



Photo by Jawwad Qureshi

Figure 1. Adult Asian citrus psyllid

# Dormant sprays for Asian citrus psyllid management

By Jawwad Qureshi

Several studies have documented the positive effects of controlling the Asian citrus psyllid (ACP, Figure 1) for citrus tree health and sustainability in Florida. The mature blocks established before and after the discovery of huanglongbing (HLB) in 2005 continue to benefit from psyllid control.

One psyllid is enough to infect a tree with HLB for life, and repeated infestations negatively affect tree health and contribute to the spread of the disease. Therefore, psyllid control continues to be a necessity for successful citrus production. An efficient pest management program should consider psyllid biology, tree phenology, application timing and method, and chemical effectiveness.

## ACP LIFE CYCLE

ACPs go through three distinct life stages: egg, nymph and adult.

Females lay eggs in buds and unopened leaves of young shoots. Eggs are small and almond shaped with a pale yellow to orange color.

Upon emergence, nymphs feed on the soft tissues of new leaves and shoots and develop through five instars. They are generally light yellow with orange or blue-green coloration on the abdomen and have dark red eyes. They produce white secretions of wax called honeydew. The secretions are easy to observe when hanging from the rear ends of the nymphs or on the leaf surface. The secretions later cause sooty mold.

The mature nymph transforms into an adult with mottled wings held

“roof-like” over the body. The adult abdomen stays at an angle of 30 to 45 degrees with the plant surface. It takes about two to three weeks from egg to the development of the adult, depending on the temperature.

## SEARCHING FOR PSYLLIDS

The best place to look for the adults and their progeny is the newly developing buds and young shoots (known as flush). Adults are found aggregated on the young shoots where they feed, mate and reproduce. They also feed and survive on mature growth, generally feeding on the underside of the leaves.

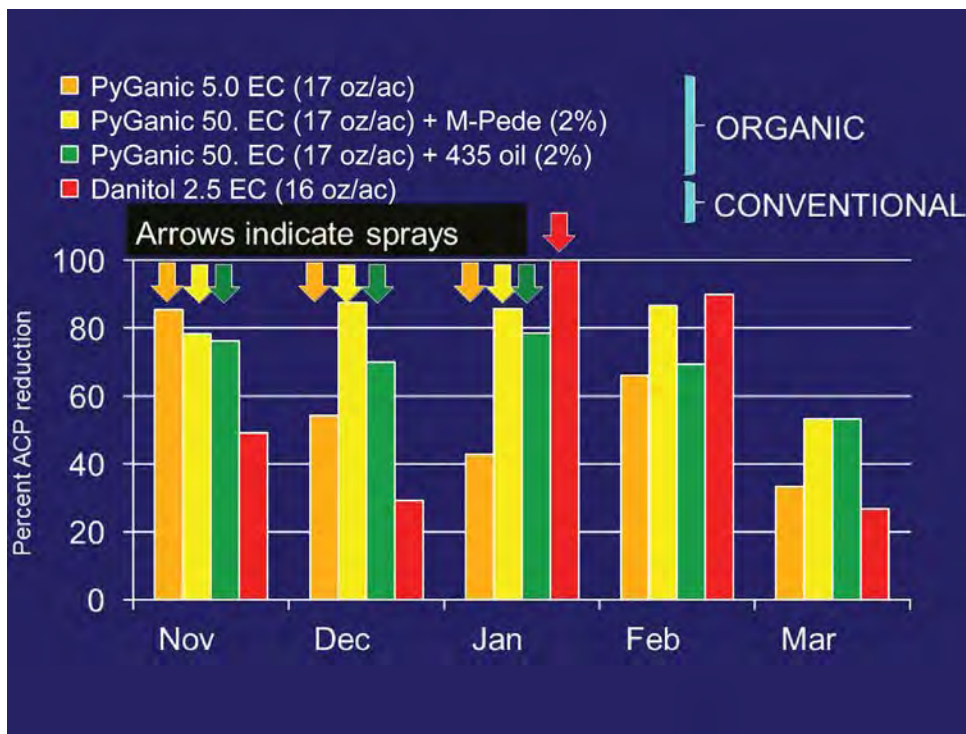
The mature nymphs and adults are easy to see with the naked eye. However, a magnifying hand lens helps to look inside the smallest feather flush for eggs or young nymphs.

