Managing secondary and occasional citrus pests in Florida while battling Asian citrus psyllid

By Phil Stansly

PEST STATUS

Like many other things in life, pests are often ranked in order of importance. Key pests are often defined as those that consistently cause economic damage on a regular basis. Occasional pests cause serious damage from time to time, often in response to environment conditions or management practices. Secondary pests could be considered as a special case of the latter, occurring in response to actions taken to control a key pest.

No one would dispute the present eminence of the Asian citrus psyllid, (ACP) *Diaphorina citri*, as a key pest in Florida citrus, due primarily to its role as a vector of huanglongbing (HLB) or citrus greening disease. As far as we know, this invasive pest has only been with us since 1998 and the disease since 2005. The pre-eminence of ACP has relegated some citrus pests to lower status while others became minor pests, thanks to a gradual buildup of their natural enemies.

Talk to some of the old-timers and they'll tell you of scale wars that raged in the 1960s and 1970s, brought to a halt by biological control mainly through the action of species-specific parasitic wasps. Citrus rust mite had a long run as a key pest, at least for fresh fruit growers. *Diaprepes* weevils were once the scourge that some thought would end citrus production in Florida. Brown citrus aphid spread citrus tristeza virus and took out most trees on sour orange. Citrus leafminer exploded in Florida following rapid invasion of the state in the mid-1990s.

SECONDARY PEST OUTBREAKS

Secondary pest outbreaks are often associated with non-target effects of insecticides that eliminate or suppress their natural enemies. Thus, it is not surprising that we are seeing more problems these days from rust mites, scale insects and leafminers than in the recent past, given the stepped-up spray programs being employed for ACP control. This is especially true where foliar sprays of broad-spectrum insecticides, i.e. organo-phosphates (Group 1B) and pyrethroids (Group 3) are used extensively. Group number refers to mode of action (MoA) of the active ingredient. Mode of action is listed on the label and should be rotated and preferably not repeated in a single year for resistance management. See http://www.irac-online.org/content/uploads/MoA-classification.pdf. for a complete list of insecticide MOAs.

MANAGEMENT OPTIONS

The solutions to secondary pest problems are twofold: (1) modify the spray program to reduce collateral damage to beneficial insects or mites, and (2) apply products at critical times in the life cycle of the specific pests for maximum suppression.

We have seen that programs confining broad-spectrum insecticides to two "dormant" sprays in winter (targeting mainly adult psyllids) and employing relatively selective products during the growing season can provide effective control of both ACP and occasional pests. The presently available toolbox of recommended selective products that suppress ACP and certain occasional pests (listed after the product name) as well includes: (1) spinetoram (Delegate, leafminers, Group 5); (2) spirotetramat (Movento®, rustmite, scales, mealybugs, whiteflies, Group 23); (3) diflubenzuron (Micromite®,

Top left: *Citrus leafminer adult moth (*Photo by Lyle J. Buss, University of Florida). ***Top right:*** *Ladybeetle (Chilochorus circumdatus) adult and larva feeding on snow scale (*Photo by Chris Freebairn, Bugs for Bugs). ***Bottom left:*** *Ladybeetle Olla v-nigrum feeding on ACP nymph* (Photo by Phil Stansly). ***Bottom middle:*** *Diaprepes abbreviatus adult weevil in flight* (Photo by Phil Stansly). ***Bottom right:*** *Brown citrus aphid, Toxoptera citricida (*Photo from FDACS-DPI).

leafminers, rustmites, weevils, Group 15); (4) fenproximate (Portal®, mites, Group 21A); and (5) abamectin (various products, rustmite, leafminers, Group 6). Other products for control of occasional pests include methoxyfenozide (Intrepid®, leafminers, Group 18) and pyriproxyfen (Knack®, scales Group 7C). These are valuable in that their use would not repeat any mode of action targeting ACP. We should not forget Florida's old standard, horticultural mineral oil. Oil is useful as an adjuvant and a pesticide in its own right, providing some control of just about every citrus pest including ACP, loosening sooty mold, and suppressing the fungal disease greasy spot.

New products will be added to the toolbox for ACP control as they gain registration and pass muster. Some on the immediate horizon that could provide welcome alternatives and rotation partners and control additional pests include cyantraniliprole or cyazypyr (Exirel®, Verimark®, leafminer, Group 28), tolfenpyrad (Apta®, mites, Group 21A), sulfoxaflor (Closer®, aphids, Group 4C) and flupyradifurone (Sivanto®, unclassified).

YOUNG TREES

Conspicuously missing from the lists above are the neonicotinoids (Group 4A) that are also effective against ACP as well as leafminers, scales and other sucking insects, but perhaps better saved for use as drenches on young trees. Young trees flush often and thus require the continuous protection best afforded by systemic insecticide applied to the soil. Presently available active ingredients include imidacloprid (various products), thiomethoxam (Platinum®) and clothianidan (Belay®). Soon we are expecting registration of Verimark, which has shown good activity as a soil drench against ACP and citrus leafminer. Meanwhile, drenches of any neonicotinoid should be followed with a spray using a different MoA to slow selection for resistance against Group 4A products.

THRESHOLD OR CALENDAR SPRAYS?

The question of how many sprays are necessary for ACP control is uppermost in many growers' minds. Certainly, if HLB incidence is low, one would want to keep it that way as long as possible, and an aggressive program is justified. However, once HLB incidence is high, it may make more sense to adopt a threshold approach. Fewer sprays mean lower costs and, depending on products used, less risk of secondary pest outbreaks. We have preliminary results from two replicated experiments now in their third year where HLB incidence is above 80 percent. Monthly sprays were the most effective for suppressing ACP and also resulted in highest yields. However, an organo-phosphate spray and a pyrethroid spray in the winter dormant season followed up later with selective insecticides if and when ACP reached a nominal threshold of two per 10 stem tap samples was sufficient to maintain ACP well below that threshold most of the year, and was more cost effective than monthly sprays. Nevertheless, the long-term effects of such a practice remain to be seen.

CITRUS IPM

Gone are the days when process fruit growers in Florida could produce a great crop of oranges with only two oil sprays and let biological control take care of the rest. Now, with the imperative of killing psyllids at any cost, we're getting less help from beneficials. However, good pest management is not just about killing. Like anything else, it is more about striking a balance to create an environment in which the trees can thrive. Correct timing, targeted sprays, rotation of insecticides and selective insecticides during the growing season are all ways to improve control while preserving natural enemies of psyllids and other pests.

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Coming events

New Varieties Development & Management Corp. (NVDMC) has announced that six fresh fruit grower meetings will be conducted on three days to support the launch of the new Fast Track citrus evaluation program. Dates, times and locations are:

- July 1: 9:30 a.m. at the Lake County Extension office in Tavares; 2:00 p.m. at the Citrus Research and Education Center in Lake Alfred
- August 1: 9:30 a.m. at the Highlands County Extension office in Sebring; 2:00 p.m. at the Southwest Florida Research and Education Center in Immokalee
- August 2: 9:30 a.m. at Indian River Research and Education Center in Fort Pierce; 2:00 p.m. at Brevard County Extension office in Cocoa

Seating may be limited. An RSVP is requested by fax to (321) 214-0223 or e-mail to Lucy.Nieves@ffva.com

Citrus Expo will be conducted August 14–15 at the Lee Civic Center in North Fort Myers. Check out www.CitrusExpo.net to learn everything about Citrus Expo.