



# The Meeting of Minds to Share Solutions for a Complex Insect Pest

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Wireworms, the soil-inhabiting larvae of click beetles (Coleoptera: Elateridae), threaten food production by reducing crop yield, often drastically. The livelihood of those producing food, the farmers, can be equally threatened as a result of fallen income. In organic agriculture, synthetic insecticides that might otherwise be used for wireworm control, are prohibited. In jurisdictions such as Europe where they are heavily regulated and restricted, the expansion of food production can be constrained. Where effective synthetic insecticides are available, their use not only can cause risks to human and environmental health, but their market stability is tenuous, as regulatory standards align with scientific discoveries that render them unacceptable.

An acceleration in the use and discovery of alternative pest management strategies has occurred since the mid twentieth century, and for many agricultural insect pests, such strategies have entirely supplanted those based on synthetic pesticides. For wireworms, there have always been elements of alternative strategies—some whose origins pre-date the widespread use of chemical pesticides—but only in recent decades have these strategies and related improvisations been more seriously considered for mainstream application. Wireworms have the ability to survive food scarcity and other adverse environmental conditions by burying deep down in the soil and remaining inactive for weeks or even months. This makes them especially difficult to control. Furthermore, it is typical that wireworms at an infested site are a complex of species, having developed over several years and comprise overlapping generations. These factors confound the promise that a single control strategy can negate

concern for this pest, so current research is focussed on integrated pest management of wireworms in a long-term context, instead of focusing on single measures for one crop or one season.

In 2022, a special symposium entitled “A subterranean challenge – protecting crops from pestilent wireworms” took place at the 26th International Congress of Entomology in Helsinki, Finland. Organized by Giselher Grabenweger of Agroscope, Switzerland (also symposium Chair) and Todd Kabaluk of Agriculture and Agri-Food Canada, the aim of the symposium was to gather international pest management scientists whose novel research serves to reframe traditional approaches to wireworm management in agriculture. Presentations ranged from chemotrophy to agroecology to biological control. The result of the symposium was not only an exchange of scientific information, but also a consolidation of collaborations and innovative ideas that have always characterized meetings of wireworm experts.

## Aims and scope

Much of the content presented at the wireworm symposium related to interactions between plants and insects. Recognized as relevant to this journal, Arthropod-Plant Interactions commissioned this special issue with wireworms as the central theme, culminating in the presentation of a wide range of ideas on

- Monitoring
- Behavioral response to volatile organic compounds
- Mating disruption
- Control with entomopathogens
- General management improvement

The content of this special issue elaborates on that presented at the congress symposium, with additional contributions from invited experts conducting research involving alternative wireworm management strategies. In both obvious and sometimes cryptic ways, these ideas involve the

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interaction between plants and insects, a relationship whose understanding we hope will broaden the readers' view when considering the possibilities in managing a destructive insect pest.

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