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INRAE unit

IGEPP
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MaIAGE

Partner

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Role of plant-microbiota interactions in the adaptation of an insect pest to its host

The μFlyAdapt project aims to highlight the selective recruitment and the role of rhizosphere microorganisms in the adaptation of a root-feeding insect (the cabbage maggot *Delia radicum*) to its host plant (*Brassica napus*).

During their development cycle, plants maintain dynamic and intimate interactions with communities of microorganisms.

The attack of a cultivated plant by an insect root pest involves the interaction between two holobionts: the plant and the root and rhizosphere microbiota on the one hand, and the insect and its microbiota on the other. These two entities, usually considered as distinct, actually have something in common because the microorganisms of the plant's root and rhizosphere, necessarily by passing the plant's defence molecules, are also likely to be recruited by the pest in its gut microbiota, due to their detoxifying properties.

Objectives

We propose to determine the share of heritability and environmental origin of the microbiota of a root pest and to measure the impact of this recruitment on the adaptive value of the pest.

To do this, we will use massive sequencing to monitor the dynamics of the microbiota of the insect (*Delia radicum*, the cabbage maggot) throughout its life cycle in parallel with the dynamics of the root and rhizosphere communities of two rapeseed (*Brassica napus*) genotypes with contrasting levels of defence compounds. In a second, more functional component, we will quantify the defence compounds and hormones in the roots, the bacterial gene *saxA* known to degrade plant defence compounds and produce metatranscriptomic data to better understand the nature of the interactions between the plant, the microbiota and the insect.



Partners

INRAE division	INRAE unit	Expertise
SPE Plant Health and Environment	IGEPP	Community ecology, plant-microbiota-bioaggressor interactions, metaomics, metabarcoding, culturomics, functional ecology, metatranscriptomics, molecular biology, bioanalysis, microbiology, plant microbiota experiments, insect biology and ecology, chemical ecology, plant metabolites, bioanalysis, insect experiments, insect microbiota, bioinformatics, biostatistics
	Agroecology	Bioanalysis, molecular biology, development and production of molecular data on taxonomic and functional diversity
MATHNUM Mathematics and Digital Technologies	MaIAGE	Modelling, bioinformatics
Partner	Expertise	
iDIV Univ Leipzig (Allemagne)	<i>D. radicum</i> genomics, chemical ecology (detoxification)	

