

PROGRAM AREA: Root and Root Zone Problems

PROJECT NUMBER & TITLE: 3033-H. *Pseudomonas*-*Cytospora*-canker complex of stone fruit trees.

PROJECT LEADER: W. H. English.

PERSONNEL: Paul Bertrand, J. M. Duniway, C. I. Kado, D. E. Kester, B. F. Lownsbery and Frank Schick.

OBJECTIVES: To determine the predisposing factors leading to systemic invasion of stone fruit trees by *Pseudomonas*. To develop controls for this disease. To re-evaluate present inoculation techniques in field and laboratory. To eliminate all individual rootstock clones of questionable value from the supply of disease-resistant rootstocks developed previously with the aid of thermo neutrons.

WORK IN PROGRESS:

1. Effect of soil moisture levels on susceptibility and disease development from *Pseudomonas syringae* on French prune trees. 1972 plots on moisture stress to be evaluated in spring 1973. (Dr. Duniway cooperating.)
2. Continued evaluation of residual soil fumigation effects on bacterial canker in a previously fumigated Yuba County orchard.
3. Evaluation of leaf scar vs. hypodermic inoculations in stone fruit trees inoculated in the spring of 1972.
4. Evaluation of frost damage as predisposing French prune trees to bacterial canker.
5. Interaction of pin and ring nematodes, soil fungi and *Pseudomonas syringae* on host reaction. First experiment on French prune started in November 1972. Results on peach now available and experiment on prune initiated. (Cooperating with Nematology.)
6. Re-evaluation of present inoculation techniques in the laboratory and field on individual disease-resistant rootstock clones previously developed with the aid of thermo neutrons. (Pomology cooperating.)

EXPERIMENTS COMPLETED: The study of the interaction of ring nematodes, *Pythium* spp. and *Pseudomonas syringae* on the development of stem cankers in peach trees.

WORK PLANNED: Follow through on the experiment started in 1972 as most are evaluated during their second year. To be specific:

1. Continue study on the relation of soil moisture to disease development. Evaluate the summer moisture effect. Set up part two of the experiment to evaluate the winter phase of disease development. (Joint project with Dr. Duniway.)
2. Systemic invasion of French prune by *Pseudomonas syringae*. Finish experiment using new antibiotic resistant bacteria being developed by Dr. Kado. (Joint project with Dr. Kado.)

3. Cooperate in the ring and pin nematode experiments of Dr. Lownsbery on French prune supplying bacteria and bacterial canker severity evaluations of stem cankers. (Joint project with Dr. Lownsbery of Nematology.)
4. Crown gall, bacterial canker resistance. Eliminate all rootstock clones of questionable value from the supply of rootstocks developed previously and evaluate the value of the survivors for use in disease resistance breeding programs. (Joint project with Dr. Kester of Pomology.)
5. Yuba County soil fumigation plot. Continue gathering data to evaluate the residual effects of soil fumigation under land management by new owners.

MAJOR ACCOMPLISHMENTS: The finding that leaf drop, dieback and death of Carolyn peach trees on Lovell rootstock in the lath house were associated with the presence of Criconemoides xenoplox and not with Pseudomonas syringae or Pythium.

IMMEDIATELY APPLICABLE RESEARCH RESULTS:

The results of the nematode experiment with peach are applicable for setting up an experiment using French prune to investigate the disease complex using both pin and ring nematodes. The results are not applicable at the grower level--experiments precede field control experiments.

EVALUATION OF PROJECT: Definite progress has been made in separating the effects of different causal agents in the bacterial canker complex. The contribution of bacteria in the natural environment under different physiological moisture stress conditions is being investigated as are the conditions under which the bacteria become systemic.

PUBLICATIONS OR REPORTS:

Lownsbery, B. J., W. H. English, E. H. Moody, and F. J. Schick. 1972. Development of stem cankers in peach trees inoculated with ring nematodes, *Pythium* spp., and *Pseudomonas syringae*. *Phytopathology* 62:774. (Abstr.)