

Article

Warehouse Pests of Agricultural Products

Murodov Baqojon Egamberdi o'g'li, Doctor of Biological Sciences, Associate Professor
Head of Laboratory, Research Institute of Plant Quarantine and Protection

Qodirov Nodir Qodir o'g'li
PhD student, Research Institute of Plant Quarantine and Protection

Citation: Egamberdi o'g'li, M. B & Qodir o'g'li, Q. N. Q. Warehouse Pests of Agricultural Products. American Journal of Biology and Natural Sciences 2026, 3(2), 109-111.

Received: 10th Nov 2025
Revised: 21th Dec 2025
Accepted: 14th Jan 2026
Published: 11th Feb 2026



Copyright: © 2026 by the authors. Submitted for open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>)

Abstract: Pests of stored products are key limitations for the safekeeping and quality maintenance of food commodities globally [5]. In this work the species composition, spreading, harmfulness and biocontrol potential of most important storages pests of grain, leguminous and dried fruit products are considered. Research has centered on insect pests in the order Coleoptera, which are preminent and most destructive storage ecosystem organisms. Economic pests such as *Tribolium confusum*, *Tenebrio molitor*, *Sitophilus granarius*, *Sitophilus oryzae*, *Oryzaephilus surinamensis*, *Callosobruchus maculatus* and *Plodia interpunctella* were found by field observations under the laboratory conditions. These insects damage our crops due to their feeding, contamination and product quality loss with economic losses across storage, processing and transportation situations.

Keywords: pest, Coleoptera, beetles, insects, parasites, larva, population, biological control, cosmopolitan.

Introduction

Warehouse pests are insects that mainly damage grain products. They are widely distributed in warehouses, elevators, mills, pasta and confectionery factories, residential buildings, and other facilities; they are also found in fields and grain stacks. Most warehouse pests belong to the order Coleoptera (beetles) of the class Insecta.

Materials and Methods

The species composition of warehouse pests is very broad and diverse. Species that cause damage during the storage, processing, transportation, and other stages of agricultural products are widely distributed throughout the world. Among the most harmful pest species are the confused flour beetle *Tribolium confusum* Duv., the yellow mealworm *Tenebrio molitor* L., the granary weevil *Sitophilus granarius* L., the rusty grain beetle *Cryptolestes ferrugineus* Steph., the sawtoothed grain beetle *Oryzaephilus surinamensis* L., the cowpea weevil *Callosobruchus maculatus* F., the rice weevil *Sitophilus oryzae* L., the lesser grain beetle *Cryptolestes pusillus*, the brown carpet beetle *Attagenus simulans* S., the Frisch carpet beetle *Dermestes frischii* Kug., the Indian meal moth *Plodia interpunctella* Hb., the flour moth *Pyralis farinalis* L., the common hairy mite *Glycyphagus destructor* Sch., the house

dust mite *Glycyphagus domesticus* De, and others. These pests are widespread and cause damage to stored grain and legume products.

Result and Discussions

Despite the widespread use of chemical agents against warehouse pests, there remains a strong need for environmentally safe control measures. Scientific research on biological control methods against warehouse pests is being conducted by scientists and doctoral researchers of the Research Institute of Plant Quarantine and Protection.

Warehouse pests cause damage in two main ways: first, they feed on stored grain, legume crops, dried fruits such as apricot, apple, fig, jujube, and other stored products, reducing their quantity; second, they deteriorate product quality.

Our observations indicate that warehouse pests also have widely distributed natural enemies. These include parasitoid wasps *Anisopteromalus calandrae* and *Lariophagus distinguendus*, as well as lacewings and braconid wasps, which parasitize pest larvae. Their effectiveness against *Sitophilus zeamais* and *Sitophilus oryzae* has been proven in a number of studies.

In biological control, the use of these parasitoids reduces the population of *Sitophilus oryzae* by 57%. Control efficiency can be increased up to 90% by grain polishing. It has been determined that the developmental period of *Lariophagus distinguendus* on *Sitophilus oryzae* is 20 days at 25 °C [3,4].

