Project Number: 89-V1

# THE DETECTION OF THE ALMOND LEAF SCORCH BACTERIA.

YEAR END REPORT - December 1989

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## PROBLEM AND ITS SIGNIFICANCE:

Almond leaf scorch (ALS), or golden death as it is also called, is caused by a xylem-limited bacteria which has been named Xylella fastidiosa. This bacteria has been studied in detail in grapevines where it causes Pierce's disease. In almonds, however, although it has been established that the same bacteria causes almond leaf scorch, very little is known about the alternate hosts for the disease in almond orchards, the identity of the vectors under field conditions, or the development of disease in individual trees from the time inoculation occurs until symptoms appear and the tree begins to decline.

Of particular interest are the great differences observed throughout California in the percentage of almond leaf scorch in individual orchards. If the techniques are developed to study this disease in detail, it may be possible to discover why some areas are relatively unaffected by almond leaf scorch while in other areas entire orchards are killed. An understanding of the differences in the rate of disease in different locations could provide an effective approach to control of almond leaf scorch. Growers in the central valley have found that understanding of the vector relations of Xylella fastidiosa in grapes has been very useful in controlling Pierce's disease in valley conditions. Similar knowledge of the vector relations of Xylella fastidiosa in almond orchards would contribute to control of almond leaf scorch.

## ACCOMPLISHMENTS AND PLANS FOR THE 1989-1990 FUNDING YEAR:
## OBJECTIVES:

This is a new project in it's first funding year. In the first six months of the project we have contacted growers and farm advisors with the request that any incidence of almond leaf scorch be reported. We hope over time to develop a distribution map for Almond leaf scorch based on both reports from growers and, as detection techniques are optimized, random surveys.

Survey work of orchards in Contra Costa and San Joaquin Valley was conducted in fall of 1989. Samples were tested with acidified methanol and by culturing. An orchard for in depth vector studies, with a high incidence of almond leaf scorch, has been selected for next years' study.

Because sampling and testing results will be the most valuable if conducted from the beginning to the end of a growing season, the majority of the funding for 1989-1990 will be spent in the spring of 1990 when vector and disease surveys will be initiated. It is

hoped that one full calender year of leafhopper trapping may contribute to a better understanding of the transmission of almond leaf scorch.

With the information gained during the survey work this fall, the work plan for the upcoming growing year has been formulated. It will consist of three parts:

(1) Continue to survey the state for almond leaf scorch infection. Throughout the course of this project, all growers and farm advisors will be encouraged to send samples to our lab for testing. Updated estimates of the extent of damaged caused by ALS in California are needed in evaluating the importance of the disease.

(2) In Davis, young almonds will be inoculated this spring and the development of disease studied in these trees. Using various detection techniques, the distribution of the bacteria in almond trees from the time of inoculation through the development of disease will be studied under these experimental conditions.

(3) An orchard with severe ALS has been selected for detailed studies of sharpshooter populations in an effort to identify the vector of the disease. The orchard will be mapped, diseased trees marked, and observations will be made regularly to locate new infections. Collections of leafhoppers will be made throughout the growing year by net and vacuum sweeper. Yellow sticky traps will be placed in and around the orchard; those traps will be collected and the species of xylem-feeding leafhoppers determined. Actual infectivities studies of the sharpshooters on assay plants will also be made.