Project Number: 82-S8

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Title: Almond Leaf Scorch

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Objectives:

1) Continue to search for alternate hosts of the almond leaf scorch bacterium and determine if vectors actually can acquire the bacteria during confined feeding on them; 2) use bacterial toxin in evaluating relative susceptibility of available almond varieties that could be used for replacement trees in sites where disease is chronic; 3) continue evaluating almond varieties for relative resistance and susceptibility in the established field block at Davis; 4) compare the bacterial isolates obtained by different areas for pathogenicity, persistence in the trees and cultural and serological variability.

Results and Future Plans:

Weed plants transferred to the greenhouse after being ELISA positive in the field most often did not maintain this reaction. No bacteria were isolated from these plants and we did not feed vectors on them. Oconium or poison hemlock is one alternate host that shows symptoms in the field. We did not commonly find this plant near almond orchards but a wet site near Tracy was located where the plant grows. Isolation attempts will be made in 1983.

Circumstantial evidence suggests a definite association between the more severely affected orchards and wet areas favoring weed growth. Among the weeds are found known hosts of the bacterium some of which test positive with ELISA. So far we have not been able to isolate the causal bacterium of leaf scorch from these plants. We attribute this to very low bacterial titers in the symptomless monocot plants.

Twenty one almond varieties were tested with the toxin of the bacteria and evaluated for relative tolerance (appendix). In these tests Padre, Yolo Ripon, Butte and Ruby were most resistant. Difficulty with a toxin source in a second series of tests prevented verification of these results and further tests this year. During December the culture difficulties were resolved and ample supplies of toxin are now available for further tests.

Our problems with maintaining viable bacterial cultures led us to research the possible contamination of these cultures with a bacteriophage. We are in the process of testing 18 isolates of the bacteria from almond, grape and alfalfa for the presence of phage. The materials are in plastic now and will be sectioned and observed as microscope time becomes available.

Additional research underway and not yet completed involves: 1) attempting isolation of bacteria from wood of varying age in infected trees; 2) with the evidence that bacteria often die out in incipient infections we want to determine if a phage pathogen might be responsible or if environmental factors may be involved; 3) we also want to determine if strain variation may be involved in the severity of disease at certain sites; 4) confirm the role of reservoir hosts in the epidemiology of the disease.

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APPENDIX

NOT FOR PUBLICATION

The information on reaction of almond varieties to toxin of the Pierce's Disease bacterium, Xylemella fastidiosum (new species) is shown below. Test was performed by Jorge Cepeda, pest management student, under the direction of George Nyland - spring 1982.

A. Symptoms appeared 5-10 hours after exposure

Variety	Field Rating	Disease rating 0-5
Planada	very susceptible	4.95 a
Jordanolo	very susceptible	4.23 ab
Merced	very susceptible	3.71 bc
Livingston	very susceptible	3.43 bcd
Peerless	very susceptible	2.88 cd

B. Symptoms appeared 24 hours after exposure

Neplus Ultra	susceptible	4.19 a
Thompson	susceptible	3.62 ab
Monterey	susceptible	3.50 abc
Price	susceptible	3.27 abc
Sauret #2	susceptible	3.22 abc
Fritz	susceptible	2.69 bcd
Mission	susceptible	2.40 bcd
Sauret #1	susceptible	2.17 cd
Non Pareil	susceptible	1.85 d
Sonora	susceptible	1.62 d

C. Symptoms appeared 36 hours after exposure

Carmel	tolerant	2.94 a
Ruby	tolerant	1.48 ab
Butte	tolerant	0.70 ab

D. Symptoms appeared 50 hours aftr exposure

Padre	highly tolerant	1.14 a
Yolo	highly tolerant	0.47 a
Ripon	highly tolerant	0.12 a