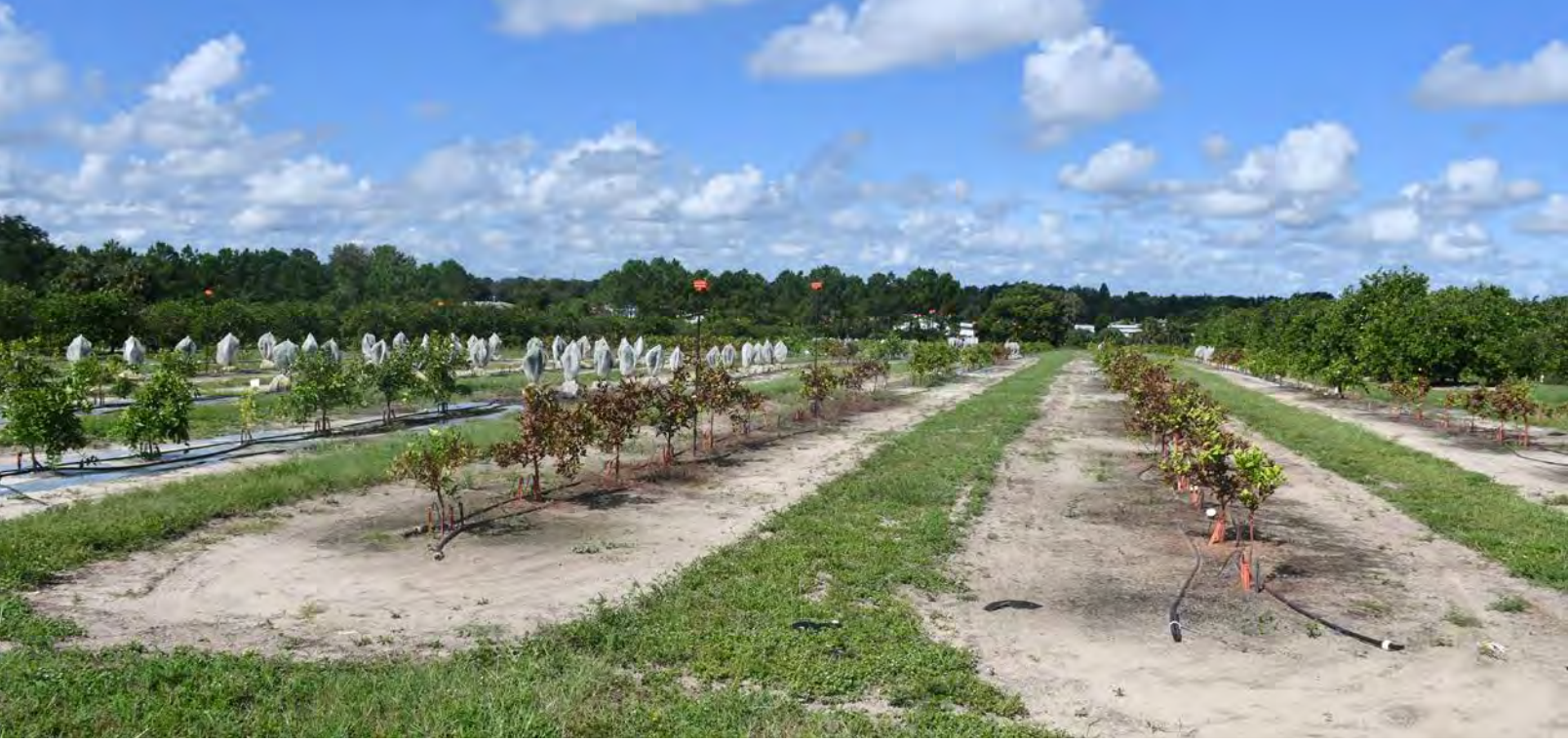

A trial at the Citrus Research and Education Center is evaluating the use of individual protective covers, red-dyed kaolin clay, metalized reflective mulch and insecticide applications.

Comparison of ACP/HLB management tools for citrus resets

By Lauren Diepenbrock, Megan Dewdney, Christopher Vincent and Davie Kadyampakeni

As the threat of potential shutdowns loomed in March 2020, a University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) team put the final plants in the ground, individual protective covers (IPCs) on trees, and kaolin and pesticide applications on a 2.7-acre planting at the Citrus Research and Education Center. Despite minor delays from the university's research pause, the project now includes data for over a year and a half regarding problematic insects, mites and pathogens; irrigation and fertigation needs; and plant growth parameters related to implementing each tool. Specifically, this project compares each of these parameters across treatments with IPCs, red-dyed kaolin clay, metalized reflective mulch without regular insecticide application, metalized reflective mulch with monthly insecticide application, and monthly insecticide applications.