Adult psyllids also can be monitored by the tap-sampling method. A tap sample is conducted by placing an 8- by 11-inch laminated white sheet of paper or a clipboard under a branch, which is tapped three times with a short length of PVC pipe. Psyllids and beneficial insects such as ladybeetles, spiders and lacewings are counted as they fall onto the paper. One hundred such tap samples in a block should be sufficient to obtain an estimate of the population to make a spray decision. The spray may not be needed if the average numbers are below 0.2 ACP per tap sample, which indicates that populations are low. Complete eradication of psyllids from blocks is ideal but hard to achieve, even with some harsh insecticides.

## SEASONALITY AND SPREAD

HLB disease has caused several imbalances in citrus plant functions, including irregularities in the shoot production cycles. Still, most mature trees in Florida produce most flush in the spring followed by sporadic flushes in summer and fall. These events provide the best opportunities for ACP adults to reproduce and spread HLB.

It is important to understand that ACP females have a very high reproductive rate with the potential to lay more than 700 eggs in a lifetime when the environmental conditions are optimal, and flushes are available. Even one-third of this number at a 1:1 sex ratio suggests a tremendous increase



**Figure 2.** Asian citrus psyllid (ACP) adults were reduced with dormant spray applications in organic and conventional programs. Organic programs (orange, yellow and green columns) included three dormant sprays in November, December and January. The conventional program (red column) received only one spray (Danitol®) in January. Organic programs included sprays of PyGanic alone or tank-mixed with M-Pede or HMO FL 435-66.

in ACP populations and the need for effective control.

Citrus tree growth slows during cold or dry weather, limiting the psyllid's ability to develop and reproduce. However, overwintering adults remain in the trees and start laying eggs when suitable tissues become available in the spring and the following flush cycles.

## SELECTING DORMANT SPRAYS

Insecticidal sprays applied during winter before bud break are commonly known as dormant sprays. The objective is to maximize psyllid suppression, protect the spring flush and reduce subsequent reproduction during the growing season.

Winter is the best time to spray for ACP for several reasons. Flush production is limited, and as a result so is ACP reproduction. Adult populations are at their minimum with the fewest eggs and nymphs. Tree canopies are thin compared with the growing season, which improves spray penetration, both by ground and overhead aerial sprays.

Broad-spectrum pyrethroids and organophosphates (OPs) may be used to target overwintering populations of psyllids. The collateral damage expected from such chemicals is less because many beneficial organisms are scarce due to the lack of prey.

University of Florida Institute of

Food and Agricultural Sciences (UF/IFAS) researchers tested applications of one to two dormant sprays before spring growth. A significant reduction of psyllid populations was observed during the growing season lasting past spring. The use of selective insecticides during the growing season helps improve the abundance of beneficial organisms such as ladybeetles, lacewings and spiders that attack several pests, including psyllids, leafminers, mealybugs, aphids, mites, etc.

Pyrethroids and OPs may be used again during the growing season to spray the border or perimeter of the blocks where psyllids tend to congregate more if needed. The number of dormant sprays can be determined based on the situation, but at least two dormant sprays provide a good start into the growing season.

In large-scale field studies conducted over several years, UF/IFAS researchers observed overwintering populations of ACP between November and January in the conventional and organic programs and, therefore, the need for suppression (Figure 2). It is better to repeat a dormant spray between November and January if it rains or a foliar flush occurs.

Researchers also tested monthly applications of natural pyrethrin (PyGanic) mixed with horticultural mineral oil (435 oil) or insecticidal

soap between November and January. This provided significant suppression of overwintering psyllid populations. These treatments offer tools for commercial citrus producers and those in other environments where conventional products may not be appropriate.

Flush is attractive to several pests and beneficial organisms common during the growing season. Therefore, choosing insecticides less damaging to beneficial organisms is important. There are many options for rotating the insecticide mode of action and products that control ACP and other pests during the growing season (see the 2020-2021 Florida Citrus Pest Management Guide).

In addition, researchers have seen psyllid suppression with 435 oil (2 percent v/v) by itself, suggesting its rotational use with insecticides. However, its effects are short-lived and less when compared to most insecticides.

In conclusion, controlling ACP in mature blocks during the winter and the rest of the year is important in reducing the incidence of HLB in those blocks and the spread of ACP and HLB to new plantings that are more vulnerable. 🍊

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