

# Analysis of local vegetation for the presence of endemic plant pathogen *Xylella fastidiosa*

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## Objectives

*Xylella fastidiosa*, a gram negative bacterium, colonizes plant xylem within many different plants and is thought to be endemic to the Gulf coast. Pierce's disease along the coast makes it nearly impossible to grow *Vitis vinifera* in this area. The focus of this project has been the screening plants within the Houston area where the level of the bacteria is assumed to be very high. We are investigating multiple species within different plant families to determine if there are trends in the types of plants which become infected given *Xylella fastidiosa* is present.

Given that most growers along the Gulf coast are growing hybrids, we are also investigating the levels of *X. fastidiosa* within Blanc du Bois, Black Spanish and Cynthiana. We are not only evaluating bacterial levels within each of these varieties, but also productivity of each variety (crop yields and pruning weights). Are there differences in the level of bacterial load among these hybrids? Does the bacterial level within these hybrids seem to be consistent from leaf to leaf within the same vine? Does the bacterial level seem to be consistent from vine to vine within the same variety? Does the level measured within a vine correlate with productivity?

## Procedures

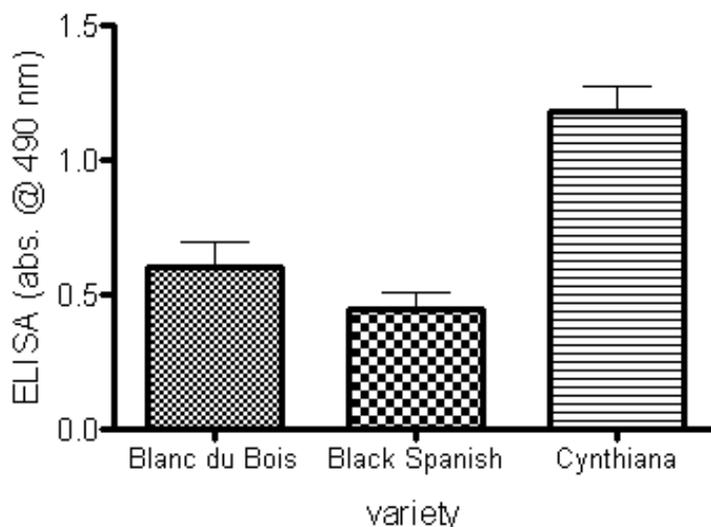
The presence of the *Xylella* bacterium has been done primarily by the technique ELISA (enzyme-linked immunosorbent assay). ELISA is an antibody-based test which means when antibodies specific to *Xylella* (in wells of plastic dish) interact with proteins on *Xylella* (in your crushed plant sample) a yellow-orange color will result.

We are currently trying to confirm the ELISA data collected using real time PCR and dilution plating. Dilution plating involves making several dilutions and then placing the bacteria onto media that encourages growth of *Xylella* bacterial colonies that are counted to determine concentration. Real time PCR is a molecular technique that makes many copies of the *Xylella* DNA and allows one not only to detect the presence but the concentration of *Xylella* DNA in a sample.

## Results

ELISA readings from 49 different plant families and over 76 different species and 300 different plants have results in a few trends so far. Many families of plants in the area including Asteraceae, Bromeliaceae, Cyperaceae, Ericaceae, Hydrophyllaceae, Lamiaceae, Ranunculaceae, Rosaceae, Rubiaceae and Vitaceae contained at least 2-3 species that scored consistently positive for *X. fastidiosa*. Individual species including *Baccharis* (sea-myrtle), *Youngia japonica* (Japanese hawk-weed), *Campsis radicans* (trumpet vine) scored consistently very high for presence of *X. fastidiosa*. Some plants such as *Allium canadense* (wild onion), *Nothoscordum bivalve* (false garlic), *Rubus trivialis* (southern dewberry) and *Castilleja indivisa* (Texas paint brush) and *Lantana urticoides* (Texas lantana) showed large variability in bacterial load, but were typically positive. Our positive host data correlates with limited findings from other states, but the scope of this study reveals that the niche of this plant pathogen may be quite extensive in the Gulf Coast region. ELISA readings are currently being confirmed to assure that the data does not include any false positives.

Using leaf samples from Austin County vineyard in August of 2003 we found a significantly higher level of *X. fastidiosa* in the variety Cynthiana than in either Blanc du Bois or Black Spanish. Within this vineyard, the crop yield of Cynthiana has been declining suggesting this variety may be less tolerant of PD than the other two under strong disease pressure.



ELISA assays for *Xylella fastidiosa* were run on leaf sinus tissue sampled on August 18, 2003 at Austin County Vineyard. Tissue from 3 leaves per vine were used in each assay. Twenty-seven vines were sampled for each variety.

## Significance

This research will help us evaluate which families are most likely to hosting *Xylella fastidiosa* which will help us evaluate the epidemiology of the disease as it moves between native vegetation and vineyards.

For those planting hybrids, we need more information on how these hybrids perform in a PD hot zone over the long hall. Studies of hybrid vineyards near Houston can help us with this.

## Planned Work

All above ELISA data needs to be confirmed with additional techniques. We also plan to try to determine the strain or strains of bacteria present in the native plants in the Gulf region.