INSECTS AND MITES

Each treatment initially aims to reduce the likelihood of Asian citrus psyllid (ACP) infestation to minimize huanglongbing (HLB) infection risk. All treatments displayed low to no ACP infestation in the first year of the trial. However, sampling and insecticide treatments were delayed by several months due to the research pause.

By the spring of 2021, infestation levels were low in reflective mulch, kaolin and control plots. While this is promising for reducing the impacts of ACP, citrus leafminers (CLM) became highly problematic in all plots with exposed flush and soft leaves. CLM infestation was prevalent in the summer of 2020, likely due to delays in the spray program. CLM pressure was far less in all treatments in the spring and summer of 2021 and absent in IPC treatments.

Additionally, spider and rust mites reached high levels of infestation during drier periods in plots with IPCs, kaolin and reflective mulch without monthly insecticide applications. This suggests that a miticide application should be applied during these dry periods to reduce the potential for defoliation.

In the fall of 2021, lebbeck mealybug was found in several IPC-covered trees and has since spread into neighboring plots, triggering

additional insecticidal inputs in all plots to protect developing trees.

PATHOGENS

There were no visual symptoms of HLB in the first year of the trial. In the second year, symptoms were prevalent in the monthly insecticide application treatments; fewer were observed in the reflective mulch treatments and the IPCs. These results need to be confirmed by ongoing PCR testing.

Greasy spot affected nearly all the trees in the trial beginning in fall of 2020 regardless of treatment but was less severe when rated in January 2021.

Canker became a chronic problem on most trees in the plots with the rainy season in July 2020. The one exception was the IPC treatment, where fewer trees were affected. Canker severity on leaves was high in 2020 but was significantly reduced with treatments of Blockade, the plant defense stimulator, and regular copper applications. Canker severity was lowest in the IPCs and highest in the monthly insecticide applications and reflective mulch treatments. The kaolin treatment had an intermediate canker severity.

No sooty mold was observed in 2020 but was observed in the IPCs in 2021.

Phytophthora levels were surprisingly high in the first year for unknown reasons but fell to expected levels in the second year. The one exception was the reflective mulch with insecticide treatment, which also had higher than average root growth, allowing more phytophthora to survive.

PLANT GROWTH

The greatest growth was in the reflective mulch treatment, but with some caveats. Reflective mulch was the only treatment for which trunk girth was greater than the control. Red kaolin application led to trunk girth between the control trees and the reflective mulch.

Root growth under the reflective mulch was also much greater than in trees with the other treatments. This growth was primarily directly adjacent to the trunk. At about 2.5 feet from the trunk, the root density under the mulch drops off dramatically. If this pattern continues, it could lead to structural vulnerability in high winds.

Root and trunk growth of trees under IPCs or red kaolin has not yet separated from the controls.

IRRIGATION AND FERTIGATION NEEDS

In the first 18 months of the project, the research team observed elevated water content in the irrigated root zone of the reflective mulch, but the treatments without mulch that used IPCs, kaolin clay or insecticide were comparable. Past research has shown that with the mulch, evaporation losses of water are reduced by up to 40%, resulting in greater water retention in the root zone. Differences in the root zone or leaf nutrient contents between treatments were not seen but will continue to be monitored in the next few months as trees get older and treatment differences become more apparent.

CONTINUING PROGRESS

The initial two years of funding for this project were obtained through the Huanglongbing Multiagency Coordination program. This enabled the UF/IFAS team to get plantings in the ground and establish the baseline data needed to support grower interest in using these tools to support healthy resets.

This project will continue for an additional two years with funding recently obtained from the Specialty Crop Research Initiative's Emergency Citrus Disease Research and Extension program. In the coming years, UF/IFAS will have research-backed recommendations for the incorporation of reflective mulch, red-dyed kaolin and IPCs in commercial plantings. Additionally, this new funding supports similar research for residential citrus plantings in hopes of reducing the reservoir of HLB and its psyllid vector in residential plantings while bringing back the joy of having citrus in home landscapes.

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