

BACTERIAL CANKER

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The objectives of this project are to obtain information on the role of certain biotic and abiotic factors in the development of bacterial canker and on the basis of this information devise effective control measures. Factors currently under consideration are rootstocks, soil-borne nematodes, soil moisture, soil physical condition (use of backhoe), mycorrhizae, and temperature. Studies also are in progress to ascertain the effectiveness of pre- and postplant soil fumigation as a control for this disease. Field studies are in progress in four orchards (three counties) in the Sacramento Valley, and experiments under controlled or semicontrolled conditions are underway at Davis.

The three orchards in which a backhoe was used in conjunction with soil fumigation (either methyl bromide or Telone) continue to show tree growth significantly greater than that of trees given a standard planting. In one of the orchards, the backhoe alone provided improved growth. Although the incidence of bacterial canker was low during the past year, trees in the two orchards in which growth was stimulated by soil fumigation but not by backhoeing, still showed considerable resistance to bacterial canker. Canker was 4-6 times as severe in the controls as in the fumigation sites. In a fourth orchard, in which postplant soil fumigation with DBCP was employed, no new canker activity occurred during the past year, but tree growth in plots that were fumigated at the 5-gal/acre rate continued to exceed that of the controls. Tree losses from canker in these plots were reduced by approximately 80%. The addition of a mycorrhizal fungus to the planting site has to date had no effect on tree growth or canker susceptibility. No data have as yet been obtained on the susceptibility to canker of French prune on peach rootstock in the two orchards under test.

A laboratory test was conducted to ascertain if temperature and the canker bacterium interact to cause injury to prune buds at the bud-break stage. Significantly more buds were killed when shoots were sprayed with bacteria than with water prior to chilling to either -5 or -10C. Buds on twigs sprayed with bacteria prior to incubating at 13C did not differ from those sprayed with water. In another temperature study, inoculated dormant prune and peach shoots, chilled at -2, -6, and -10C for 24 hours prior to incubating at 15C, developed larger cankers than unchilled shoots only when chilled to -10C. This experiment is being repeated using biotypes that vary in toxin production and ice-nucleation capacity. In a lathhouse experiment with peach, the effect of the interaction of soil moisture and nematodes (Macroposthonia xenoplax) on canker development was examined. Cankers on trees in wet soil were significantly larger than those on trees in dry soil; at an intermediate soil moisture level the cankers were intermediate in size.