



## Major Stored Grain Pest and their Integrated Management

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### Abstract

This article provides an overview of major stored grain pests, their nature of damage, and specific management techniques employed to control them. A wide range of insect pests are associated with stored grains, and their presence can lead to significant losses in quantity and quality. Beetles such as *Callosobruchus* species, *Trogoderma granarium*, and *Tribolium confusum*, weevils like *Sitophilus oryzae* and *S. granarius*, moths such as *Corcyra cephalonica*, and rodents are among the major pests encountered in stored grains. Major stored grain pests can cause significant damage and losses if not properly managed. Integrated pest management (IPM) strategies are commonly employed to control these pests.

**Keywords:** Integrated pest management, Major stored grain pests, Significant damage, *Trogoderma granarium*

### Introduction

Stored grain pests pose a significant threat to agricultural productivity and food security worldwide. These pests not only cause direct damage to stored grain but also lead to economic losses and food contamination. Effective management strategies are crucial to mitigate the risks associated with these pests. To combat these pests, botanical extracts have been explored as an alternative approach in grain protection. Botanical extracts can have insecticidal properties, affecting pest growth, development, feeding behavior, and acting as repellents. Some botanical extracts have shown promise in killing or repelling storage pests, offering potential solutions to the problems associated with synthetic pesticides. Plant derivatives, such as neem, have been widely studied for their bioactivity against storage pests. Neem and other plant-based products are considered relatively safe and are widely accepted by consumers. Additionally, traditional herbs and spices like turmeric, garlic, and cloves have been used by people for managing storage pests due to their natural insecticidal properties. The use of botanical pesticides is now emerging as one of the prime means to protect crops and their products and the environment from pesticide pollution (Kumar *et al.*, 2022).

### List of Major Stored Grain Pests and Their Nature of Damage

**Rice Weevil (*Sitophilus oryzae*):** The rice weevil is one of the most common pests infesting stored grains, particularly rice. Adult weevils lay eggs on grains, and the emerging larvae bore into the kernels, feeding on the internal contents. This results in reduced grain quality, weight loss, and susceptibility to fungal infections.

**Red Flour Beetle (*Tribolium castaneum*):** Red flour beetles are highly adaptable and infest a wide range of stored grains and milled products. Both adults and larvae feed on grain

particles, causing contamination, degradation of nutritional value, and the production of foul odors.

**Sawtoothed Grain Beetle (*Oryzaephilus surinamensis*):** This beetle is a major pest of stored cereal grains, flour, and other processed products. The larvae and adults consume the grain, causing significant damage and facilitating the growth of molds and fungi.

**Pulse Beetle (*Callobruchus chinensis* Linn.):** Pulse beetle is primary pest of stored pulses. Its adult is not damaging and having short life span. Only grub causes damage to stored pulses. The grubs cause damage by eating out the entire internal content of the grain, leaving only the shell behind. These damaged grains are unfit for human consumption as well as sowing purpose. The losses caused by this pest to the pulses have been estimated to the tune of 40 to 50 per cent in storage (Mishra *et al.*, 2022).

**Indian Meal Moth (*Plodia interpunctella*):** Indian meal moths infest a variety of stored grains, including corn, wheat, and rice. The larvae tunnel into grains, contaminating them with their excrement and silk webs. They are known to cause mass grain destruction, leading to severe economic losses.

### **Integrated Pest Management (IPM)**

Adopting an integrated pest management approach combines multiple strategies for effective and sustainable pest control. This includes a combination of cultural, physical, biological, and chemical controls tailored to specific pest species and storage conditions. IPM focuses on prevention, monitoring, and the use of non-chemical methods as the primary means of control.

**Sanitation:** Maintaining proper sanitation practices is vital to prevent and manage stored grain pests. This includes regular cleaning of storage facilities, removal of spilled grain and debris, and eliminating potential pest habitats. Thoroughly clean storage bins and equipment between batches to reduce the risk of infestation.

**Temperature and Humidity Control:** Stored grain pests thrive in favorable temperature and humidity conditions. Implementing proper temperature and humidity control measures in storage facilities can significantly reduce pest populations. Lowering the temperature and humidity levels can slow down pest development and reproduction, preventing infestations.

**Monitoring and Early Detection:** Regular monitoring of grain storage areas is crucial to detect pest infestations at an early stage. Inspect stored grains for signs of damage, insect activity, or the presence of larvae, adults, or their eggs. Utilize pheromone traps, sticky traps, or insect monitoring systems to track pest populations and determine the need for intervention.

**Physical Controls:** Mechanical methods can be employed to control stored grain pests. These include sieving, air blowing, and gravity separation to remove infested grains and pests. Installing insect-proof screens, sealing cracks, and using tight-fitting lids on storage containers can prevent pest entry.

**Chemical Controls:** In situations where pest populations are high or other methods have proven ineffective, chemical controls may be necessary. Chemical insecticides specifically formulated for stored grain pest management can be applied as sprays, dusts, or fumigants. It is important to follow product instructions and safety guidelines while using these chemicals.

### **Conclusion**

The storage of grains in traditional methods in villages, especially in developing countries, can create favorable conditions for pests to thrive, leading to significant infestation and subsequent losses. Integrated pest management (IPM) is indeed the best approach to minimize infestation and mitigate the negative impact on food supplies. IPM offers a holistic and sustainable approach to pest management, combining multiple strategies to effectively control pests while minimizing the use of synthetic pesticides. It emphasizes the integration

of various pest control methods, including cultural, biological, and chemical control, to achieve long-term pest suppression.

### References

1. Kumar, A., Kumar, P., Shukla, P. and Kumar, A. (2022). Botanicals: Towards the Eco-Friendly Approach for Pest Management. *Biotica Reasearch Today*, 4(12): 837-839.
2. Mishra, P.K., Kumar, A., Kumar, A., Aman, A. S. and Sonkar, S. (2022). Eco-friendly Management of Pulse beetle (*Callosobruchus chinensis* Linn.) in Storage. *Just Agriculture*, 3(4): 1-6.
3. Said, P. P. and Pashte, V. V. (2015). Botanicals: The protectants of stored grains pests. *Trends in Biosciences*, 8(15): 3750-3755.