Monitoring methods for Asian citrus psyllid

By Phil Stansly, Alejandro Arevalo and Jawwad Qureshi

Regular scouting of pest populations is the cornerstone of any good IPM program. Without scouting, the grower is shooting in the dark when it comes to controlling pests effectively, economically and without unnecessary collateral damage to beneficial insects and mites. This is true even without the benefit of a firm economic threshold, which unfortunately we still don't have for Asian citrus psyllid (ACP), due to its role as a vector of citrus greening disease or huanglongbing (HLB).

Of course, growers would rather control the pest to zero and avoid any threat of HLB, but unfortunately this is not a realistic goal. The next best thing is to optimize control practices, and to do this, we need to track what the pest population is doing over time. Therefore, a reliable and efficient scouting method that generates recordable data is a must.

ADULT PSYLLIDS

Adults spread greening and are the usual target of insecticide sprays. Eggs and nymphs are hidden in new flush and hard to control. Also, immature stages are the target of the natural enemies; therefore chemical applications on flush will harm beneficials. However, adults can be effectively controlled when there is little or no flush and fewer beneficials attracted to immature psyllids and other prey. A number of methods have been used to sample adult ACP. Here are some pros and cons of each.

Tap sample: This method was developed for studies on ACP in 2006 and later adapted for routine monitoring. All that is necessary is a laminated sheet of letter-size paper or a smooth white surface such as a clipboard, and a 1-foot piece of one-half-inch or three-quarter-inch PVC pipe. The sheet or board is placed about 1 foot below a leafy branch, which is struck three times with the pipe. The number of psyllids falling onto the sheet are counted and recorded. The slippery sheet surface impedes the psyllids to take flight, but some may fly off before they can be counted if numbers are high.

This method works with dry or wet foliage and has proved to be reliable and consistent for commercial scouting and research purposes. Beneficial insects like ladybeetles, spiders and lacewings can also be counted as can other pests such as root weevils and leafminer adults. It is recommended that 10 tap samples be taken at each of 10 locations per block — five around the borders where psyllids tend to congregate and five in the interior of the block.

An example of the sheet used by the SWFREC with instructions and pictures of the most common pests and beneficials encountered using this method can be found online at http://swfrec.ifas.ufl.edu/entlab

Sticky traps: Sticky traps are used to monitor flying adult ACP. Yellow or yellow-green sticky traps have been used to monitor field populations of this insect. These traps have similar efficiency when compared to tap sample. However, sticky traps are expensive (approximately $1 per trap), and the results will be delayed for one or two weeks depending on how long the traps are left out before being read. This means that by the time the traps are ready to be collected, a new generation of ACP may have already emerged. The time it takes to hang, collect and read a single trap under a magnifying lens is about seven minutes — 14 times more than the tap sample and at a much greater cost.

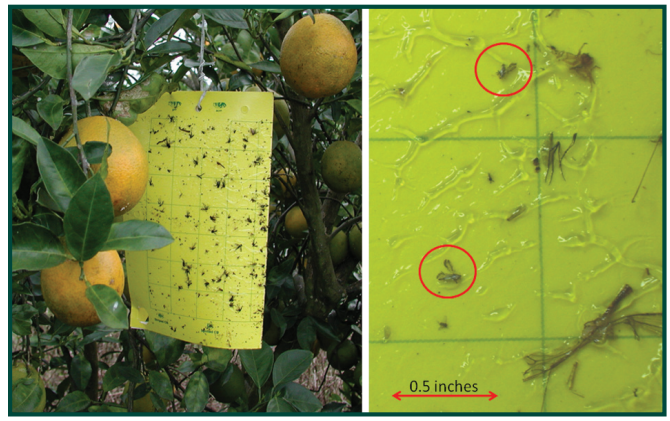

Figure 2. *Sticky card hanging in tree (left) and appearance of captured psyllids (right)*

Sweep nets: A strong 15-inch diameter sweep net is swung in a 180° arc so that the net rim strikes well into the canopy. After a few sweeps, the number of psyllids captured inside the net are counted and recorded. In a recent study comparing the sweep net with the tap sample, there were no differences in the number of psyllids captured per sample at high densities, although at low densities, more psyllids were counted per tap than per sweep. However, sweeping knocks off fruit, tree trash, ants, etc. that make it hard to count psyllids. Also, the net is heavy, especially when wet, and could easily spread canker if the disease was present in the grove.

Figure 1. *Taking a sample (left) and appearance of psyllids on white clipboard (right)*

Figure 3. *Use of the sweep net (left) and net with debris and ants (right)*

Figure 4. *Citrus flush infested with green citrus aphids (left) and Asian citrus psyllids (right)*

IMMATURE PSYLLIDS

Nymphs and eggs are found only on young flush and must be sampled by direct observation. Actually counting psyllid nymphs in the field is next to impossible, but the number of psyllids per shoot is correlated with percentage of shoots infested. Therefore, all we need to determine for each shoot examined is whether psyllid eggs or nymphs are present. Ten shoots are checked at each stop at the same 10 locations per block used for the tap sample. Psyllid nymphs are orange in color and secrete a white wax. They can be easily distinguished from aphids that may be green, brown or black and have no eggs. Psyllid feeding causes the flush to twist while green aphids cause it to curl. Aphids may be considered beneficial as they attract ladybeetles, lacewings and other predaceous insects that also eat psyllids.

Percentage of shoots infested is not really useful unless we also know how much flush is on the tree, so we also need a measure of shoot density. We get this by keeping track of the number of trees needed to locate 10 new shoots at each stop or how many trees are searched, not to exceed 20 trees if 10 shoots cannot be found.

SAMPLING ADOPTION BY GROWERS

A survey of southwest Florida citrus managers was led last summer by Mongi Zekri of Hendry County Extension. Of 27 respondents representing 106,148 acres of commercial citrus groves (80 percent of the total acreage), 96 percent monitored ACP with 95 percent using the tap method, 76 percent shoot examination, 14 percent sticky traps and 9 percent sweep nets. Unfortunately, most respondents did not monitor systematically or record data, and therefore lost the advantage of maintaining an historical record of psyllid populations in their groves.

Using the tap sample and flush inspections as described above, it is possible for an ATV-mounted individual to sample and record results from 10 trees at 10 locations in any size block in less than one-and-a-half hours. At a cost of $25 labor plus vehicle amortization, a 50-acre block could be monitored 40 times for the cost of a single spray at $20/acre. This is considerably more monitoring than the recommended every two weeks during the growing season from March through October. Thus, scouting does make dollars as well as sense!

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