RESEARCH LABORATORY TECHNICAL REPORT

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Olive Knot

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Olive knot is caused by the bacteria *Pseudomonas savastanoi* pv. *savastanoi*. The bacteria produces a plant growth hormone (indoleacetic acid, IAA) which causes the olive to produce galls or knots that consist of woody olive-derived tissue. The pathogen can live inside of galls and/or as a surface epiphyte on branch and leaf tissue. Oleander is also a host of this pathogen and can be infected by a closely related strain of the same bacterial species.

Disease Cycle

Infection by the pathogen occurs at wound sites, most commonly leaf scars and pruning wounds (Figures 1 and 2). Pathogen activity peaks during rain events, when bacteria can be observed oozing from knots. Winter infections are common, but the most important infection period is during spring rains. Although olives are evergreen, leaf turnover is highest in late spring, resulting in numerous leaf scar infection sites.

Controlled research has shown that leaf scars remain susceptible to infection for 7 days while pruning wounds remain susceptible for 14 days. In Europe, the olive fly has been implicated as a disease vector; however, in North America no insect vector has been reported and the disease likely spreads via wind, rain, and fog. No published research describes the potential distance of spread.

Figure 1: Significant infection of trunk at branch

Figure 2: Infection of pruning wound

Management Recommendations

Management of olive knot involves the following three strategies: sanitation pruning, chemical protection against new infection, and chemical management of existing knots.

Sanitation pruning

Pruning to remove existing knots will reduce but not eliminate inoculum for future infections. Pruning should occur *during hot and dry weather* when the

bacteria is dormant and infection of wounds is highly unlikely. In addition, the need for tool sterilization is reduced during pathogen dormancy, but tools should be sterilized between trees using a 10% bleach or 25% Pine-Sol® solution. For large jobs, efficiency can be increased by using multiple saws or pruners and letting one set soak while the other is in use.

Chemical protection

Copper-based bactericides are well known to control a wide range of bacterial disease. Research has shown that in laboratory and field studies, applications of copper reduces olive knot incidence and is most effective when applied in fall (post-harvest) and in the spring during wet weather and leaf abscission. In research on olive knot management, Dr. B. L. Teviotdale and colleagues with the University of California concluded "one post-harvest application of copper bactericide provides only minimal protection against olive knot, and that additional sprays in spring are needed to substantially improve disease control" (1). In addition, Dr. J. E. Adaskaveg at U.C. Riverside found through field experiments that copper treatments (Kocide® in graph below) were most effective in reducing disease compared to other options (2).

Chemical treatment of existing knots

Treatment of existing knots that cannot be pruned out due to location on major branches or trunks is possible, however little research exists regarding this treatment. A plant-metabolite based product (Gallex®) has been reported as effective against olive knot and crown gall, another bacterial gall disease. This product must be 'painted' on existing galls, and has been shown to dramatically reduce or eliminate viable bacteria from treated galls. This treatment will not eliminate epiphytic bacteria (living outside of galls) and is secondary to copper treatments.

1) Teviotdale, B.L., and Krueger, W.H. 2004. Effects of timing of copper sprays, defoliation, rainfall, and inoculum concentration on incidence of olive knot disease. Plant Disease 88:131-135

2) Adaskaveg, J.E., et al. 2012. Epidemiology and management of olive knot caused by *Pseudomonas savastanoi*. In: California Olive Committee Final and Interim Research Reports, Feb. 2012. Pp. 66-75.

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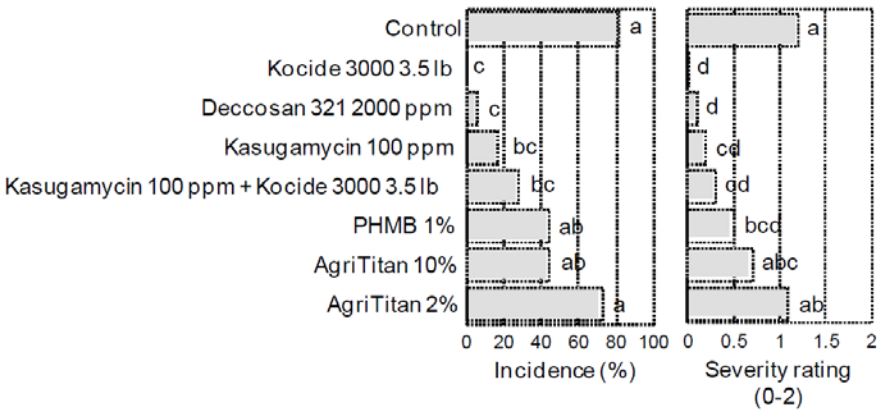
Fig. 8. Evaluation of selected treatments for the control of olive knot in field studies



In October 2011, lateral twig wounds of olive trees were inoculated with *P. syringae* pv. *savastanoi* (10^7 cfu/ml), treated with selected bactericides and sanitizers using a hand sprayer, and covered with Parafilm. A preliminary evaluation for was done in early January of 2012.