

## Time line of experiment

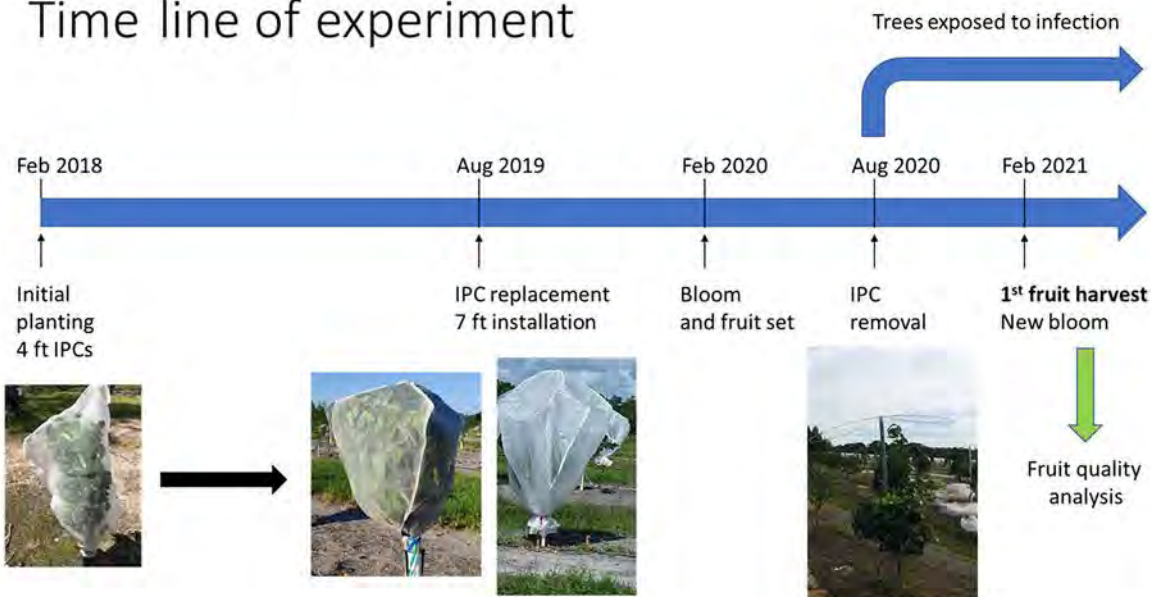


Figure 1. Time line of the individual protective covers experiment at the Southwest Florida Research and Education Center

# IPCs improve fruit yield and quality

By Fernando Alferez, Ute Albrecht, Susmita Gaire, Ozgur Batuman, Jawwad Qureshi and Mongi Zekri

University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) researchers established a field trial in February 2018 to evaluate the efficacy of individual protective covers (IPCs) to prevent Asian citrus psyllids from spreading HLB and to study the effects on tree growth and physiology.

The trial was planted at the UF/IFAS Southwest Florida Research and Education Center (SWFREC) research farm in Immokalee. It consists of 90 Valencia orange trees on Cleopatra rootstock arranged in a completely randomized design. Trees were either not covered or covered with 4-foot-tall IPCs immediately upon planting. The 4-foot IPCs were replaced by 7-foot IPCs in August 2019 after 18 months to allow more space for the canopy to expand. These larger covers were removed in August 2020 when the canopy had filled the new space.

Researchers started to monitor the progression of HLB and fruit set in these now exposed trees after IPC removal and compared yield and fruit quality with the control trees that had not been covered since the beginning of the study. A time line of the study is depicted in Figure 1.

## HLB INCIDENCE

Results show that under high psyllid pressure, 80% of the trees not protected with IPCs became infected with *Candidatus Liberibacter asiaticus* (CLAs) by six months after planting. All uncovered trees were infected by one year after planting.

