



POPULAR ARTICLE

The hidden battle for the grain: Unveiling the threat of storage pests in harvested paddy

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Intricacies of the subject

Paddy (*Oryza sativa* L.) is an important cereal crop and a staple food for a large population worldwide. After harvesting, paddy may undergo post-harvest losses during handling, drying, storage, and processing. Among these, storage pest infestation is an important problem affecting the quality of harvested paddy. During storage, pests such as rice

weevil (*Sitophilus oryzae*), lesser grain borer (*Rhyzopertha dominica*), and Angoumois grain moth (*Sitotroga cerealella*) can damage the grains. This infestation results in grain weight loss, kernel damage, contamination, and reduced market quality. Therefore, proper storage and effective pest management practices are essential to minimize post-harvest losses and maintain the quality of paddy.

Major storage pests of paddy





Table: The important insect pests associated with stored paddy include

Common name	Scientific name	Type of damage
Rice weevil	<i>Sitophilus oryzae</i>	Internal feeder
Lesser grain borer	<i>Rhyzopertha dominica</i>	Internal feeder
Angoumois grain moth	<i>Sitotroga cerealella</i>	Internal feeder
Rice moth	<i>Corcyra cephalonica</i>	External feeder
Red flour beetle	<i>Tribolium castaneum</i>	Secondary/external feeder
Saw-toothed grain beetle	<i>Oryzaephilus surinamensis</i>	External feeder
Khapra beetle	<i>Trogoderma granarium</i>	Serious stored-grain pest

Harvested paddy is susceptible to infestation by several primary and secondary storage pests. Among these, the rice weevil (*Sitophilus oryzae*) is one of the major internal feeders, with both larvae and adults causing damage by feeding inside the grain, resulting in hollow kernels, weight loss, and deterioration in grain quality. Similarly, the lesser grain borer (*Rhyzopertha dominica*) bores into grains and produces powder, causing extensive damage significant and quantitative losses. The Angoumois grain moth (*Sitotroga cerealella*) is another important internal feeder, whose larvae develop within the grains and cause hollow kernels with characteristic emergence holes. Secondary pests such as the rice moth (*Corcyra cephalonica*) and red flour beetle (*Tribolium castaneum*) primarily attack broken and damaged grains. The rice moth produces webbing and causes grain clumping, while the red flour beetle contributes to contamination and unpleasant odour. Other important storage pests include the saw-toothed grain beetle (*Oryzaephilus surinamensis*), which feeds mainly on damaged and broken grains, and the khapra beetle (*Trogoderma granarium*), whose larvae cause severe contamination through feeding, cast skins, and body hairs. Collectively, these pests contribute to significant quantitative and qualitative losses during paddy storage, emphasizing the importance of proper storage and pest management practices.

Storage pests of harvested paddy

Classification of paddy storage pests

Storage pests of paddy are mainly classified into internal feeders and external feeders. Internal feeders such as *Sitophilus oryzae*, *Rhyzopertha dominica*, and *Sitotroga cerealella* develop and feed inside the grain, causing hidden damage. External feeders such as *Tribolium castaneum*, *Oryzaephilus surinamensis*, and *Corcyra cephalonica* feed on the surface, broken grains, and grain debris. Both types of pests can reduce the quality and quantity of stored paddy. Early identification of these pests is important to prevent serious grain damage.

Factors causing pest infestation

Pest infestation increases due to high moisture content, warm temperature, long storage periods, poor sanitation, damaged grains, and poorly maintained storage structures. These conditions help insects grow and multiply quickly. Therefore, proper storage conditions are important to prevent pest infestation. Keeping the storage area clean and dry can greatly reduce pest problems.

Losses caused by storage pests

Storage pests cause both quantity and quality losses in paddy. They reduce grain



weight, damage grains, and produce powder and broken kernels. Pest infestation can also reduce nutritional quality and seed germination and contaminate grains with insect fragments and excreta. Severe infestation may lead to significant economic losses. It can also reduce the market value and acceptability of stored paddy.

Hermetic storage bags



Management of storage pests in paddy

Effective management of storage pests is essential to protect harvested paddy from damage and quality deterioration. Pest infestation can be reduced by adopting proper storage and preventive practices.

Regular inspection of stored paddy

Proper drying: Paddy should be dried to a safe moisture level before storage, as high moisture encourages insect growth and multiplication.

Good sanitation: Storage rooms, bags, containers, and equipment should be cleaned regularly. Old grains, dust, and grain residues should be removed to prevent pest breeding.

Regular inspection: Stored paddy should be checked periodically for signs of insects, damaged grains, webbing, or powder formation. Early detection helps prevent severe infestation.

Proper storage containers: Clean, dry, and insect-proof containers or bags should be used to protect paddy from pest entry.

Hermetic storage: Airtight storage systems can help control insect pests by creating unfavourable conditions for their survival and multiplication.

Botanical methods: Natural plant-based materials and traditional grain protectants may be used as safer alternatives to reduce pest infestation.

Chemical control: When infestation is severe, approved insecticides or fumigation methods may be used under proper supervision and recommended safety guidelines.

Integrated pest management: Combining proper drying, sanitation, regular monitoring, and suitable control methods provides effective and sustainable protection of stored paddy.

Overall, proper storage management and early pest detection are important for reducing post-harvest losses and maintaining the quality of paddy during storage.

Conclusion

Storage pests are a major cause of post-harvest losses in harvested paddy. Insects such as rice weevil, lesser grain borer, and grain moth can damage grains and reduce their weight, quality, nutritional value, and market acceptability. Pest infestation is mainly influenced by factors such as high moisture



content, warm temperature, poor sanitation, and long storage periods. Therefore, proper drying, clean storage conditions, regular inspection, insect-proof containers, and

suitable pest control methods are essential. An integrated storage pest management approach can effectively reduce losses and help maintain the quality and safety of paddy during storage.

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