

## Encadrement :

Elvira DE LANGE, PhD Student, University of Neuchâtel, Institute of Biology, Rue Emile-Argand 11, CH-2009 Neuchâtel, Switzerland, 0041 32 718 31 62, [elvira.delange@unine.ch](mailto:elvira.delange@unine.ch)

## Titre du stage :

**Differences and similarities in herbivore resistance between maize and its wild ancestor teosinte**

## Résumé:

### Background:

Plants are highly sophisticated organisms. They have access to a broad spectrum of direct and indirect defense mechanisms to protect themselves against herbivore feeding. Direct defense mechanisms include the production of toxic compounds. By means of indirect defense mechanisms, plants “call for help” from natural enemies of their herbivores. These natural enemies can be predators, which feed on the herbivores, or parasitoids, that pond their eggs in the herbivores, thereby killing them. Because the herbivores don't usually have a distinctive smell, the natural enemies use the volatiles of the plant to find their food or hosts.

### Objectives:

The aim of this study is to determine the differences and similarities between the defenses of cultivated maize and its wild ancestor teosinte. Both direct defenses (resistance against the caterpillar *Spodoptera littoralis*) and indirect defenses (attraction of the parasitoid wasp *Cotesia marginiventris*) will be studied. Potentially, novel defense traits identified in the wild species could be incorporated into maize to generate novel pest-resistant crops.

### Methods:

Caterpillar feeding-bioassays, parasitoid wasp behaviour-bioassays, plant volatile collection, plant volatile analysis by means of gas chromatography, analysis of expression of defense-related genes

## Références bibliographiques :

- (1) Turlings, T.C.J., and Wäckers, F. (2004). Recruitment of predators and parasitoids by herbivore-injured plants. In: Advances in insect chemical ecology, (eds. R.T. Cardé and J.G. Millar), Cambridge University Press, pp. 21-75.
- (2) Erb, M., Flors, V., Karlen, D., De Lange, E., Planchamp, C., D'Alessandro, M., Turlings, T.C.J., and Ton, J. (2009). Signal signature of aboveground-induced resistance upon belowground herbivory in maize. The Plant Journal, early view April 2009.
- (3) Rosenthal, J.P., and Dirzo, R. (1997). Effects on life history, domestication and agronomic selection on

plant defence against insects: Evidence from maizes and wild relatives. *Evolutionary Ecology* **11**, 337-355.

**(4) Mangelsdorf, P.C., MacNeish, R.S., and Walton, C.G.** (1964). Domestication of Corn. *Science* **143**, 538-545.

#### **Techniques mises en œuvre :**

- Caterpillar feeding-bioassays
- Parasitoid wasp behaviour-bioassays
- Plant volatile collection and analysis by means of gas chromatography
- Plant gene expression analysis by means of quantitative PCR (qPCR)

#### **Compétences particulières exigées :**

General interest in plant-insect interactions, preferentially knowledge of the English language, and a good temper!

Liste complète des sujets de stage de M2 sur le site de la filière bop : <http://www.u-bourgogne.fr/BOPdijon/>