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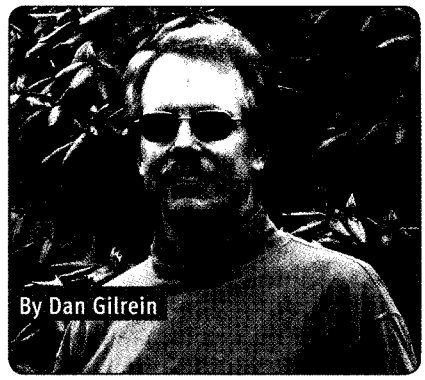
Choose the most effective aphid controls



FOR PLANT ENTOMOLOGISTS, evidence that spring has arrived is the increased number of phone calls and plant samples being sent related to insect and mite activity. Thrips, fungus gnats, twospotted spider mites and aphids top the list of inquiries to me to date. Despite a relatively mild winter, clearly these pests did not originate outdoors, but more likely moved from other crops or in a few cases may have arrived with new plant material. In any case, there are problems to solve and choices to make in managing any of these.

A closer look at aphids

Aphids are almost an annual tradition on greenhouse crops. Unlike some other pests, such as thrips, as a group aphids are usually relatively easy to control. So far this season, green peach, melon and crescent-marked lily aphids have been identified on spring crops.

Melon aphid has been the most common species on greenhouse plants and also the one eliciting the most complaints from growers about poor efficacy. These insects are usually dark green or nearly black, sometimes with pale-yellow individuals mixed in.

Melon aphid enjoys a very wide host range, although some strains or biotypes exhibit preferences for certain plants. For example, melon aphids have been collected from the field on catalpa or pumpkin that would just not "take" to impatiens after multiple attempts to infest the plants.

Melon aphid tolerates very low temperatures, a fact made apparent to one grower in late winter bringing herb stock plants into the greenhouse from unheated cold frames for spring propagation. Melon aphids often have a noticeable waxy coating, which may help protect them from insecticide sprays, and they have evolved physiological ways to detoxify some common pesticides. Michigan State University Pesticide Resistance Database has many reports of insecticide resistance in this species, primarily to organophosphate and pyrethoid insecticides.

Green peach aphid is also common in greenhouses with many reports in the Michigan State Database of resistance to the same chemical controls. They have a similarly wide host range including many popular greenhouse bedding plant and flowering pot crops.

Colonies of green peach aphids are mostly pale green with occasionally pinkish-orange individuals, although there seems to be a dark-red variant that some think may be a different species. Compared to melon aphid, I tend to receive fewer complaints about difficulty controlling green peach aphids, although they, too, are sometimes reported to have enzymes that detoxify some insecticides.

Both melon and green peach aphids are notorious for their ability to transmit certain plant viruses, although this is generally less of a concern in finished crop production compared with long-term maintenance of clean stock plants for propagation.

Crescentmarked lily aphid, named for a horseshoe-shaped dark band on the abdomen, was recently found on Easter lily on Long Island, N.Y. It has been reported to feed on other ornamental crops including begonia, calla lily, cineraria, *Zantedeschia*, ferns, pansy, fuchsia and cyclamen. Like the Trojan Horse, bulbs can carry these aphids within their layers. The aphids move above ground as foliage grows but may not be obvious at first, as the aphids initially remain low in the canopy. Some literature reports distortion of foliage from their feeding, although I have not observed this on Easter lily and have yet to find them on any other greenhouse crop.

Tulip bulb aphid is similarly insidious, conveniently carried on tulip, narcissus and crocus bulbs or iris rhizomes. Dusty gray in appearance, their heavy waxy coating and residence on vertical plant parts probably helps reduce impact of insecticide sprays that fail to stick or wet adequately.

Chrysanthemum aphid appears nearly every year on Long Island, but only on mums. They are relatively large, dark brown and often found on stems where they are more easily detected than the well-camouflaged green peach aphid.

Tobacco and potato aphids have appeared on calibrachoa and related plants. Tobacco aphid is closely related to green peach aphid with the same detoxification enzymes in some populations.

Foxglove aphid is distinguished by its pale-green color, dark-green blotch at the base of the cornicles (tailpipes) and larger size. It has become a fairly common pest in recent years, surprisingly on zonal and

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ivy geraniums. On many plants they cause moderate to severe distortion as they feed.

Other aphids. Other aphids I have observed include rice root aphid on *Aechmea*, dieffenbachia and other foliage plants; cowpea aphid on gerbera; plum leaf curl aphid on mums; bright yellow oleander (milkweed) aphid on oleander, ***Hoya*** and *Asclepias*; and the strikingly red *Uroleucon obscuricaudatum* on *Heliopsis* to name a few. In Florida, several new invasive aphid species have been sighted, including an Asian ficus aphid on *Ficus* and coriander aphid on fennel, dill and coriander.

Looking for aphids

Monitor for aphids by checking for the sticky honeydew they produce while feeding and their cast skins, which look like white bits of dust. Scan under leaves and on terminal growth and stems for the aphids themselves.

Sticky cards won't provide an early warning for aphid infestations. However, if you are using them for other pests, watch for trapped winged aphids that could indicate a possible source to track down in the greenhouse.

