

## D I S E A S E S

### Influence of Dormant, Bordeaux Sprays on Incidence of Deep (Phloem) Canker - G. S. Sibbett, W. B. Moller

Trunk and limb sprays of Bordeaux (16-16-100) have been applied annually to a portion of a Hartley walnut orchard since 1963. During the 1972 season, the first incidence of Deep (phloem) Canker (4 cases) developed in the sprayed portion of the orchard. Eighteen cases of either Deep (phloem) Canker or Shallow Bark Canker have been detected in the larger, unsprayed portion for several years. In 1973, rate of spread will be determined in the sprayed portion of the orchard.

### Systemic Spread of *Erwinia rubifaciens* in Hartley Walnuts - J. M. Gardner, C. I. Kado

Earlier recommendations of using surgical removal of deep cankers to prevent further disease development have been re-examined experimentally. For this, it was necessary to construct a mutant of *E. rubifaciens* that had two genetic markers. The organism was inoculated into Hartley trees at various times of the year. Trees were cut down at various times and then sectioned. Each section was analyzed for bacteria using a medium which selected for only the mutant bacteria. Our studies show that the bacteria move as much as 9-10 feet beyond the site of inoculation. The rate of systemic translocation is about 2 feet per month during the fall. Disease symptoms are limited in comparison, so that in many cases it was possible for us to isolate *E. rubifaciens* cells from symptomless portions of the tree. We therefore believe that surgical removal will not be completely effective in eliminating bacteria from infected trees. However, surgical removal of cankered areas can still be effective in reducing bacterial populations in orchards, if done properly. We have recently isolated a toxic enzyme which is elaborated by the bacteria. We are uncertain at this time whether the enzyme is induced by environmental stresses or whether the tissues in younger sections of the tree are resistant to the action of the toxin. The enzyme has been purified and partially characterized. It primarily destroys cell walls and membranes of plant cells.