

Particle films for organic or conventional prevention of Asian citrus psyllid

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Year 2 of 2 (90% Complete)

Objectives

1. Compare Asian citrus psyllid populations under kaolin treated and untreated conditions
2. Compare citrus growth and yield under kaolin treated and untreated conditions

Problem and Significance

Because of the high cost incurred by the risk of huanglongbing (HLB) infection, citrus growers need improved methods of reducing Asian citrus psyllid (ACP) populations. Organic growers in particular have few options for ACP management. Particle films offer the potential of both preventing ACP arrivals on plants and enhancing growth and yield. Standard white-colored kaolin particle films are approved for organic production. Experiments with red-dyed particle films have further reduced ACP and delayed HLB infection in Florida. This project aims to assess these practices in the cultivars and conditions of California.

Benefit to Industry

This project will benefit industry by developing knowledge of the efficacy of white and red-dyed kaolin particle films to prevent ACP arrivals. We expect this knowledge to be immediately utilizable by growers to enhance ACP management.

Progress Summary

We have worked with willing citrus growers, establishing replicated large-scale field trials in their groves. We designed our data collection to take advantage of the large plot: we collect ACP data at various points along a transect of the plots. This will allow us to assess questions of edge effects. If the edge effect is strong, it may not be necessary for growers to treat entire groves. This design will assess that question. We will be assessing ACP by visual estimation, assessing nymph populations on new flushes, and by tap counts. These assessments are scheduled at 2-week intervals from May-November, the season in which ACP populations are expected to be highest. We will assess growth by measuring changes in trunk cross-sectional area at 6-month intervals, and yield will be assessed in bearing trees by crop load estimation and subsampling.

After the colorant used to dye kaolin red failed to receive approval for organic production, we are experimenting with colorants that are compatible, assessing their impact on reflectance and adhesion. Our studies were initiated in four groves in May 2020 (Figure 1). These groves were two groves of non-bearing lemon in Ventura Co., one grove of bearing lemons in Riverside Co., and one grove of bearing navel oranges in Riverside Co. The Navel grove dropped out of the trial in July, and we continue with the three remaining lemon groves.



Figure 1 Aerial photograph of white and pink (red-dyed) kaolin particle film treatments on first year lemon planting in Ventura Co. CA.

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2020-2021 Annual Report

Initial growth measurements were performed before treatments began, as were ACP population assessments, and were gathered every 6 months thereafter. Initial results suggest that the treatments are impacting growth of canopy volume, but results are not yet consistent, with the best treatments in Orchard Farm (Riverside) being pink, which was significantly lower than white at the Limco site (Figure 2).

Initial results indicate that kaolin treatments strongly reduce ACP population (Figures 3 and 4), but that as new flushes emerge the pink color effect lasts longer than the white (Figure 3). These results indicate that particle films strongly reduce Asian citrus psyllid and may have positive impacts on tree growth, and are consistent with results obtained in other projects in Florida.

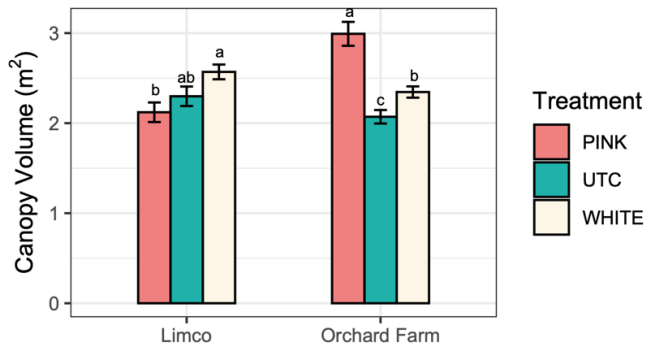


Figure 2. Growth in canopy volume of trees treated with with no ACP prevention (UTC), red-dyed kaolin (Pink), or naturally white kaolin (White) particle films.

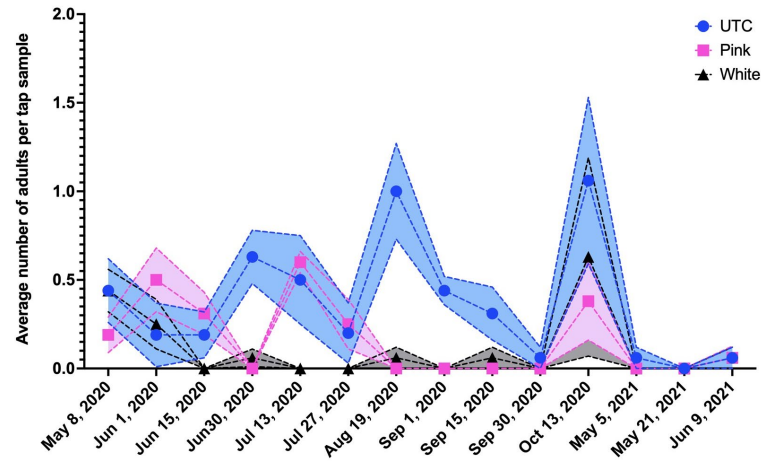


Figure 3. Average number of adult Asian citrus psyllids (ACP) per set of 20 taps in bearing age lemons in Riverside Co. California in 2020-2021, when treated with no ACP prevention (UTC), red-dyed kaolin (Pink), or naturally white kaolin (White) particle films.

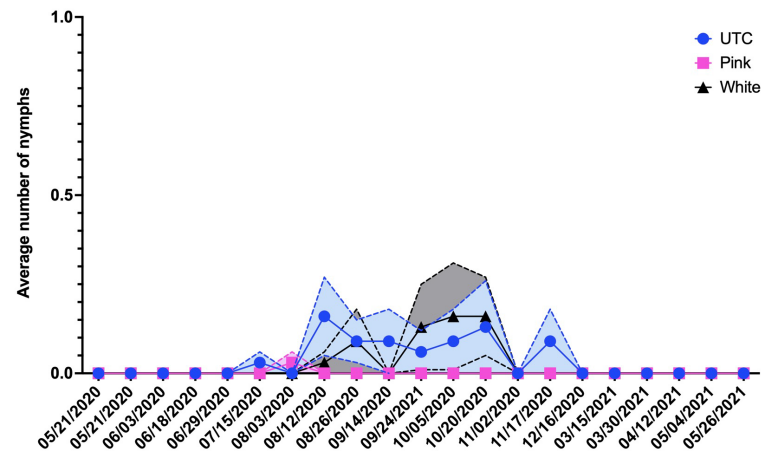


Figure 4. Average number of nymphs Asian citrus psyllids (ACP) per set of 20 taps in non-bearing age lemons in Ventura Co. California in 2020-2021, when treated with no ACP prevention (UTC), red-dyed kaolin (Pink), or naturally white kaolin (White) particle films.

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