BIOLOGIE DES ORGANISMES ET DES POPULATIONS

M2 bop - 2016-2017
Proposition de stage

Supervision :

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Funding for student:

X yes (2650 CHF/m ~2400€) □ to be discussed □ no

Title of the research project :

Does the corn rootworm use maize "call-for-help" signals to locate a host?

Key words :

Maize, *Diabrotica virgifera*, plant-herbivore interactions, caryophyllene, insect behavior and performance.

Summary :

The group of Biotic Interactions offers master internship positions on the interactions between maize and an invasive pest in Europe: Diabrotica virgifera. This insect is extremely harmful for maize crops as it cause about 1 billion dollar crop losses every year in the US (where it originated from) and raises ecological and economic concerns in Europe. As no pest management strategy seems to be efficient, our group aims at understanding the ecological success of the insect using a multidisciplinary approach and outstanding techniques.

Upon attack by the root herbivore, maize plants do emit a volatile compound, called E-β-caryophyllene (EBC). This compound was previously shown to be attractive for the natural enemies of the herbivore, entomopathogenic nematodes (EPNs) (1). Recent research suggest that that the root herbivore benefit from aggregating on host plants and use the "help signal" (EBC) to locate plants that are already infested (2). The aim of the current internship is to determine if such behavior is innate or due to experience, and its impact on the herbivore performance and fitness.

Literature (2 references):

1. Rasmann S, Köllner TG, Degenhardt J, Hiltpold I, Toepfer S, Kuhlmann U, Gershenzon J, Turlings TCJ (2005) Recruitment of entomopathogenic nematodes by insect-damaged maize roots. Nature 434(7034):732–737.
2. Robert CAM, Erb M, Hibbard BE, French BW, Zwahlen C, Turlings TCJ (2012) The specialist root herbivore reduces plant resistance and uses an induced plant volatile to aggregate in a density-dependent manner. Functional Ecology 26(6): 1429-1440.

Technical aspects of the research project :

Behavioral choice assays, performance assays, GC-MS

Essential skills and abilities desired :

We are looking for motivated students with a background in ecology, chemical ecology or behavioral ecology, willing to learn and apply multidisciplinary techniques. Candidates with an interest in continuing research after their master (PhD) are encouraged. The members of the lab come from all around the world; therefore, the main spoken language is English. French can also be used with the maize project members.