# Comprehensive Research on Prunes

PROGRAM AREA: Root and Root Zone Problems

PROJECT NUMBER AND TITLE: H-1714 The Cytospora-Pseudomonas canker complex of stone fruit trees

PROJECT LEADER: W. H. English

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OBJECTIVES: To ascertain the role that *Cytospora* plays in prune dieback and the nature and control of bacterial canker.

WORK IN PROGRESS:

A. Cytospora canker and dieback. Studies on predisposition of trees to the disease and on spore dispersal are in progress, as follows:

1. Analysis of various prune soils where different levels of disease occur in the trees.
   a. Textural analysis
   b. Mineral analysis
   c. Biotic analysis

2. A second trial has been set up to determine the importance of pruning wound infections.

3. A controlled test is underway to ascertain the effect of the root lesion nematode (*Pratylenchus vulnus*) in predisposing prune trees to *Cytospora* infection.

4. A fourth study is in progress to determine the distance of pathogen dispersal from a source as a function of spore numbers at the source and wind velocity.

B. Bacterial canker

1. Major emphasis is being given to a study of backhoeing, with or without fumigation, and postplant fumigation on the development of bacterial canker in young prune trees. This investigation is being conducted in commercial orchards in the Sacramento Valley (Marysville, Live Oak, and Chico) in which losses from canker have occurred. In the preplant treatments, backhoe holes have been dug 6 x 6 x 5 feet deep, and during backfilling some sites have been fumigated with either Telone (1 qt.) or methyl bromide (MC-2, 1.5 lb.) These treatments will be compared with standard plantings. In each orchard 100 tree sites are involved. One of the experimental orchards is near Live Oak and the other near Chico.

   The postplant treatments are being conducted in two prune orchards a few miles north of Marysville. Fumazone (DBCP) is being injected in a 5-foot swath on each side of the row at rates of 2.5 and 5.0 gal/A (approximately 6-8" deep). Some plots will receive a single

fall treatment and others an annual fall treatment. Canker incidence will be assessed annually on the 500-1,000 experimental trees in each orchard.

In both the pre- and postplant tests, data will be taken on soil type and on the kinds and abundance of plant parasitic nematodes (cooperation of Dr. Lownsbery, Nematology Department).

2. A second study is in progress to ascertain the effect of moisture stress during summer on the susceptibility of young prune trees to the bacterial canker pathogen. Stressed and unstressed trees have been inoculated at leaf scars and artificial injuries and data on canker development will be taken in the spring.

3. A third experiment is in progress in which prune and other stone fruit trees are being inoculated with an antibiotic-resistant mutant of Pseudomonas syringae (the canker bacterium) to ascertain if this organism can live in trees without causing disease symptoms. It will be compared with a nonmodified strain to ascertain its virulence to stone fruits and to bean seedlings. It is thought that young bean seedlings may serve as a good indicator plant for this bacterium. This question also is being investigated.

4. A fourth study involves the interaction of pin and ring nematodes, soil fungi, and Pseudomonas on host reaction. Included in this study are the plum rootstocks Myrobalan and Marianna 2624. This work is cooperative with Dr. Lownsbery of the Nematology Department.

EXPERIMENTS COMPLETED:

1. Determination of the pathogenicity of Cytospora to healthy trees.

2. Effects of moisture stress on the development of Cytospora canker.

3. The role of sunburn in Cytospora canker development.

4. Seasonal development of Cytospora canker.

5. "Summer wilt" surveys and the consistent demonstration of moisture stress in leaves of infected branches as compared to healthy branches of the same tree.

6. An experiment which demonstrated that frost-injured branches of prune and other stone fruit trees were no more susceptible than normal branches to the bacterial canker organism.

WORK PLANNED:

No new work on Cytospora canker is planned, merely the completion of research in progres. Research on bacterial canker will be continued along the lines outlined above.