



PRACTICE ABSTRACT No. 8

Wireworm biocontrol strategies

Wireworms (Coleoptera: Elateridae) are the soil-dwelling larvae of click beetles and are one of the most important pests of potatoes. Within the ECOBREED project field experiments on wireworm biocontrol strategies were established at Kmetijski inštitut Slovenije in 2020 and 2021 evaluating several preparations based on entomopathogenic fungi of the genus *Metarhizium*. The knowledge arising from ECOBREED will assist farmers in the control of wireworms in organic potato production.

PROBLEMS:

- Wireworms damage potatoes by tunnelling into the tubers while feeding, reducing their market value rather than yield.
- Even a small population of wireworms can cause significant economic losses.
- Wireworms have a very long development cycle (3-6 years), which makes them difficult to control in both organic and conventional production systems.



Fig. 1. Potato tubers damaged by wireworms

SOLUTIONS:

- Biological control with entomopathogenic fungi (EPF) of the genus *Metarhizium* whereby these beneficial cosmopolitan soil fungi successfully kill root feeding herbivores such as wireworms.

- By increasing the concentration of entomopathogenic fungi in the soil, we can increase the frequency of fungal infections of wireworms.
- Attracap® is a granular bioinsecticide for wireworm control in potato and asparagus crops that works via the “attract and kill” principle. The granules contain starch, yeast and EPF *M. brunneum*. When the capsules come into contact with soil moisture, they start to release CO₂. Wireworms are attracted to the CO₂ sources and thus come into contact with the entomopathogenic fungi in the capsules and die within a few days.

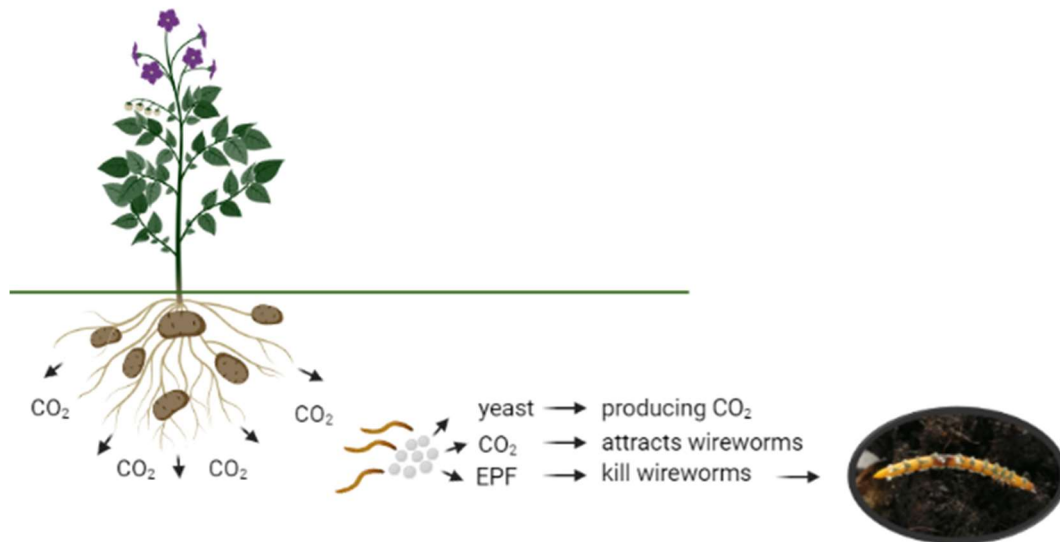


Fig. 2. Baker's yeast, starch, and entomopathogenic fungi are encapsulated in Attracap® granules. Yeast produces CO₂ that attracts the wireworms away from the plant. Wireworms come into contact with the entomopathogenic fungi in the capsules, become infected and die (photo:BioRender.com).

PRACTICAL RECOMMENDATIONS:

- The use of entomopathogenic fungi is a suitable biological control method for certified organic potato production.
- For long-term effects, it is recommended that entomopathogenic fungi are used over several consecutive seasons.
- Caution is advised as entomopathogenic fungi are sensitive to UV light, so their efficacy is reduced if they are exposed to sunlight for too long.
- It is recommended that entomopathogenic fungi are applied to the potato field at the time of planting.

FURTHER INFORMATION

Biocare Biological plant protection (2022). Attracap. Available at: <https://biocare.de/attracap-eng/>

Parker WE and Howard JJ (2002). The biology and management of wireworms (*Agriotes* spp.) on potato with particular reference to the U.K. *Agricultural and Forest Entomology* 3(2): 85-98. doi.org/10.1046/j.1461-9563.2001.00094.x

Benjamin EO, Grabenweger G, Strasser H, Wessler J (2018). The socio-economic benefits of biological control of western corn rootworm *Diabrotica virgifera virgifera* and wireworms *Agriotes* spp. in maize and potatoes for selected European countries. *Journal of Plant Diseases and Protection* 125: 273-285. doi.org/10.1007/s41348-018-0156-6

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ECOBREED CONSORTIUM



ABOUT ECOBREED:

ECOBREED is a 5-year (2018-2023) project funded by European Union's Horizon 2020 research and innovation programme that will improve the availability of varieties and seed suitable for organic and low-input production. Activities will focus on four crop species i.e. wheat, potato, soybean and common buckwheat, selected for their potential contribution to increasing the competitiveness of the organic sector.

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