

Citrus pest overview – where's IPM now?

By Michael E. Rogers

A couple of years ago, the primary insect- and mite-related concerns of Florida citrus growers were making sure rust mite populations were under control or how best to manage the Diaprepes root weevil in groves. Of course, there were other sporadic pests that needed controlling on occasion, but in most cases, there were relatively straightforward answers to the majority of pest-related problems — what a difference a few years make!

Florida growers now have to deal with citrus greening disease and canker, and changes must be made to previous IPM (Integrated Pest Management) programs which relied heavily on the use of oil-only applications in many cases. In the past, pesticide applications (including oil) were used to control pests once their populations reached levels causing significant damage to the fruit or foliage. However, with an insect such as the Asian citrus psyllid that vectors citrus greening disease, it only takes one infected psyllid feeding on a plant to transmit the greening pathogen. Even with the best psyllid control program possible, not all psyllids will be eliminated from a grove. Thus, management programs should be designed to provide as much reduction in the psyllid population as possible.

While the number of insecticide applications required to manage citrus pests (in particular psyllids) will increase, this does not necessarily mean that IPM is no longer a feasible goal for citrus production. On the contrary, it is now more important than ever to develop a comprehensive IPM approach to managing multiple important pest and disease problems that are present at the same time in a grove. The approach should use as few pesticide applications as possi-

ble to maintain the profitability of citrus production. While higher fruit prices will help offset some of these costs, additional planning will be necessary.

IPM is defined as an approach to reducing crop losses from pests (including insects, mites, nematodes, diseases and weeds) in a manner that is effective, economically sustainable and environmentally sound. Thus, IPM includes the proper choice and timing of pesticide applications, host-plant resistance, improved horticultural practices and biological control. Development of resistant varieties may ultimately be the solution to many of the pest problems plaguing citrus growers, especially with regard to greening, but such alternatives will take some time to develop. In the meantime, pesticides will be a major component of canker and greening control programs.

One aspect of an IPM program is the proper selection and timing of pesticide applications. Most of the newer classes of insecticides used today have fewer negative effects on human health and the environment. However, just because these products are more environmentally friendly does not mean that biological control will not be disrupted. Many products currently used in citrus are broad spectrum in terms of affecting both pest and beneficial insect populations. These products are useful in some situations for managing pests, but “back-to-back” application of broad spectrum insecticides should be avoided when possible to allow for recovery of natural enemy populations. When possible, soil-applied systemic insecticide use will reduce the potential negative effects on beneficial insect populations while providing whole tree protection.

Also key to selecting the right insecticide to use as part

Table 1. List of insecticides and miticides recommended for use in the Florida Citrus Pest Management Guide and their effects on different pests and beneficial insects

Pesticide active ingredient	Target pest								Effects on Beneficial Insects
	Psyllid	Leafminer	Rust Mites	Spider Mites	Root Weevil Adults	Aphids	Scale Insects	Mealybugs	
Abamectin + oil	++	+++ _R	+++ _R	+	+(oil)	+(oil)	+(oil)	+(oil)	medium
Imidacloprid (soil appl., nonbearing)	+++ _R	+++ _R	-	-	+	+++ _R	++	+	low
Imidacloprid (foliar application)	+++ _R	+	-	-	-	+++ _R	++	+	medium
Acetamiprid	-	+++ _R	-	-	?	+++	+	++	medium
Carbaryl	?	-	+	?	+++ _R	+	+++ _R	+	high
Chlorpyrifos	+++ _R	+	+	-	+	+++ _R	+++ _R	+++ _R	high
Fenpropathrin	+++ _R	?	+	+	+++ _R	-	-	+	high
Dimethoate	++	-	-	-	?	+++ _R	+++ _R	+	high
Spinosad	-	+++ _R	-	-	-	-	-	-	low
Spirodiclofen	-	-	+++ _R	+++ _R	?	-	-	-	low
Diflubenzuron	++	+++ _R	+++ _R	+++ _R	+++ _R	-	-	-	low
Pyridaben	-	?	++	+++ _R	-	-	-	-	high
Aldicarb	+++ _R	-	+++ _R	+++	-	+++ _R	-	-	low
Sulfur	?	-	+++ _R	+++	-	-	?	?	high (short term)
Fenbutatin oxide	-	-	+++ _R	+++ _R	-	-	-	-	low
Petroleum oil	+	++ _R	++ _R	++	+(eggs)	+	++ _R	+	low

(R) = product recommended for control of pests in Florida Citrus Pest Management Guide
 (+++) = good control of pest (++) = short-term control of pest
 (+) = low levels of pest suppression (-) = no observed control of pest
 (?) = no data available

of an IPM program is planning ahead for those pests that are likely to reach high enough levels to warrant controlling. Diligence in scouting not only for pest populations but also numbers of beneficial insects is important in making this decision. Based on scouting, and previous years' experiences of what pests will likely be a problem at a given time, the concept of multi-targeting of pests can be incorporated into a grove specific IPM program.

Multi-targeting is the use of one pesticide application to control (or prevent) multiple pest problems. The concept is not much different from decades past when broad-spectrum insecticides such as chlorinated hydrocarbon and organophosphate insecticides were the primary products used in citrus production. These products wiped out most insects, pest and beneficial, in a grove with one application. Development of insecticide resistance as well as environmental concerns has led to the decline in use and/or cancellation of many of these products in citrus production. Today, most of the products used are safer both to the environment and human health, but lack the ability to provide adequate control of a wide variety of pests with one application.

Knowing which pests a product will effectively control is obviously important. Also important is the recognition of which products, when used to control one pest, will also provide some suppression (not necessarily total control) of other pests of importance at that time. By using such products, more time can elapse before making another pesticide application for additional pests. For example, during the summer oil spray for greasy spot control, a miticide is typically included in the oil spray to control rust mites. In this particular case, choice of a miticide that also has some activity on psyllids and/or leafminer will provide some suppression of those pest populations, providing some additional time before another spray is needed.

There are a number of different scenarios or combinations of pest problems that may arise in any given grove that will determine how product choice should be made.

Table 1 is a list of the insecticides and miticides currently registered in Florida citrus that are recommended by IFAS for control of at least one particular citrus pest, indicated by an "R" in the table. The table is intended to show where a particular product is used as a recommended control for one pest and what additional pests may be either controlled or suppressed. Also included in the table is a column indicating the general effects that a given pesticide will have on beneficial insect populations.

While the effects a pesticide can have on beneficials can vary across the wide range of species present in citrus, the generalizations made here are intended to better understand the potential impacts a particular product may have on other pest populations via disruption of biological control. Products listed as having high effects on beneficial insects have been shown to have significant negative impacts on many important groups of natural enemies. Those products listed as medium have some negative effects on a few groups of natural enemies. Products categorized as low have relatively few negative effects on beneficials following the application of these products due to their pest specific-mode of action, the manner in which they are applied or their short residual effect. Repeated applications of pesticides with high impacts on beneficial insects should be avoided when possible.

Citrus greening and canker are the driving forces behind much of the research under way. New information continues to be developed regarding the management of these two serious issues facing the Florida citrus industry. As this information is developed, citrus IPM strategies will continue to be refined. Despite the obstacles that lie ahead, development of a comprehensive IPM strategy for managing these and other potential pests will be a challenging but obtainable goal.

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