

Evaluation of Critical Factors during the Long-term Storage of Agricultural Products in Storage Facilities of Thessaly with Emphasis on Stored Product Insects - Abstract

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Summary

Insects are the most important pests of stored agricultural products, as they can cause significant quantitative but also quality degradations in the product. Thus, food protection from such pests is of great importance in order to prevent postharvest losses and secure food availability. Today, the protection of stored products is mainly based on suppressive methods, in contrast to the lack of preventive measures. At the same time, the continuous and improper use of contact and gaseous insecticides has led to resistance development in several major insect species, and is posing a continuous threat to the sustainability of these key treatments. In the present work, the University of Thessaly in collaboration with a cooperative of agricultural products, carried out on-site inspections, indicating all the critical points in storage facilities and products of the cooperative, which can contribute to the increase of entomological and fungal infestations. The inspections were accompanied by various sampling methods in order to collect and identify at the laboratory scale the existing species and pathogens in the stored products, as well as to evaluate the existence of resistance to the most widely used insecticides, using different diagnostic protocols. Various insect species and fungi were found in all the warehouses. The collected insects, *Rhyzopertha dominica* (F.) (Coleoptera: Bostrychidae), *Sitophilus zeamais* Motschulsky (Coleoptera: Curculionidae) and *Cryptolestes ferrugineus* (Stephens) (Coleoptera: Laemophloeidae), are major pests of stored products worldwide. Saprophytes that cause serious degradations during storage and can produce mycotoxins were found in the cereals. Most of the insect species collected from stored cereals and legumes were found to be resistant to phosphine, by using the standard Phosphine Tolerance kit (PTT) (Detia Degesch GmbH, Laudenbach, Germany). At the same time, the tested populations did not indicate significant traits of resistance to the active ingredients deltamethrin and pirimiphos-methyl in dose-response bioassays, but in many cases, the recommended label doses were not able to completely control some populations of these species. The results of the present work underline the importance of population on the efficacy of insecticides that are currently in use in stored product protection. Moreover, the use of the residual grain protectants as an alternative solution to fumigation can be proposed as a means to mitigate tolerance/resistance to phosphine, but the continuous use of contact insecticides is equally risky on the basis of resistance development.

Keywords

Stored product insects, mycotoxins, stored cereals, insecticides, resistance, phosphine

Proceedings of HAICTA 2022, September 22–25, 2022, Athens, Greece

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CEUR Workshop Proceedings (CEUR-WS.org)

Acknowledgements

This research was co-financed by the European Regional Development Fund of the European Union and Greek national funds through the Operational Program Competitiveness, Entrepreneurship and Innovation, under the call RESEARCH-CREATE-INNOVATE (Τ2ΕΔΚ-03532).



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Co-financed by Greece and the European Union