Project No. 83-T9: Almond Diseases
Shot Hole (Stigimina)
Brown Rot (Monilinia spp.)
Hull Rot (Rhizopus and Monilinia)
Others (scab, leaf blight, and rust)

Project Leader: J. M. Ogawa

Other Personnel: L. M. Highberg on shot hole
V. Canez on brown rot
H. A. Bolkan on brown rot and rust
B. T. Manji on brown rot
R. Vanden Bulk on pollen germination

Subject: Annual Report

I. Shot hole: Study the life cycle of the pathogen and relate it to infection periods, inoculum production, and host susceptibility. These studies will be related to crop losses and will determine the timing of sprays for maximum crop production. Future studies will be related to disease forecasting methods.

Interpretive Summary:

Shot hole: The fungus nomenclature was changed for Coryneum beijerinckii to Stigmina carpophila based on the presence of sporodochia and absence of an acervulus. The fungus was found to overwinter as spores on the host surface and in bud scales in addition to twig lesions. Twig lesions were more abundant than expected and shoot tip blight observed in orchards with severe infections during the 1982 and 1983 seasons. This information on overwintering could suggest a late fall or early winter spray to prevent leaf infections which provide inoculum which could overwinter on the tree or provide new infections. Judging from studies on crop yield as related to fungicide sprays and timing, ziram and captan applied at petal fall provided nonsprayed trees (4-year experiment). Once all fungicide spray plots were uniformly treated with ziram sprays, the differential in crop yield continued to exist indicating slow recovery of c crop yield. In an orchard with very high inoculum, a pinkbud spray could be beneficial in protecting blossoms and newly developing leaves from infection. Chlorothalonil (Bravo 500) was found to be effective in control of shot hole and is in the process of registration.

Two manuscripts have been prepared for publication by L. M. Highberg, graduate student on this project. A pamphlet on Shot Hole of Stone Fruits" is now available as a priced publication.

Publications:

1. Ogawa, J. M. et al. 1983. Shot hole of stone fruits. Division of Agricultural Sciences. Leaflet 21363, 4 pp.

2. Highberg, L. M. 1983. Yield reductions in almond related to incidence of shot hole disease. M.S. thesis. Dept. of Plant Pathology, UC Davis, p. 1-18.

3. Highberg, L. M. 1983. Survival of shot hole inoculum in association with dormant almond buds. M.S. thesis. Dept. of Plant Pathology, UC Davis, p. 19-33.

III. Brown rot: Examine the populations of Monilinia causing blossom blight and hull rot, to identify to species (M. laxa or M. fructicola) and to determine whether isolates are resistant to benomyl. Continue to obtain data to register new alternative fungicides.

Interpretive Summary:

Brown rot: The brown rot blossom blight is still caused primarily by Monilinia laxa although in some orchards M. fructicola has been detected. Benomyl-resistant (1 ppm) M. laxa was detected in a Fresno County almond orchard where treatments with Benlate had failed to control the disease. In this orchard, iprodione (Rovral) controlled the blossom blight and it is registered for the 1984 seasons. Two applications are suggested at blossom time. The research on the fitness of benomyl-resistant isolate to compete with the benomyl-sensitive isolate under various stresses of fungicides is being conducted by Victor Canez, graduate student on this project. To reduce the population of the fungus and especially that of the benomyl-resistant lines, sodium pentachlorophenate (SPCP) is being considered for testing as a dormant spray.

Publications:

1. Canez, V. M., Jr., and H. Bolkan. 1983. New fungicides prove effective on both benomyl-resistant and susceptible isolates of fungus causing brown rot in almonds. Almond Facts Nov/Dec. issue, p. 40-41.

III. Hull rot: Obtain temporary tolerance for the insecticide, Dichlorvos, for preliminary experimentation in an orchard to reduce insect populations during hull split and possibly reduce hull rot.

Interpretive Summary:

Hull rot: The disease, attacking the hulls as they split, is caused by Rhizopus and Monilinia and possibly the most difficult disease to control. For the 1983 season, an insecticide, Dichlorvos, was used with an experimental use permit in the Tenneco West Ranch in Fresno County to reduce the vector population (Nitidulids and Drosophilia) which has been shown to carry fungal spores from diseased to healthy nuts. Two applications were

made, first at hull split and second ten days later on three, one-acre replications where 15 selected trees in each replication were marked for evlauation of disease andp lacement of insect traps. Traps were examined once a Rhizopus was not shown between the treated and untreated plots because the incidence of Rhizopus was too low.

Publications:

Data on Dichlorvos and insect populations are provided in Annual Report of Dr. R. M. Bostock.

IV. Leaf blight, scab, and leaf rust.

Leaf blight: This disease, caused by a fungus, Hendersonia rubi, is becoming more prevalent in northern Sacramento Valley and in some orchards reducing yields. Infectin of the leaf petioles during the summer results in movement of the fungus into the buds during the winter. Control measures should be reevaluated.

Scab: This disease caused by Fusicladium carpophilum, is becoming widespread in the Sacramento Valley and in some orchards severe defoliation occurred during the summer. Testing of newer fungicides is needed.

Leaf rusts: This disease, caused by a fungus, Tranzschelia discolor, has appeared in the northern Sacramento Valley and caused early defoliation. Preliminary tests indicate that this rust fungus is not the same as that on prunes. Effective control measures must be developed.

Publications:

1. Ogawa, J. M., H. A. Bolkan, and W. H. Krueger. 1984. Outbreak of almond rust diseases in northern California. Plant Disease: 67 (in press).

V. Almond survey form:

1. The fungicide treatments applied by the almond growers vary considerably. This difference can be related to the pathogens present, the environment specific to the orchard, and the cultivars grown. Yet in many instances there are no clear cut reasons why certain fungicides or fungicide combinations are used. The survey form was specifically made to obtain a picture of the current trends in fungicide usage and the diseases for which they are applied. If adequate numbers are returned, a summary will be prepared for publication (survey sheet attached).