According to Smith, the development of *Anisopteromalus calandrae* on *Sitophilus zeamais* requires 17 days [5].

Smith and Ryoo reported that these parasitoids prefer fourth-instar larvae, which indirectly affects early detection of pest infestations [3,4,5].

According to Smith (1994), biological control of *Sitophilus zeamais* using *Anisopteromalus calandrae* is limited by the pest's long lifespan and extended oviposition period, which hinders full population suppression; however, the parasitoid reduces the growth rate of the pest larval population. Analysis of different release rates of *Anisopteromalus calandrae* showed that a 1:1 ratio was effective. The interval between the first and second generations of parasitoids allows pest larvae to damage grain products, which may lead to widespread infestation after two weeks [5].

In laboratory tests, braconid wasps and lacewing larvae are being tested against warehouse pests of a number of stored products. The biological efficacy was 80% of braconid adults to the Indian meal moth by application at a ratio of 1:20 to third, fourth and fifth instar larvae; 87% – 1:15; 90% – at a ratio of 1:10 and up to 100% – at the ratio of 1:5.

Therefore, application of entomophagic braconids at 1:10 and 1:5 ratios is a safe way to protect stored fruits (jujube, apple, apricot), pistachio as well as many other products with regard to Indian species infestation.

Chrysopa septempunctata and *Chrysopa carnea* entomophages are being assessed in various proportions to the confused flour beetle (*Cochliobus mileis*); the moth of Indian meal and sawtoothed grain beetles; cowpea and rice weevil; among other pests. Polyphagous entomophages, lacewing larvae are extremely effective when the rate is increased. But, they like the nature best of all, and do not want to stay in a warehouse so the adult insects will scatter into environment.

We observed that, of the warehouse pests, Coleoptera are most frequently found. Fifteen species of Coleopteran losses were identified. Some predaceous entomophages against these pests have been under investigation.

Conclusion

Among storage pests, the most common are the confused flour beetle *Tribolium confusum* Duv., yellow mealworm *Tenebrio molitor* L., granary weevil *Sitophilus granarius* L., sawtoothed grain beetle *Oryzaephilus surinamensis* L., cowpea weevil *Callosobruchus maculatus* F., rice weevil *Sitophilus oryzae* L.; Indian meal moth *Plodia interpunctella* Hb.; flour moth *Pyralis farinalis* L.; common hairy mite *Glycyphagus destructor* Sch.), house dust mite *Glycyphagus domesticus* De and other species which cause damage to stored grain and leguminous products. Biological, cultural, and where appropriate, chemical control measures should be applied promptly..

REFERENCES

- [1] Ro'ziyev, S. (2022). Improvement of mass rearing and application methods of the parasitoid *Encarsia* against whiteflies. *Academic Research in Educational Sciences (Conference)*, 654–658.
- [2] Ryoo, M. I., Hong, Y. S., & Yoo, C. K. (1991). Relationship between temperature and development of *Lariophagus distinguendus* (Hymenoptera: Pteromalidae), an ectoparasitoid of *Sitophilus oryzae* (Coleoptera: Curculionidae). *Journal of Economic Entomology*, 84, 825–829.
- [3] Ryoo, M. I., Yoon, T. J., & Shin, S. S. (1996). Intra- and interspecific competition among two parasitoids of the rice weevil (Coleoptera: Curculionidae). *Environmental Entomology*, 25(5), 1101–1108.
- [4] Smith, L. (1993). Host-size preference of the parasitoid *Anisopteromalus calandrae* (Hymenoptera: Pteromalidae) on *Sitophilus zeamais* (Coleoptera: Curculionidae) larvae with a uniform age distribution. *BioControl*, 38(2), 225–232.
- [5] Smith, L. (1994). Computer simulation model for biological control of maize weevil by the parasitoid *Anisopteromalus calandrae*. In: Highley, E., Wright, E. J., Banks, H. J., & Champ, B. R. (Eds.), *Stored Product Protection. Proceedings of the 6th International Working Conference on Stored-Product Protection*, 17–23 April 1994, Canberra, Australia. CAB International, Wallingford, UK, pp. 1147–1151.