

Diagnostic Tests for *Xylella fastidiosa*

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Excerpted in part from “Pierce’s Disease”, published by the University of California, Division of Agriculture and Natural Resources; Publication 21600. Authors: Lucia G. Varela, Rhonda J. Smith, and Phil A. Phillips. To obtain a copy of “Pierce’s Disease”, contact the UC Cooperative Extension Sonoma County office or your local UC Cooperative Extension office.

Positive identification of *Xylella fastidiosa* can be accomplished by three methods: enzyme-linked immunosorbent assay (ELISA), a serological test; polymerase chain reaction (PCR) analysis, a molecular method; and culturing the bacterium on selective media. All these tests may be performed by some commercial laboratories. However, none of these methods distinguish Pierce’s disease strains of the bacteria from other strains of *X. fastidiosa*, such as the strain that causes oleander leaf scorch. The only way to determine if the bacteria are the Pierce’s disease strain is to find disease symptoms expressed in grapevines.

The different diagnostic tests have certain advantages and disadvantages. Positive test results from symptomatic vines are a good confirmation of Pierce’s disease. Negative test results, however, do not mean that Pierce’s disease is absent. In chronically infected vines, bacteria do not move into the new season’s growth until midsummer. Testing of diseased vines before this time may yield false negative results. Also, the bacteria are not evenly distributed throughout the vine; therefore, even summer and fall sampling can result in false negative results if samples are not taken from symptomatic plant parts.

ELISA is based on using an antiserum to detect the presence of the bacterium and is the most common test available at commercial laboratories. This technique is used to confirm the presence of *X. fastidiosa* in symptomatic plants after June. It does not provide as sensitive a detection of the bacterium as PCR.

PCR is the most sensitive technique for detecting small numbers of bacteria in plants and is primarily used in research. With this test, specific parts of the bacterium’s DNA are enzymatically amplified. Immuno-capture (IC) PCR uses *X. fastidiosa*-specific antibodies and treated magnetic beads to capture bacteria cells from plant extracts. The captured bacteria are then placed into a PCR reaction tube to detect the pathogen. IC-PCR has the advantage of getting rid of plant inhibitors and testing larger pieces of plant tissue. Although it is specific for *X. fastidiosa*, PCR cannot determine if the bacteria are dead or alive.

Make arrangements with the diagnostic laboratory for taking samples and shipping. Samples taken from August through October of symptomatic leaves that still contain some green tissue and are attached to the canes generally give the most reliable test results. Tag the samples and the plants from which they were taken in order to identify infected and noninfected plants.

The list of laboratories that follows is not complete. No criticism is implied of any lab that is not listed and no endorsement of listed labs is implied. Many labs do not perform diagnostic tests for plant pathogens yet they may offer a service of shipping your sample to a lab that does. The originating lab receives the diagnostic report and handles all of the billing. It is often more convenient for growers to give samples to a lab they commonly do business with than to open a new account with a second lab. If there is an urgent need for the results of a PD diagnostic test, then you ought to consider contacting a lab that performs the test in-house.

Selected California Laboratories that Conduct Diagnostic Tests for *Xylella fastidiosa*

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Lab Name	Address	City	Zip	Phone	Website	Description of Services ¹
Agri-Analysis Associates ³	930 Riverside Parkway, Suite #30 Riverside Business Park	West Sacramento	95605	(916)371-4727	www.agri-analysis.com	ELISA and PCR
California AgQuest Consulting, Inc. ³	4545 N. Brawley Avenue	Fresno	93722	(559) 275-8095	www.calagquest.com	Will send sample to a different lab
California Seed & Plant Lab ³	7877 Pleasant Grove Road	Elverta	95626	(916) 655-1581	www.calspl.com	PCR ²
FPS, University of California, Davis ³		Davis	95616	(530) 752-3590	http://fps.ucdavis.edu	PCR
Soil and Plant Laboratory ³	1594 N. Main Street	Orange	92867	(714) 282-8777	www.soilandplantlaboratory.com	PCR ²
Eurofins STA Laboratories ³	7240 Holsclaw Road	Gilroy	95020	(408) 846-9964	www.stalabs.com	ELISA and PCR

¹"ELISA" is enzyme-linked immunosorbent assay. "PCR" is polymerase chain reaction. See text for more details.

²Real Time PCR: Tests are conducted using three DNA probes and a fluorescent dye read by a computer. The tests are faster and more accurate

³Please phone before sending samples