



**Plant Health
Institute
Montpellier**

Subject:

How do co-infections affect the epidemiological dynamics of two strains of the plum pox virus?

Context

Traditionally, research in plant epidemiology focused on systems composed of a single pathogen infecting a single host. However, recent studies suggest that the diversity of both plants and pathogens plays an important role in epidemiological dynamics. In particular, several strains of a pathogen species can circulate in a single plot and co-infect the same hosts. The epidemiological properties of such co-infecting strains could then be very different in single infections or co-infections.

The project focuses on two strains of the plum pox virus (PPV), causing the sharka disease on Prunus trees (including plum, peach and apricot trees). The sharka causes severe symptoms on Prunus trees, in turn resulting in important income loss for growers. The virus is transmitted by aphids in a non-persistent and non-circulative way, allowing very fast spread in orchards. In France, the sharka is under mandatory survey and control: once an infected tree is detected, it has to be removed. Preliminary results showed that several PPV strains can circulate in a single orchard, and trees infected by several strains have been detected.

Aim

The aim of the project is to compare the epidemiological properties of two PPV strains on young plum trees, in single infections and in co-infections. The latency periods, virus accumulations and transmission rates of the strains will be measured for each modality. The experiments will be performed in the lab, where several methods classical to plant virology will be used (e.g., aphid transmission, symptom survey, sampling on infected plants). The infections will be monitored using serological (ELISA) and molecular (qPCR) techniques. The results will then be analyzed with statistical methods.

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