

SUSTAINABLE STORAGE OF GRAINS BY IMPLEMENTING A NOVEL PROTECTANT AND A VERSATILE APPLICATION TECHNOLOGY

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INTRODUCTION

novIGrain is an international European Horizon 2020 project, focussed on developing of a new Plant Protection Product (PPP), with the goal to minimize post-harvest grain losses. Right now, approximately 20% of all produced grain is lost while being stored. These losses are caused by mycotoxine contamination and storage pests, which are becoming more and more resistant against commonly used pesticides.

IMPORTANCE OF novIGrain

- Introducing the first larvicide for stored grain protection in the European Union
- Increasing the amount of available insecticides, to counteract insecticide resistance
- Creating easily accessible innovations, products and tools

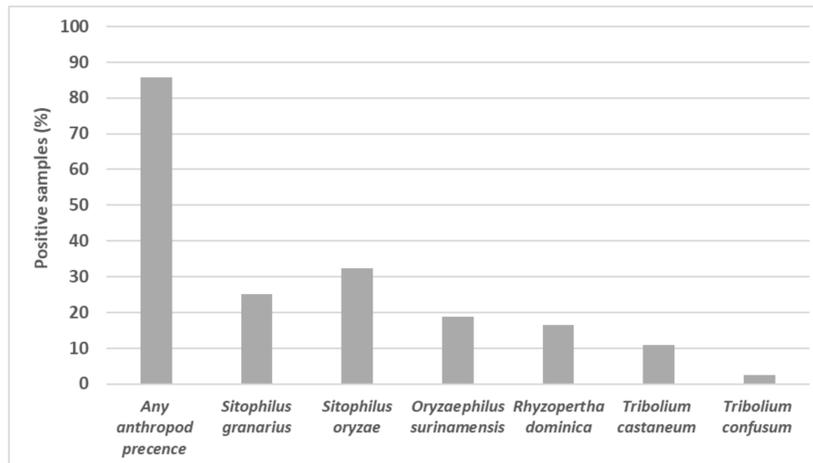


Figure 1: Percentage of positive samples for arthropod presence and six different target species. Samples collected from various facilities in the Czech Republic (n = 238) (Aulický, R., Frydova, B., Vendl, T., Stejskal, V., 2022)



Figure 2: The target species. Upper row: *S. granarius*, *S. oryzae* and *O. surinamensis*. Lower row: *R. dominica*, *T. castaneum* and *T. confusum*

OBJECTIVES

- Investigating the resistance of storage pests to insecticides commonly used in the EU
- Developing a new larvicide to protect stored grain from insects
- Developing a new technology, which can apply two different insecticides at the same time
- Estimating the environmental, social and economic impacts of the newly developed products

RESISTANCE ASSESSMENT

- Estimation of the current resistance of storage pests to currently used pesticides
- Focus on six of the most economically important storage pests
- Evaluating the different levels of pest resistance based on geographical location and type of business
- Evaluation of the the efficacy of new juvenoid-based products on resistant species

STAKEHOLDER INTERACTION

- Co-creation workshops
- International Expert Panel
- Interaction with Policy makers
- Demo tours
- Efficacy trials

IMPACT ASSESSMENT

- Economic
- Environmental
- Social



INNOVATIONS

Decision Supporting Tool

- User friendly tool accessible on the novIGrain website
- Provides suggestions on grain storage management
- Uses the resistance assessment and input from stakeholders and experts to reduce the risk of development of insect resistance to grain protection products

New Larvicide based on S-Methoprene

- Juvenile Hormone Analogue-type Insect Growth Regulator
- Effective against several common storage pests at the same dose and specificity
- Can be applied in Ultra-low volumes
- Favourable mammalian toxicology profile
- Good Maximum Residue Levels (MRL)

Dual-channel spraying system

- Placed onto the conveyor belt
- Tracks the speed of the conveyor belt and adjusts the application of the insecticides
- Separate nozzles prevent mixing between insecticides
- Combination of larvicide and adulticide application possible

Executive Summary

- European regulations on insecticides are becoming more and more strict. As a result, the amount of available insecticides in the European Union is decreasing.
- The resistance of storage pest to commonly used insecticides is increasing. Because of the limited amount of different solutions, the resistance will continue to increase, and commonly used insecticides will become unreliable.
- The introduction of new and safe products is necessary, and bringing a new product to market requires systematic work not only from a technical and chemical perspective but also through extensive regulatory effort to meet high standards.
- New product should be developed as part of a system with application technology to maximise its impact, supported by a thorough assessment of economic, environmental, and social factors to ensure it is sustainable by design.

novIGrain Project Status (Final Year)

- The product prototype has been developed and is undergoing extensive testing to meet regulatory requirements.
- The application technology prototype is complete and will soon be showcased in a series of demonstration tours.
- Resistance research has resulted in several scientific publications and supported communication goals of the project.
- Impact assessment work is in its final stage, with initial conclusions ready for presentation.

Explore more insights on the potential Business Models for the new Larvicide on the second novIGrain poster →