The development of a medium for the selective isolation of Xanthomonas juglandis has greatly facilitated the study of the disease cycle of walnut blight on English walnuts in California. Initially the medium was used to determine if dormant buds and catkins could serve as a site where the pathogen could overwinter. A survey of eight walnut varieties (Ashley, Eureka, Franquette, Hartley, Marchette, Paynes, Serr, and Vine) showed that dormant buds and catkins could become infested with blight bacteria. Chi-square analysis of these data indicated that the frequency of bud infestation was significantly higher than catkin infestation. The level of infestation in a given orchard generally reflected the blooming habit of the variety and the efficiency of orchard management with regard to blight control. Late varieties tended to have a lower degree of dormant tissue infestation as did early varieties in orchards intensively sprayed with coppers.

The nature of dormant bud infestation and the fate of this inoculum were investigated. X. juglandis appears well adapted for epiphytic survival. Bud infestation represents a combination of a surface population of the pathogen and an internal population of blight bacteria. This internal population may be as high as 10 times greater than the pathogen population on the surface. Within the convolutions of the bud, blight bacteria are provided moisture and protection from lethal ultra-violet light, making these tissues an excellent overwintering site.

In spring, with the resumption of growth and leaf emergence, this overwintering inoculum rapidly infects emerging leaves. In sprinkler irrigated orchards and orchards in areas where heavy dews are common, infected leaves are an extremely important source of inoculum for disease spread throughout the growing season. These infected leaves can provide inoculum for early and late season nut infections, for infection of other leaves and for infestation of developing buds and catkins. Infested buds and catkins then aid the overwinter survival of the pathogen and in this way provide inoculum for the next growing season.

With this information about the disease cycle of walnut blight, one approach to control would be to reduce the overwintering population of the pathogen with the application of copper sprays during dormancy. A field plot was established near Visalia, California, during the 1977-78 growing season to test the effectiveness of dormant period sprays. Several parameters were considered when evaluating the treatments including reduction of bud infestation (following dormant sprays), amount of nut blight at harvest and the percentage of infested buds at the end of the season. The results from this plot were encouraging but not conclusive. Dormant sprays when applied in conjunction with prebloom-bloom sprays resulted in statistically significant reductions in the number of blighted nuts at harvest when compared to the unsprayed controls. However, these sprays were not significantly better than prebloom-bloom sprays alone. When buds were analyzed at the end of the season, all treatments that included at least one dormant spray along with the prebloom-bloom sprays significantly lowered the frequency of bud infestation when compared to the unsprayed controls and the prebloom-bloom sprays alone. These results would suggest that the value of dormant sprays cannot be assessed in a single year plot since part of the benefits may lie in their ability to significantly reduce the amount of overwintering inoculum. This plot will be repeated next season to continue to evaluate the effectiveness of dormant season copper sprays for the control of walnut blight.