

TSM SAMPLE ABSTRACT

LOCALIZATION OF ACC OXIDASE TO MONITOR CELLULAR LEVELS OF ETHYLENE IN PIERCE'S DISEASE IN GRAPE PETIOLES.

E. ANN ELLIS¹ and B. GREG COBB², ¹Microscopy and Imaging Center and ²Dept. of Horticultural Sciences, Faculty of Molecular and Environmental Plant Sciences, Texas A&M University, College Station, TX 77843.

Pierce's disease is caused by the bacterium *Xylella fastidiosa* which infects the xylem and results in scorching and premature abscission of the leaves of wine grapes. Ethylene has been demonstrated to play a role in the pathology caused by a number of plant pathogens. The enzyme 1-aminocyclopropane-1-carboxylate oxidase (ACC oxidase) is the last enzyme in ethylene production and is a biomarker for sites of ethylene production. Colloidal gold based immunocytochemical localization of ACC oxidase was done in petioles of grape leaves infected with *X. fastidiosa* to determine cellular sites of ethylene production in Pierce's disease. In addition, petioles of uninfected plants injected with ethylene were examined for ACC oxidase.

ACC oxidase localized in the bacteria, adjacent to the bacteria in the xylem and accumulated in xylem cell walls. There were decreased levels of ACC oxidase in the cytoplasm of parenchyma cells and adjacent vacuoles and cell walls. Localization of the enzyme in cell walls and vacuoles probably indicates cell wall absorption of the secreted enzyme. Ethylene treatment of uninfected plants maintained in the greenhouse resulted in the same leaf scorching and petioles left with the appearance of matchsticks as that seen in plants infected with *X. fastidiosda*. There were high levels of ACC oxidase throughout all cells and tissues of petioles injected with ethylene. These results of ACC oxidase localization in uninfected, ethylene treated grape vines corroborate the results of ACC oxidase localization in naturally infected grape vines and provide a better understanding of the role of ethylene in the pathology of Pierce's disease. [Supported by USDA UPHS Grant 05-0955 CA.]

ABSTRACT SUBMISSION CATEGORIES: Please indicate the appropriate categories.

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