



**Thesis title: The epidemiology, ecology and diversity of the Flavescence dorée (FD) phytoplasma and its vector *Scaphoideus titanus* Ball across the Piedmont.**

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**Confidential:**  Yes  No

**Abstract (max 300 words)**

**Topic position & objectives:** Flavescence dorée (FD) is an economically important disease of grapevines that results from an infection by wall-less bacteria known as phytoplasmas. Flavescence dorée phytoplasma (FDP) is transmitted by the leafhopper, *Scaphoideus titanus*, to both cultivated grapevine as well as abandoned and wild grapevine present outside the vineyard. Two subtypes, FD-C and FD-D, are responsible for FD epidemics in the Piedmont region. Primary infection events originating from wild grapevines outside the vineyard were hypothesized to be more important to the FD epidemic cycle than within vineyard secondary infection events.

**Methods:** To test this hypothesis, the presence of FDP in populations of *S. titanus* both inside and outside the vineyard as well as in outside vegetation was assessed via PCR. A preliminary Multilocus Sequence Typing (MLST) analysis utilized two genes to determine the FDP subtypes present within the epidemic components at two geographically distant sites.

**Results:** Only the within vineyard proportion of FD-infected *S. titanus* was found to significantly differ among the sampled sites. Neither the proportion of FD-infected *S. titanus* nor the proportion of FD-infected vegetation outside the vineyards differed significantly among the sites. However, the proportion of FD-infected *S. titanus* outside the vineyard was found to be slightly higher than the proportion of FD-infected *S. titanus* inside each vineyard among the sites though this was not significant. The two sites in the MLST analysis differed in which subtype was predominant.

**Main conclusions:** This observed trend, along with previous studies noting a higher density of vectors and disease prevalence of FD along vineyard borders, suggests that FD epidemics are driven more by primary infection events in the Piedmont. These results confirm that abandoned vineyards and wild rootstock populations surrounding the vineyard harbor populations of both FDP and FD-infected *S. titanus*. MLST analyses will allow for better interpretations of FDP's genetic diversity on a geographic scale.

**Keywords (5): Flavescence Dorée Phytoplasma, *Scaphoideus titanus*, *Vitis vinifera*, wild *Vitis*, Disease Ecology**

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