



Figure 1. Place the clipboard about one foot below a branch, which is then struck three times.

Why, when and how to monitor and manage Asian citrus psyllid

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Asian citrus psyllid is responsible for the spread of citrus greening or huanglongbing (HLB), a devastating disease of citrus. Monitoring the vector is a key component of successful pest and disease management. Effective psyllid management requires a rapid, easy to use, and reliable method of evaluating the pest population.

The adult psyllid is the prime control target because it is directly responsible for the spread of the greening pathogen from diseased trees. The adult phase is also the most exposed psyllid life stage and thus easiest to



Figure 2. Psyllid adults have pointed abdomens when seen from above and a typical 45° stance from the side. Other pests that may be seen are root weevils (pictured is the Sri Lanka weevil) and tiny leafminer adults, top right two photos. Beneficials may include ladybug larvae and adults, trash bugs (ant lions) and spiders.

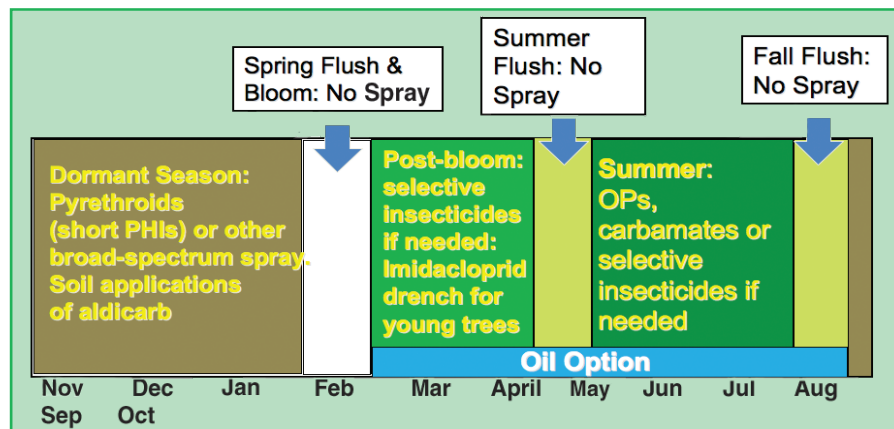


Figure 3. Psyllid management plan for Florida citrus:

- Monitor populations year-round — “Tap” sample for adults; flush infestation and density.
- Apply one or more broad spectrum sprays in winter.
- Avoid spraying on flushes.
- Post-bloom, use only soft chemistry if needed. Apply imidacloprid to young trees as a drench.
- A program of frequent oil applications is an option throughout the growing season.
- Use organo-phosphates or more selective chemistry prior to fall flush if necessary.

control. Therefore, a reliable method of monitoring adult populations, independent of tree age and growth stage, is the basis of a good management plan. Data on flush density, infestation rates and populations of key beneficial insects is also useful.

Here we describe an easy and rapid method of obtaining the information needed to make rational psyllid management decisions. All you need in the field is a clipboard and a good set of eyes, although a hand lens will also be helpful.

WHEN TO MONITOR

It is important to monitor psyllids year-round, although frequency may change depending on flushing patterns and management considerations. Once a month is usually sufficient for mature trees, especially in winter. However, the post-bloom period is especially critical, so monitor closely then. Young, vigorously growing trees may require scouting as often as once a week, although once every two weeks would be the norm. However, sprays are best applied before trees flush, so psyllids should be closely monitored prior to anticipated flushes. Follow-up counts after insecticide applications are also important to evaluate control.

HOW TO MONITOR

The “tap” sample is a rapid and reliable way to assess adult populations, regardless of whether flush is present or not. We like to use a clear or white plastic clipboard, held face down if trees are wet, about one foot below any branch with a good amount of foliage. The branch is struck sharply three times with the hand or stick (Figure 1). Do one tap sample per tree. Psyllids and other insects falling onto the clipboard are quickly noted.

Psyllid adults are easily recognized by wing markings, body shape with pointed abdomen when seen from above, and characteristic 45° stance (Figure 2). They may fly quickly, but usually stay on board long enough to be counted. Note the number of adult psyllids counted in 10 tap samples from 10 different trees. Other insects of interest that can be observed during tap sampling include pests such as root weevils and leafminer adults, and beneficials such as spiders, lady-beetle adults and larvae, and ant lions.

Next we evaluate the density of flush and the percentage of shoots that are infested with psyllids. Search along one side of the trees until 10 young shoots are found. If 10 shoots cannot be found, record the number seen in 20 trees. Don't count shoots that are already expanded, but only those with new leaves emerging from the bud where psyllids are likely to lay eggs. Examine these shoots, preferably with a hand lens, and determine whether any stage of psyllid is present — egg, nymph or adult.

Note three numbers: (1) shoots observed, (2) shoots infested, and (3) number of trees searched to find these shoots. The number of infested shoots per tree can be calculated by dividing the number of infested shoots found by the number of trees searched. The number of infested shoots per tree is another useful guide for determining when and what to spray.

This completes the procedure for one stop. Normally, you are done in five to 10 minutes and ready to move on to the next stop. Ten stops per block, 10 trees per stop for a total of 100 taps, are adequate to provide a good picture of the psyllid population under most conditions. It is a good idea to make half of these stops around the edges of the block where psyllids often accumulate. Note locations so that hot spots can be identified and treated accordingly. Input the data on a spreadsheet to create a historical record for each block. Forms, data sheets and more information can be found at <http://swfrec.ifas.ufl.edu/entlab/programs/index.htm>.

HOW MANY IS TOO MANY?

One psyllid is too many to be sure, but eradication is an unrealistic goal once the pest has become established. First and foremost, maintaining a viable operation is necessary. Management programs should be directed toward extending the productive life of citrus trees by slowing the spread of greening and maintaining all pests below economic thresholds. Unfortunately, no threshold has yet been determined for psyllids, so we can only watch population trends and treat when numbers of adults are on the upswing. Three or fewer adults per 100 tap samples are often seen during the winter and late summer. Significant departures from winter

norms could justify an insecticide application.

WHEN TO TREAT

Soil applied imidacloprid should be used for protecting young trees to the extent permitted on the label. Late spring is the best time for this, followed by fall and winter if possible. A foliar insecticide application is highly recommended for all trees at least once during the dormant (winter) season to kill adults before they can enter the spring flush. Often we do not see significant reinfestation for up to five months. Sprays during the rest of the year should be applied when necessary as determined by adult psyllid counts and before anticipated flushes (Figure 3). Sprays on flushes are generally ineffective and harmful to beneficial insects, but cannot always be avoided in young blocks.

CHOICE OF INSECTICIDE

Broad-spectrum insecticides are most effective against adult psyllids and can be applied by air. However, they are also the most harmful to beneficial insects. Therefore, harsh sprays should be used only when they do most good and least harm. Pyrethroids are often used in winter for their short (one-day) pre-harvest intervals. A selective insecticide such as spinetoram is a better choice for a post-bloom application if necessary, but should be applied by standard ground equipment.

Oil can be used any time, but must be applied as often as every two weeks to be effective. The organo-phosphates (chlorpyrifos, phosmet) and carbamates (carbaryl, oxymyl) can be used later in the growing season if warranted by scouting. More selective options would include abamectin, diflubenzuron or spirotetramat, all with oil. Naturally, classes of insecticides should be rotated to avoid selection for resistance. Consult the Florida Citrus Pest Management Guide publication SP043 at <http://edis.ifas.ufl.edu> for more information on recommended insecticides.

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