

## BACTERIAL CANKER AND CERATOCYSTIS CANKER OF FRENCH PRUNE

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## ABSTRACT

Bacterial canker, caused by Pseudomonas syringae pvs. syringae, is a serious disease of stone fruit trees in California and is responsible for the decline and death of trees primarily in young orchard plantings. Research by several investigators has indicated that predisposition by low temperature, ring nematodes, cultural practices or other factors is necessary for infection and disease development. Because the etiology of bacterial canker is very complex, control measures have not been completely successful. Our research emphasis is on the influences of pruning time and rootstocks on disease incidence and severity. Our principal accomplishment this year has been the acquisitions of necessary experimental materials and the establishment of a test plot at the Kearney Horticultural Field Station.

We are also studying Ceratocystis canker which is caused by the fungal pathogen, Ceratocystis fimbriata, and affects primarily prune and almond. The disease is initiated in mechanical injuries to the bark. We are studying this disease in almond under a grant from the Almond Board and will extend our findings to prune when appropriate. Our research emphasis is on potential biological and chemical control agents and disease resistance development in bark wounds.

## OBJECTIVES

Our primary emphasis is on bacterial canker disease.

The objectives of this research are: 1) to determine if time of pruning influences the incidence and severity of disease in California, 2) to determine if rootstocks have an effect on the incidence and severity of disease, and 3) to initiate basic studies on virulence factors in the pathogen.

Research on bacterial canker and peach tree short life (PTSL) in the southeastern U. S. has shown that pruning peach trees in the late fall makes trees more susceptible to disease than trees pruned in late winter. The reason for this is unclear. This has never been observed under California conditions and therefore research is necessary to determine this.

English observed that French prune trees on peach rootstock were more resistant to bacterial canker than prune trees on plum rootstocks, an important observation which warrants further investigation. This research could provide incentives to examine other suitable rootstocks for their benefit in areas with severe canker problems.

## PROCEDURES

### Bacterial Canker - Field Studies

A field plot was established at the Kearney Field Station which consists of French prune on Nemaguard, Marianna 26-24 and Myro 29-C rootstocks and Andross peach on Nemaguard and Lovell rootstocks. The plot is in a randomized block design with the trees close-planted. Trees will be pruned in late fall (Dec. 1) and late winter (March 1) over several years. Selected branches will be inoculated in mid-winter (Jan. 15) each year with a virulent isolate of P. syringae and canker expansion measured in spring. This plot will tell us if time of pruning and rootstocks influence the physiological susceptibility of the trees to disease.

This experiment is in progress and we should obtain our first year's data this spring.

In cooperation with Extension personnel, we are locating orchards with a history of severe canker problems to establish plots for testing the effects of pruning time and rootstock. These areas will be identified during the winter of 1983.

### Laboratory Studies

We are exploring the use of a dormant twig assay used by other researchers to evaluate pathogen characters important for disease development. In this assay, cuttings are made from the current season's branches during the winter and then these are subjected to two temperature treatments. One of these treatments is a short, low temperature incubation which is designed to test whether the ability of P. syringae to catalyze ice-formation is necessary for symptom development. Another character, the ability to produce the toxin, syringomycin, has been implicated as an important factor for disease development. We will test strains of the bacterium that are + and - for these characters in the twig assay. If ice-nucleation is important for disease, then the results would strongly suggest that research should be directed at reducing populations of ice-nucleation active bacteria in the orchard and at cultural practices which enhance the cold-hardiness of trees during critical periods in the winter and early spring.

### Ceratocystis Canker

A questionnaire was distributed to prune farm advisors to survey the importance of Ceratocystis canker in French prune.

## RESULTS AND CONCLUSIONS

### Bacterial Canker

No conclusions or results are available at the present time since this winter is our first experimental season. We will obtain data this spring from the experimental plot at Kearney.

## Ceratocystis Canker

Of those farm advisors responding to the survey, most felt that Ceratocystis canker is a serious problem in prune orchards, but that the disease is not widespread and an insignificant problem in most orchards. The interpretation of this is that when the disease is present in an orchard, it is problematic for the grower but most of them do not have the disease. Most respondents believed that disease incidence and the amount of shaker injury has either decreased or remained unchanged during the last five years. The respondents believe that most growers do not consider Ceratocystis canker a problem in their operations.

At this time we are not planning an extensive research project on Ceratocystis canker in prune. However, research findings on this disease in almond will be applied to prune when appropriate.