SOME TOOLS AND TACTICS FOR APHID MANAGEMENT IN FLOWER CROPS

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That aphids remain a major problem to flower growers is a legacy of the ability of some species to withstand insecticides; there are at least 32 active ingredients registered for aphid control on flower crops in Florida.

Aphids hold an unusual grip on Florida's flower growers. They rarely push a grower to the brink of financial collapse as have western flower thrips, leafminers or sweetpotato whitefly. Instead, aphids badger growers by their ubiquity and persistence.

That aphids remain a major problem to flower growers is a legacy of the ability of some species to withstand insecticides; there are at least 32 active ingredients registered for aphid control on flower crops in Florida (Table 1). Aphid control has depended largely on the preventative or curative use of organophosphorus, carbamate pyrethroid or chlorinated hydrocarbon insecticides. These tactics are no longer sufficient for aphid management and actually may be responsible for growers' current difficulties. This article highlights some practical tactics and tools available to growers to manage problem aphids in commercial flower crops.

Problem Aphids

The unique type of reproduction possessed by aphids provides shortcuts to population development and permits one aphid to create a large colony rapidly.

Several aphid species may be found on flower crops but those that present the greatest problems for growers, and that often persist despite control efforts, are the green peach aphid and the melon/cotton aphid. Growers may find that tactics to control one aphid species will not be effective in controlling another. Therefore, growers must be able to identify the aphid species present before appropriate control measures can be implemented.

Aphid colonies usually develop on the tender apical tissues, but may also occur on the stem below the shoot tip.

These two species can be distinguished from one another by the presence (in the green peach aphid) or the absence (in the melon aphid) of knob-like structures on the inside base of the antennae. When viewed from above, the green peach aphid appears as though its head has a notch between the antennae. In addition, the posterior abdominal cornicles (exhaust pipe-like structures) of the melon aphid are considerably darker than the remainder of the body. The described color difference is not so apparent in the green peach aphid.

Development of the Problem

Aphids may enter the crop production area after developing on plants outside the production area. Occasionally infestations develop from aphids carried long distances by wind or from those introduced on plant material. Wingless aphids tend to remain on the plants where they were born, but can walk among plants within the production range. When colonies are left uncontrolled and crowding occurs, winged forms are produced which disperse to other plants. Flowing irrigation water or rain may also transport aphids among plants.

The unique type of reproduction possessed by aphids provides shortcuts to population development and permits one aphid to create a large colony rapidly. Unlike most pests of flower crops, aphids are usually female and can reproduce without mating. Offspring are usually females which are able to produce young within one week. In addition, the aphids bear living young, eliminating the time required for eggs to hatch.

Damage to the Crop

Aphid colonies usually develop on the tender apical tissues, but may also occur on the stem below the shoot tip. Aphids may feed on mature leaves and flowers, but usually not in large numbers. Adults and nymphs insert needle-like mouthparts into vascular tissues and remove sap. Sugary components, or honeydews, are excreted and fall onto the upper surfaces of leaves. These substances are usually washed away by overhead irrigation or rains, but otherwise become objectionable. Excretions remaining on surfaces may attract ants or may become

Table 1. *Insecticides registered in Florida for "aphids" (or specific aphids) and permitted on one or more flower crops. The more likely candidates for controlling one or more problem aphids are indicated by (*).*

Active Ingredient	Some Trade Names	Active Ingredient	Some Trade Names
ORGANOPHOPHORUS COMPOUNDS:		**CARBAMATE COMPOUNDS:**	
*Acephate	Orthene	Bendiocarb[a,b]	Turcam, Ficam
Azinphos-methyl[a]	Guthion	Carbaryl[a,c]	Sevin
Chlorpyrifos	Dursban	Methiocarb[a]	Mesurol, Grandslam
*Diazinon[a]	Diazinon	*Methomyl	Lannate
Dimethoate	Cygon	*Oxamyl	Vydate, Oxamyl
Disulfoton	Di-Syston		
Fenitrothion	Pestroy		
Fenthion	Baytex		
Malathion[a]	Malathion		
Naled	Dibrom		
Sulfotep[a]	Plantfume 103		
	Flora-Fume		
PYRETHROID COMPOUNDS:			
Allethrin[a]	Pyrellin Space and Crop Spray		
Bifenthrin[a]	Talstar		
Cyfluthrin[a]	Decathlon, Tempo 2		
D-Phenothrin[a]	Sumithrin		
Fenpropathrin[a]	Tame		
*Fluvalinate[a]	Mavrik		
*Permethrin[a]	Pramex		
Resmethrin	Resmethrin, SBP 1382		
NATURAL PYRETHRIN/COMBINATIONS:			
*Pyrethrin + PBO[a,d]	Pyrenone		
Pyrethrin + rotenone[a]	Foliafume Insecticide		
CHLORINATED HYDROCARBON COMPOUNDS:			
*Endosulfan[a]	Thiodan		
Lindane[a]	Lindane		
MISCELLANEOUS RELATED COMPOUNDS:			
*Kinoprene[a]	Enstar		
Nicotine[a]	Nicotine Smoke Generator		
*Petroleum oil[a]	Sunspray Ultrafine Spray Oil, Saf-T-Side		
*Potassium salt of fatty acids[a]	M-Pede		
Rotenone	Rotacide		

