

**Supervision :**

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e-mail : marie-charlotte.anstett@u-bourgogne.fr Funding for student:  
\*yes  to be discussed  no

**Title of the research project :**

**Modelling the evolution of host preference according to the infection status of both host and vector of the “Flavescence Dorée”**

**Key words :**

Host-vector-pathogen interaction, Flavescence Dorée, model, host choice evolution, parasite manipulation

**Brief description:**

*The flavescence Dorée (FD) is an epidemic bacterial disease of the European grape vine (Vitis vinifera) that was first recorded in France (Charentes) c. 1950. This disease probably originates from a transfer of a phytoplasma (bacteria) from another European plant species. The leafhopper vector (Scaphoideus titanus), which was introduced accidentally in France from north America, appeared to be a good vector of the FD phytoplasma. In spite of intensive and compulsory chemical treatments, FD is now present in most Europe with a northern boundary near Beaune (Côte d’Or, France).*

*Phytoplasma sp. are known to modify the behavior of their insect vector. The costs of infection seems to be quite high for S. titanus in terms of both reproduction and survival. Moreover infected S. titanus seems to prefer infested vines. The fitness consequences of such a preference is still unclear, but as FD phytoplasma is a recent disease of S. titanus, the observed preference could be far from an evolutionary equilibrium.*

*The goal of this project is to model the evolution of the behavioural manipulation of the leafhopper’s plant preference by the FD phytoplasma. Predictions of the model will be tested with available field and experimental data to determine whether the observed preference is at the evolutionary equilibrium. Consequences on the population dynamics of the invasive FD will be studied.*

**Literature (2 references):**

Roosien, B.K., Gomulkiewicz et al. 2013 “Conditional preference aids the spread of plant pathogens: Results from a model. Environ. Entomol. 42(6):1299-1308.  
<https://colloque6.inra.fr/jst-flavescencedoree-bdx2014/Programme2>

**Technical aspects of the research project:**

*Study of existing models and of pertinent biological parameters. Choice of the right model structure and modelling per se*

**Essential skills and abilities desired:**

Interest in evolution, behaviour and modelling -

Return to Professor Frank Cézilly (frank.cezilly@u-bourgogne.fr)