



FA COST Action FA1405

USING THREE-WAY INTERACTIONS BETWEEN PLANTS, MICROBES AND
ARTHROPODS TO ENHANCE CROP PROTECTION AND PRODUCTION

WORKSHOP

PROGRAMME / BOOK OF ABSTRACT

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Insect-mediated transfer of microbial communities across plants

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Abstract

When insects feed on plants they also ingest those microorganisms living on plant surfaces and within plant tissues (named epiphytes and endophytes, respectively). While there is plenty of insight on the transmission of pathogenic microorganisms, very little is known about the ability of non-fastidious plant-associated microbiota to survive in the insect host and to colonize other plant this may feed upon.

We investigated this phenomenon in grapevine, using the sap-feeding leafhopper *Scaphoideus titanus* (also known as vector of the pathogenic *Candidatus* Phytoplasma vitis, causal agent of the grapevine 'flavescence dorée'). Newly hatched nymphs conveyed hundreds of OTUs (corresponding to the majority of the bacterial community) to bacteria-free micropropagated grapevine plants. Sequencing of the bacterial community 16S rDNA gene traced the movement of bacterial taxa from the adult plant to the vector insects, and then to acceptor plants. The latter were colonized by complex endophytic communities where Proteobacteria were predominant. In contrast, plants where *S. titanus* nymphs fed, which had not previously fed on adult plants, developed poorer bacterial communities dominated by Actinobacteria.

Surprisingly, plant roots (whose surface was physically separated from the plant stems and leaves) were also colonized by rich microbial communities, similar in composition to those found in plant stems, indicating that bacteria acquired in the plant canopy by contact and feeding were able to move endophytically through the plant tissues towards the roots.

We demonstrated the ability of insects to move a large set of taxonomically distinct bacterial taxa between plants, and discuss their potential ecological role in mobilizing bacterial communities in the agro-environment.