Development of new tools and recommendations for psyllid management programs

By Michael E. Rogers and Lukasz L. Stelinski

At a recent meeting to discuss new approaches to psyllid management, Jerry Newlin best summed up psyllid management with the statement "Killing psyllids is easy … keeping psyllid populations low is the hard part." Newlin's experience, echoed by many citrus growers throughout Florida, is not due to a lack of effective products for psyllid control, but rather the difficulties in applying the appropriate insecticide controls in a timely manner when and where needed.

Many citrus growers have implemented rigorous psyllid management programs which, under ideal circumstances, should provide substantial reductions in overall psyllid populations. However, ongoing research into psyllid movement behavior at UF's Citrus Research and Education Center has shown that psyllids move regularly, sometimes on a daily basis, back and forth between neighboring citrus groves. As a result of this constant movement of psyllids, growers may discover psyllids infesting new flush on trees (particularly in the border rows) in groves that have recently been treated. The rapid re-establishment of psyllids is a result of migration of psyllids from nearby groves where populations had not been controlled.

COORDINATED GROVE SPRAYS

If "killing psyllids is easy," then the key to managing psyllids more effectively is to minimize "psyllid swapping" between groves. This will require growers working together to develop a plan for coordinated grove sprays. The goal is to reduce psyllid populations in an area as quickly as possible to minimize re-colonization from untreated to recently treated groves. Use of aerial applications is the best option for achieving such control in the short time period desired.

Compared to conventional ground sprays, aerial applications are less likely to contact psyllid eggs and nymphs protected within unexpanded new leaf growth. Thus, aerial applications should target adult psyllids when little or no new flush is present. Broad-spectrum insecticides are the product of choice for these applications since the residues remain active on the leaf surface, providing extended control of psyllids as they move around and contact the residues.

When developing a coordinated spray program where multiple groves are sprayed simultaneously by a single aerial applicator, grove operations such as harvesting or other practices that place workers in the grove will need to be considered. Restricted Entry Intervals (REIs) for workers, Preharvest intervals (PHIs) (see Table 1), and in the case of fresh fruit destined for overseas markets, Maximum Residue Levels (MRLs) may influence product choice.

LOW-VOLUME APPLICATIONS

The use of aerial applications is an attractive option for psyllid control because of the time and money that can be saved when compared to conventional ground applications. Currently, research is under way to determine if ground applications using low-volume delivery systems can be used to reduce the time and expense of ground applications without sacrificing effectiveness in terms of controlling psyllids. Such applications can be made using a small low-volume sprayer mounted in the back of a pickup truck driven through a grove at speeds of five to 10 mph while applying the insecticide at a small particle size (or fog) that provides coverage of both the inner and outer parts of the tree canopy. Because of the small

Table 1. IFAS recommended products for control of the Asian citrus psyllid (*Diaphorina citri*.)

Pesticide / Trade Name	IRAC MOA	Rate/ Acre	Other pests controlled	REI (hrs)	PHI (days)
Aldicarb Temik	1A	33 lbs	Aphids, citrus rust mites, citrus nematodes	48	0
Carbaryl Sevin XLR Plus	1A	1.5 qts.	Citrus root weevils, scale insects, grasshoppers	12	5
Chlorpyrifos Lorsban 4 E	1B	5 pts	Aphids, thrips, mealybug, orangedog, grasshoppers	5 days	21
Dimethoate Dimethoate 4 E	1B	1 pt	Aphids, scales except snow scale and black scale, flower thrips	48	15
Fenpropathrin Danitol 2.4 EC	3	1 pt	Thrips, citrus root weevils	24	1
Imidacloprid (foliar) Provado 1.6 F (numerous generics)	4	10-20 fl oz	Aphids	12	0
Imidacloprid (soil) Admire Pro (numerous generics)	4	See label	Aphids, citrus leafminer	12	0
Phosmet Imidan 70 W	1B	1.5 lb	Citrus root weevils	24	7
Spinetoram Delegate WG + Petroleum Oil	5	4 oz + 2% V/V	Citrus leafminer	4	1
Spirotetramat Movento 240 SC + Petroleum Oil	23	10 oz + 3% V/V	Citrus rust mites, some scale insects	24	1
Zeta-cypermethrin Mustang 1.5 EW	3	4.3 oz	Citrus root weevils	12	1
Mustang Max EW	3	4.0 oz	Citrus root weevils	12	1

particle size, such applications would need to be made at night when winds are calm to reduce drift potential, but under ideal conditions, such applications could be used to treat up to 250 grove acres per night.

The prospect of low-volume spraying for Asian citrus psyllid control with insecticides is attractive because of the potential economic savings associated with this technology. Currently, use of this technique with the most effective and widely used chemicals available against the psyllid, including those listed in Table 1, is not possible because of label restrictions requiring a minimum volume of carrier well above that which a low-volume sprayer deploys per acre. Most low-volume applicators experimented with to date dispense between one and five gallons of water (carrier) per acre; however, most labels require 10 times that amount or more. Thus, research is under way to remedy this situation. The goal is to amend labels appropriately for those chemicals that have proven effective as low-volume sprays.

To date, experiments have shown that many insecticides that are effective against the psyllid using conventional air-blast sprayers are equally effective when deployed as low-volume sprays. If label changes can be made to permit the use of low-volume applications in citrus, this would be an additional tool that could be used by growers to better manage psyllid populations while reducing application costs.

Low-volume applications could be used to provide additional control of psyllids between conventional ground applications or coordinated aerial grove sprays. Low-volume applications could also be used to quickly spot-treat areas of a grove, such as border rows, where psyllids are observed to be moving in from surrounding untreated areas. However, the determination must still be made as to whether pesticide residues from low-volume sprays do not exceed the established MRLs set forth by the EPA. Efficacy data demonstrating control of psyllids, residue data and environmental fate evaluations are currently being compiled to petition label changes from appropriate governmental agencies. Until such changes are made, label guidelines must be followed.

NEW ADDITIONS TO IFAS RECOMMENDATIONS FOR PSYLLID CONTROL

In addition to evaluating new approaches to applying products for effective psyllid control, IFAS continues to evaluate product efficacy for control of psyllids and other citrus pests. For a product to be included in the IFAS recommendations published annually in the Florida Citrus Pest Management Guide (SP-43), two years of product testing are required that demonstrate the effectiveness of a product for controlling the target pest and also to ensure that no negative effects on plant health (particularly with new products on the market) are observed.

In the 2009 Florida Citrus Pest Management Guide, five insecticides have been added to the list of recommended products for psyllid control (Table 1). These new recommended products include dimethoate (Dime-thoate 4E), phosmet (Imidan 70 W), Spinetoram (Delegate WG), Spirotetra-mat (Movento 240 SC), and zeta-cypermethrin (Mustang Insecticide). For more information on recommendations for control of citrus pests, refer to the Florida Citrus Pest Management Guide (SP-43) which can be purchased from your local county extension office or accessed for free online (http://edis.ifas.ufl.edu/topic_book_florida_citrus_pest_management_guide).

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