[a] One or more products are registered on most flower crops.
[b] Chrysanthemum, green apple, oleander and spirea aphids.
[c] Rose, apple, cooley spruce gall, eastern spruce gall and elm leaf aphids.
[d] PBO is piperonyl butoxide. Green peach aphid.

colonized by a black, sooty mold fungus. Plant quality is also affected by aphid feeding which sometimes deforms leaves.

Timely detection of aphid infestations is very important.

Detection of Aphids

Timely detection of aphid infestations is very important. Workers should be trained to look for and report aphids on leaves, stems and buds. In addition scouts should inspect the crop regularly. Yellow sticky traps should be placed throughout the production facility, particularly near doors, vents and the more susceptible crops. Traps should be inspected at least once per week; twice per week would be better, especially in the spring. When winged aphids appear on traps, plants probably are infested and remedial action, such as release of predators or application of proper insecticides, should be taken.

The biological control of aphids on flower crops is possible by utilizing predators, parasites or pathogens.

Biological Control

The biological control of aphids on flower crops is possible by utilizing predators, parasites or pathogens. Certainly these agents will kill aphids, but each has disadvantages. We have experienced excellent results in controlling green peach and melon aphids in portions of greenhouses by using *Aphidoletes aphidimyza*, perhaps the most likely candidate for practical biological control of certain aphids in Florida greenhouses. Reproduction of the melon aphid sometimes out paces the abilities of *Aphidoletes aphidimyza*, however. This predatory midge (the adult looks suspiciously like a fungus gnat) can be purchased from commercial insectaries (Applied Bionomics, Sidney, British Columbia (694) 656-2123; Koppert B.V., Berkel en Rodenrijs, Netherlands, 1-31-1891-40444 and others) and released as pupae among infested plants. Pupae develop into adults within a few days and lay eggs among the aphids. Eggs hatch to voracious larvae that eat aphids and develop further to provide additional generations of predators.

Precise timing of insecticides is not as critical as for some other arthropods since tolerant pupae and eggs do not occur.

Insecticides

Precise timing of insecticides is not as critical as for some other arthropods since tolerant pupae and eggs do not occur. Systemic insecticides are particularly effective because aphids ingest large amounts of plant juices. Nonsystemic aphicides usually are effective before flowers open because aphids remain exposed on buds, stems and leaves. Aphids near bases of florets in open flowers may be difficult to kill without systemic insecticides.

Insecticides registered for aphid control on Florida's flower crops are presented in Table 1. Twenty-three of those active ingredients are permitted on most commercial flowers. In the past, excellent control has been achieved with any of several organophosphorus, carbamate, pyrethroid and chlorinated hydrocarbon insecticides listed. Some of these still may be effective at some locations, even when used alone. The more likely candidates for effective control of problem aphids are indicated only as a guide.

Recently, many growers have experienced poor control from most of these, particularly for control of the green peach aphid. Soaps (potassium salts or fatty acids) and refined petroleum oils in combination with aphicides (such as soap + acephate, soap + fluvalinate) seem to be most effective. Since aphid populations vary in their susceptibility to insecticides, growers should evaluate combinations of soaps or oils with other aphicides on their farms. Only small areas should be treated with new combinations at first, as phytotoxic reactions may occur.

Crops free of aphids can be kept free if vigilance is maintained on selecting and inspecting incoming material and if screen barriers are properly selected and installed.

Screening Production Areas

Crops free of aphids can be kept free if vigilance is maintained on selecting and inspecting incoming material and if screen barriers are properly selected and installed. Recently, Bethke and Paine at the University of California, demonstrated that melon aphids could be screened from production areas with screens of openings no larger than 340 microns (47 mesh of an 8 mil fabric). Since the green peach aphid is generally larger than the melon aphid, this screen should exclude both species.

New insecticides, combinations of old insecticides with soap or oil, new screening methods and biological control techniques may make it possible for aphids to be reduced to a minor

annoyance in flower crops...something that the active ingredients of 32 insecticides are unable to do.

Note: Mention of trade names or companies in this article is for educational purposes only. No endorsements are implied nor discrimination intended. This article is published by the Florida Agricultural Experiment Stations as T-00196.

Sources of Additional Information

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