In contrast, trees that were covered with IPCs remained CLAs-free. After IPC removal, trees started to become infected after a delay of two months (Figure 2, page 10). An explanation for this delay could be variability in psyllid populations and general plant health, making trees better able to tolerate HLB. Also, it takes time for the inoculum and symptoms to develop.

## REMARKABLE RESULTS

More than 50% of the trees that had been covered for the first 30 months of the study and were then uncovered, were positive for CLAs by the time of harvest (6 months after uncovering). The first harvest took place in early February 2021.

There were remarkable differences in both yield and fruit quality between the covered and uncovered trees. Trees that had never been covered lost 60% of the crop due to preharvest fruit drop. No fruit drop

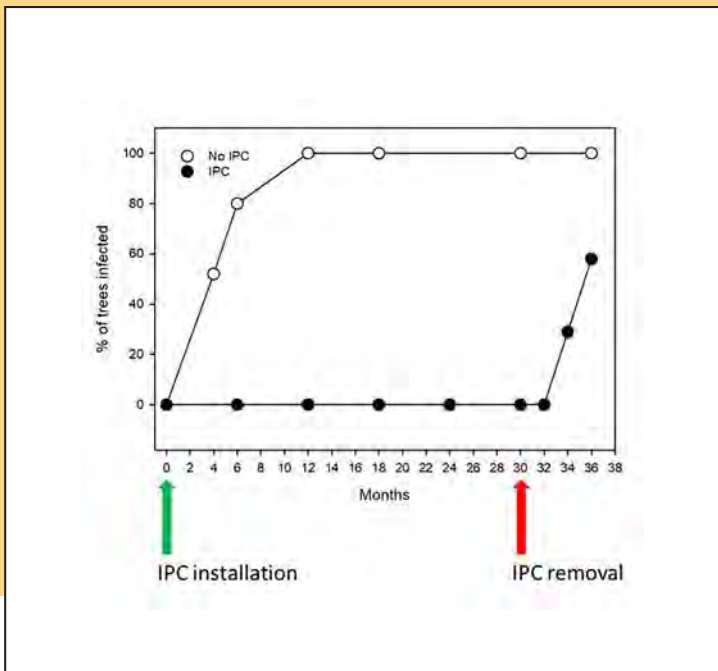


Figure 2. HLB progression was monitored for trees with and without individual protective covers. Non-covered trees had 80% infection by six months, while covered trees had no infection at all for 30 months. Once covers were removed, infection progressed. Parallel lines (same slope) show that the infection progressed at the same rate, although there was a two-month delay in detection after the IPC trees were uncovered.

was seen in the trees that had been covered by the IPCs for 30 months.

Most importantly, the internal quality greatly improved, and the total soluble solids content was significantly higher. Fruit from IPC trees had 10.9 degrees Brix as compared to 7.5 degrees Brix in non-covered trees. These results are remarkable, given that these were still very young trees entering their bearing age, the harvest was in early February and the Food and Drug Administration requirement for degrees Brix for pasteurized, not-from-concentrate orange juice was 10.5.

Although the funding for this project has ended, researchers will try to collect yield and fruit-quality data in the upcoming season to provide growers with important information regarding the beneficial effects of IPCs on fruit production and internal quality in the longer term.

### SUSTAINING TREE HEALTH

Since Florida citrus trees will continue to grow in an environment with high disease pressure, it is critical to sustain tree health once the IPCs have been removed in order to ensure

several years of high-yield, high-quality fruit. This also might help growers recoup their initial investments in IPCs.

One way to ensure tree health after IPC removal is with a relatively new plant growth regulator, homobrassinolide (HBr). Very promising HBr results already show a delay of HLB incidence in newly planted, non-covered trees. There is strong potential for a strategy that combines the use of IPCs and HBr to prolong the health of fruit-bearing trees and increase yield and fruit-quality. Both components of this combined strategy are available for growers now. Additional research on this combined IPC/HBr system would produce reliable, replicated results and provide a ready-to-adopt management strategy in a short time to help increase revenue and ensure the survival of the industry. 🍊

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