position of the traps at regular intervals. Kill the trapped rats by drowning the cage in water.

Rodent-Proof Storage:

Store the harvested crops in rodent-proof containers or facilities to prevent post-harvest losses by the rodents and to maintain the quality of the harvested crop produce.

Cultural Practices:

- **Timely Harvesting:** Harvest crops timely to reduce the period of vulnerability to rodent attacks.
- **Water Management:** Proper water management practices can deter rodents from building burrows in the fields.

Chemical Control:

The acceptance of poison bait by rodents depends on the quality, texture, taste, and odor of the bait material. Use rodenticides judiciously following the guidelines for application to minimize environmental impact and avoid non-target species harm. Common rodenticides include bromadiolone, zinc phosphide, and anticoagulants.

Before crop sowing and during germination stage:

After the harvest of wheat crop and during germination, rat burrows become visible. Place poison bait in these burrows, as well as in surrounding pavements and fallow lands. To control rodents during the germination stage of direct-seeded rice, close all burrow openings with soil in the evening. The next day, place a paper boat with 10 grams of poison bait about 6 inches deep into any reopened burrows and cover them with soil again. For *B. bengalensis* burrows, remove fresh soil to locate the tunnel and place the poison bait deep inside. Zinc phosphide can cause bait shyness in rats, making them avoid it after sub-lethal exposure. To avoid this, do not use zinc phosphide repeatedly. Instead, use bromadiolone bait 1-15 days after the initial zinc phosphide baiting.

During crop maturity:

In order to control the rats during maturity period, use poison bait @400g/acre in August-September before milky grain stage. Randomly select points in the field near the rodent activity sites and keep 10g poison bait on pieces of paper at each point.

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Biological Control:

Owls, snakes, cats and other carnivorous animals are natural predators of the rats. So, encourage the presence of natural predators near the fields that can help to control the rodent populations.

Monitoring and Surveillance:

Conduct regular field surveys to monitor rodent activity, population levels, and damage assessment to the crop. Identify the new burrows in the fields and destroy the rodent burrows to disrupt their habitat and reduce their population. Use the rodenticides and baits near the burrows for effective control of the rodents.

Community Approach:

- **Collaborative Efforts:** Control of rodents in smaller areas usually becomes ineffective due to their migration from the surrounding untreated fields. Work with neighboring farmers and local communities to implement rodent control measures collectively, ensuring a larger area is managed simultaneously.
- **Awareness Programs:** Conduct training and awareness programs for farmers to educate them about rodent management techniques and the importance of maintaining an integrated pest management approach.