

# New Mexico State University

## NM Pecan Growers Conference

October 21, 2015

### Pecan Bacterial Leaf Scorch

Pecan Bacterial Leaf Scorch (PBLs) was positively identified in Arizona pecan trees in July 2105 and in New Mexico pecan trees in August 2015. PBLs is caused by *Xylella fastidiosa*, a xylem-limited **bacterium**. *Xylella fastidiosa* is a **PLANT** pathogen, not a human pathogen. It is known to live in over 150 plant species, as a resident organism, causing disease in about 10-20% of these plants. When it causes disease, it can cause two types of symptoms depending on the host: leaf scorch and stunting. In most plants, including pecan, it causes leaf scorch symptoms (leaflet tipburn, marginal leaf necrosis, leaflet necrosis). These symptoms resemble environmental and cultural stress, such as drought, freeze injury and salt damage. The pathogen is spread by xylem-feeding insects (sharpshooters and spittle bugs) and propagation.

We are only at the very beginning of this discovery in pecans in the Southwest. The pathogen and associated disease has been found in other hosts in the southwest for some time. In NM, disease associated with *X. fastidiosa* has been identified in grapes, chitalpa, catalpa, peach, sycamore, Mexican elder, *Vitex*, and crape myrtle. Until now, all of the scientific research on this pathogen in pecan has been done by researchers in the SE U.S.

Unfortunately, there is NOT a completely reliable diagnostic test for this pathogen in pecan. The NMSU Plant Diagnostic Clinic is using the ELISA test (serological test), which is the standard for identification of this pathogen. Unfortunately, it can give a false negative. Researchers at NMSU are developing a PCR protocol which will be much more sensitive (it will be able to detect very small amounts of the bacterium) and much more reliable.

What we know so far about the disease in NM:

- The pathogen is widespread - 44 positive out of 112 (39%) trees tested have been ELISA positive and these trees are from three different counties. The disease has been found in random trees which are isolated from new plantings.
- The pathogen has been identified in 9 cultivars ranging in age from very young to 100 years old.
- Symptoms are highly variable. The pathogen has been found in asymptomatic (completely healthy looking) trees, in trees with only one or a few leaflets exhibiting scorch symptoms (nearly asymptomatic), in trees where the overall canopy of the tree is broadly affected, and trees where an entire branch shows severe scorch symptoms. Underlying stress factors may be contributing to symptoms seen on these trees.
- The pathogen exists in subspecies that have variable host ranges. The subspecies of *X. fastidiosa* in pecans in the Southwest hasn't been determined yet (if it is the same or different from what is found in other hosts in the region is unknown).

The evidence so far suggests that this pathogen may have been in pecan in the southwest, including New Mexico, for a **LONG time**. The disease may have little or no negative effect on trees that are well managed - management practices which reduce tree stress may prevent symptom development and negative effects on the trees. We believe that underlying stress factors (such as freeze, insufficient water, salinity - which can cause similar symptoms), have made the problem more noticeable this year. Established populations of known efficient insect vectors (glassy-winged sharpshooter and smoketree sharpshooter) have not been found in NM.

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## Pecan Bacterial Leaf Scorch Symptoms



Leaflet tipburn (necrosis) on a pecan with *Xylella fastidiosa* in Arizona (Photo: N. Goldberg, NMSU)



Leaflet tipburn on a pecan with *Xylella fastidiosa* in New Mexico (Photo: N. Goldberg, NMSU)

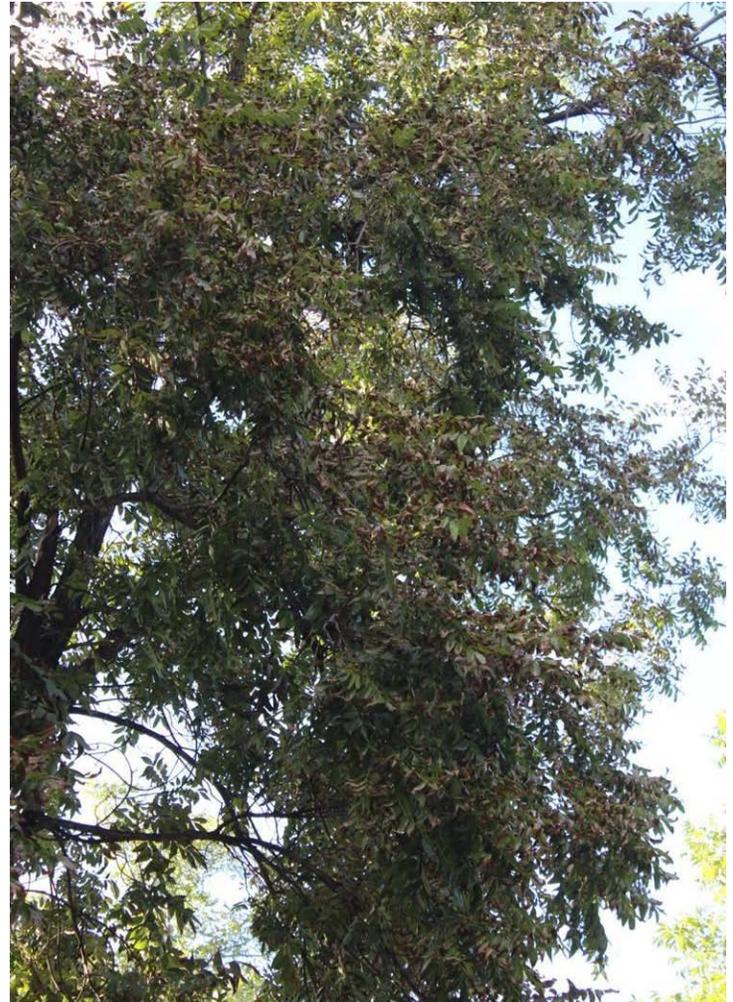


Examples of three positive PBLs samples from New Mexico (Photos: J. French, NMSU)





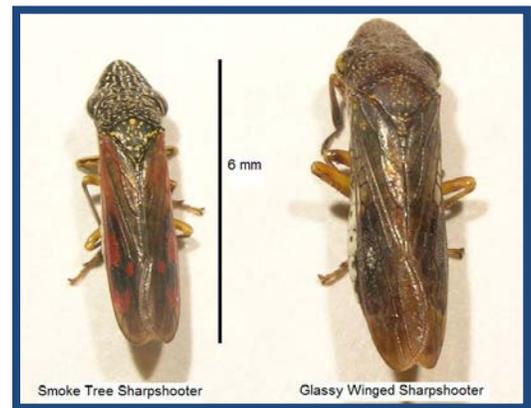
Single leaflet showing tip necrosis on a young New Mexico pecan tree (ELISA positive for *X. fastidiosa*) (Photo: N. Goldberg, NMSU)



Severe scorch symptoms on a very old New Mexico pecan tree (ELISA positive for *X. fastidiosa*) (R. Heerema, NMSU)



Severe scorch symptoms on a middle aged New Mexico pecan tree (ELISA positive for *X. fastidiosa*) (Photo: N. Goldberg, NMSU)



Two of the most efficient vectors of *X. fastidiosa* – These insects are not known to occur in New Mexico (Photo: Arizona Cooperative Extension Service)