Open PhD position at ETH Zurich, Institute of Integrative Biology

A PhD fellowship within the frame of the World Food System Center-Mercator Research Program is available for an interdisciplinary project on microbial pest control being conducted as a collaboration between the Plant Pathology group at ETH Zurich and Agroscope. The project will be supervised by Monika Maurhofer (ETH Zurich), Giselher Grabenweger (Agroscope) and Ute Vogler (Agroscope). Funding is available for four years; the PhD student will mainly work on the main campus of ETH Zurich in Zurich, and partly at Agroscope location Reckenholz.

Project description

Below ground insect pests are a yet unsolved problem not only in organic, but also in conventional crop production because they are difficult to target and the few effective chemical pesticides are already or will be banned in near future due to raising concerns for environmental and consumer safety. This project aims at developing a new approach for the biological control of soil-dwelling pest insects compatible with organic production. Our first aim is to evaluate the potential of a specific group of plant-beneficial fluorescent *Pseudomonas* bacteria with entomopathogenic activity (EPP) for insect control as a new non-*Bacillus* bacterial biocontrol agent with a different mode of action. The second aim of the project is to investigate whether below-ground insect biocontrol can be improved by combining EPP with entomopathogenic fungi (EPF) and entomopathogenic nematodes (EPN), which are already well-established biocontrol agents (BCA's) used in organic production. In lab experiments we will study the interaction of the three BCA's and test the hypothesis that EPN and EPF can serve as vectors delivering the bacteria into the insect larvae thus intensifying or speeding up the killing effect of EPN and EPF alone. We will then test promising EPP-EPN-EPF combinations in greenhouse and on-farm field trials against the cabbage root fly *Delia radicum*, a pest causing increasing losses in the production of brassicacean crops and for which no satisfactory control measures exist. This project combines fundamental research at ETH Zurich with applied agricultural research at Agroscope. We expect to provide i) new methods based on the combined application of beneficial soil organisms for the control of an important insect pest in organic and conventional vegetable production, which may be adapted to other problematic soil pests and ii) new insights into complex interactions between agriculturally important members of the soil and rhizosphere ecosystem.

Qualifications

The selected student must have BSc and MSc degrees preferably in Agricultural Sciences, Horticultural Science, or in other relevant disciplines such as Microbiology, Plant Sciences or Environmental Sciences. Desirable qualifications include familiarity with microscopy and molecular techniques, including DNA/RNA extraction, qPCR, and experience in working with plants and/or insects.

Contact

Interested applicants should send a motivation letter, a curriculum vitae and contact information for two references to Monika Maurhofer (monika.maurhofer@usys.ethz.ch)