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MECHANISMS OF *Zeuzera pyrina* - INDUCED STRUCTURAL DEGRADATION IN TREES

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The aim of this study is to investigate the mechanisms by which the xylophagous insect *Zeuzera pyrina* L. (Lepidoptera: Cossidae) contributes to the degradation of woody tissues in host plants, focusing on both mechanical damage and secondary biological processes that lead to structural failure.

The research is conducted in a 1 ha walnut orchard located in Ialoveni district, Malcoci village, Republic of Moldova, cultivated with the Fernor and Franquette varieties, aged 18 years, and in another walnut orchard of approximately 1 ha located in Anenii Noi district, Nimoreni village, Republic of Moldova, cultivated with the Fernor and Franquette varieties, aged 7 years. In each orchard, three types of entomological traps are installed per pest species (simple delta sticky traps, digital pheromone traps, and sticky panels) to monitor population dynamics. Regular sampling is carried out using yellow adhesive traps and by sweep netting every five days throughout the entire growing season to assess faunal diversity in these areas. These data will support the identification of entomophagous organisms that may contribute to reducing the populations of the studied pests.

A female *Z. pyrina* can lay up to 1,000 eggs in 5–7 days, and the larval survival rate is approximately 30%, which means that under ideal conditions, over 200 larvae can colonize a single tree. However, in practice, larval density depends on several factors, including host availability, climatic conditions, predation pressure, and hatching success. Studies in walnut orchards have reported 16–24% of trees infested, with galleries up to 50 cm long, with an actual number of larvae ranging from a few to several dozen, and never reaching the hundreds. *Z. pyrina* larvae have a larval cycle of 271–289 days depending on the host species, allowing them to excavate extensive galleries in the wood during this period.

The newly hatched larvae remain clustered for a few days, then disperse to feed on tender tissue and eventually penetrate thick wood, where they excavate galleries. The larvae enter through cracks in the bark, the bases of young branches, or branch nodes. There is no evidence that they strictly prefer the top or the side, but they are

more frequently found in young branches and the upper part of the trunk. A single larva can damage a branch in a single season, but massive infestations lead to the death of trees within 2–5 years, depending on larval density and climatic conditions. Young trees, under 10 years old, are the most vulnerable because their wood is softer and sap flow is more intense, facilitating larval penetration. Mature trees are more resistant due to the difficulty larvae face in penetrating hardwood, but they can be compromised within 4–5 years if the infestation is massive (10-40 larvae/tree). However, it has been determined that the main trunk and the base of the skeletal branches are the critical points. Larval galleries in these areas disrupt the flow of water and nutrients, leading to the drying out of the entire tree, even if other branches remain intact, highlighting the importance of research on this pest.

Keywords: tree borer, *Zeuzera pyrina,* tree structural degradation, insect pest

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