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CHEMICAL CONTROL AND BIOLOGICAL ALTERNATIVES FOR THE MANAGEMENT OF BRASSICOGETHES AENEUS: GLOBAL RESEARCH, EUROPEAN EXPERIENCE AND PERSPECTIVES FOR WESTERN ROMANIA

Paula-Maria BULZ, Ioana GROZEA
University of Life Sciences "King Mihai I" Timisoara

Abstract: *Brassicogethes aeneus (Fabricius), commonly known as the pollen beetle, is one of the most important insect pests of oilseed rape, particularly during the development of flower buds. Chemical control has traditionally represented the main management strategy, although the development of insecticide resistance and increasing environmental concerns have encouraged research into alternative approaches. This review examines the main chemical and biological control strategies reported worldwide, with particular emphasis on European research and their potential application in western Romania. For western Romania, further studies are needed to assess the performance of biological alternatives under local agricultural and environmental conditions. Overall, the reviewed literature supports an integrated approach combining carefully justified chemical interventions with biological and ecological management strategies*

Introduction

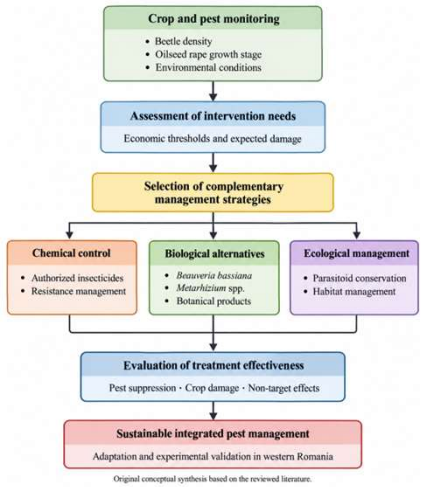
Oilseed rape (*Brassica napus* L.) represents an important agricultural crop worldwide. In European agricultural systems, crop productivity may be significantly affected by several insect pests, among which the pollen beetle, Brassicogethes aeneus (Fabricius) (Coleoptera: Nitidulidae). The species is widely distributed in European oilseed rape-growing regions, where its feeding activity during the reproductive development of plants may cause economic losses (MAUCHLINE ET AL., 2018). The objective of this review is to analyze and compare published information on chemical control and biological alternatives, considering international research, European experience and potential applications in western Romania.

Material and method

The selected publications were examined comparatively according to the control method investigated, target developmental stage, experimental conditions, reported efficacy and limitations. Particular attention was given to differences between laboratory and field results and to factors influencing the performance of biological control agents.



Conceptual comparison between conventional pesticides and biopesticides in maize protection, highlighting differences in selectivity, effects on beneficial arthropods, and ecological compatibility



Results and discussions

The economic impact of Brassicogethes aeneus in oilseed rape crops is closely related to the timing of adult colonization, pest population density and the developmental stage of the host plants.

The relationship between pollen beetle abundance and crop damage is therefore not always proportional. HANSEN (2004), using field data from spring oilseed rape crops in Denmark, demonstrated that yield losses were influenced not only by beetle pressure but also by temperature and precipitation before and after pest immigration.

Chemical control of *Brassicogethes aeneus* has traditionally relied on synthetic pyrethroids due to their rapid action and relatively low costs. However, repeated applications have contributed to the development and spread of resistant populations across Europe (SLATER ET AL., 2011.

Biological alternatives for the management of Brassicogethes aeneus have received increasing attention as potential components of sustainable oilseed rape protection. Research has mainly focused on entomopathogenic microorganisms, natural enemies and ecologically based strategies capable of reducing pest populations.

One promising research direction involves the evaluation of entomopathogenic fungi, particularly Beauveria bassiana and Metarhizium spp., under the environmental conditions characteristic of western Romania. Their potential effectiveness should be investigated in relation to application timing, temperature, relative humidity and pest developmental stage. As emphasized by HOKKANEN AND MENZLER-HOKKANEN (2018), combining biological agents with other ecosystem-based management practices may improve the sustainability of pollen beetle control.

Conclusions

The reviewed literature highlights the importance of developing alternative management strategies against *Brassicogethes aeneus*, particularly in the context of widespread pyrethroid resistance and the need to reduce dependence on conventional insecticides. For western Romania, the available international and European evidence provides a scientific basis for developing laboratory and field investigations adapted to regional conditions. Future research should prioritize the comparative evaluation of biological agents, their compatibility with natural enemies and their effectiveness in reducing crop damage.

Overall, sustainable management of B. aeneus is more likely to result from the integration of complementary control methods than from reliance on a single intervention strategy.

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