Products to control aphids

On ornamental plants, aphids are usually easy to control with various spray materials and some systemics. Based on my own trials and experience, horticultural oil (Ultra-Fine, Saf-T-Side, and others) or insecticidal soap (M-Pede, Revoke) can be very effective but rely on good contact, which may be difficult with heavy canopy growth or leaves close to the growing medium surface. These products can't be used on certain plants or flowers where there is a risk of injury because plants are under stress from lack of water or root damage, or applied too frequently.

Some caution is needed before applying oil to plants previously treated or in a tank mix with certain fungicides (e.g., Daconil and other chlorothalonil materials) or other products that may be incompatible. Oil and soap products have limitations, but in some crops or situations they may be especially useful, and resistance shouldn't be an issue.

Some growers use insecticidal soap at a very low rate (0.25-0.5 percent)

Scouting Notes

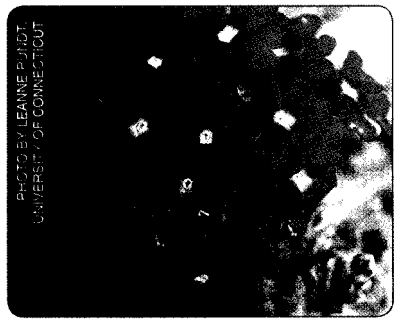
California announces LBAM eradication plan. California Department of Food and Agriculture and USDA have completed an action plan outlining 2008 strategies to eradicate the light brown apple moth from the state's Central Coast and Bay Area communities. It will likely take several years to eradicate LBAM. The primary tool for eradication will be aerial treatment with LBAM moth pheromone. Treatments are expected to begin June 1 in Monterey and Santa Cruz counties.

A USDA study indicates that if California becomes generally infested, the moth would cause between $160 million-$640 million in crop damage annually. It would hinder export opportunities and interstate commerce due to quarantine restrictions.

For more: California Department of Food and Agriculture, (916) 654-0462; www.cdfa.ca.gov/lbam

Biologicals provide thrips control. For biological controls to be effective on western flower thrips, prophylactic introductions should start on young plants or in propagation areas, University of Connecticut greenhouse IPM specialist Leanne Pundt said.

Neoseilus cucumeris is a small, predatory mite that feeds on young first instar thrips larvae. *Hypoaspis miles* or *H. aculifer* is a soil-dwelling predatory mite that feeds on pupal stages of thrips in the soil as well as fungus gnat larvae. Predatory rove beetles, *Atheta coriaria*, feed upon thrips as well as shore flies and fungus gnats. The predatory mite, *Amblyseius swirskii*, feeds upon both thrips and whiteflies. Apply *Beauveria bassiana* (fungal spores) early in the cropping cycle to ensure thorough coverage and before plants flower and produce pollen, which increases thrips egg laying. *Steinernemia feltiae*, an entomopathogenic nematode, used primarily against fungus gnat larvae, also attack thrips pupae and prepupae found in the growing medium.



Thrips damage verbena flowers and foliage.

For more: Leanne Pundt, University of Connecticut, (860) 626-6240; leanne.pundt@uconn.edu; www.negreenhouseupdate.info.

Avoid overwatering to limit springtail populations. Springtails are very small, wingless arthropods about 1/16-1/8 inch long. University of Massachusetts extension floriculture specialist Tina Smith said springtails occasionally are observed in greenhouse growing media, especially if plants have been overwatered.

Springtails have chewing mouthparts, but rarely damage the roots or leaves of greenhouse ornamental plants. They also do not vector diseases.

A few species feed on living plants and are occasionally regarded as pests. Outdoors, *Bourletiella hortensis* (garden springtail) may damage seedlings in early spring. As they feed, small holes and surface scarring develops. Some species also feed on roots. Most types of springtails are beneficial by reducing decayed vegetation to soil. To reduce populations avoid overwatering and allow the growing medium to dry between waterings.

For more: Tina Smith, University of Massachusetts-Amherst, (413) 545-5306; tsmith@umext.umass.edu.

Anise essential oils fight fungus, aphids. The fungal plant pathogen *Colletotrichum* has been able to be controlled in laboratory tests using essential oils of *Pimpinella* spp. (anise), which have high levels of organic mixtures called phenylpropanoids.

Nurhayat Tabanca and plant pathologist David Wedge at USDA's Agricultural Research Service's Natural Products Utilization Research Laboratory in Oxford, Miss., found one phenylpropanoid compound was especially effective against strawberry anthracnose and strawberry soft rot and leaf blight.

Researchers also found *P. isaurica* essential oils were more effective in controlling aphids than isolated *Pimpinella* phenylpropanoids. This research could lead to *Pimpinella* essential oils as a source of agrochemical agents.

For more: Natural Products Utilization Research Laboratory, (662) 915-1009; www.ars.usda.gov/is/pr/2008/080220.htm.

tank mixed with other materials to enhance spreading and perhaps efficacy. Pyrethroids (Astro, Tame, Talstar, Scimitar, Mavrik and Decathlon) are sometimes effective, depending on type of aphid.

Orthene TTO labels limit use to only a few greenhouse crops but it continues as a proven standby and provides some thrips control as well.

Avid and its generic versions can be used at the high (8 ounces) label rate for aphids. Expect moderate knockdown or better, as well as its usual miticidal activity. Weekly sprays with BotaniGard have given some control of green peach and melon aphids in trials at Cornell University (and even better whitefly control), but this product is probably best for low-level infestations. Use the wettable powder formulation on plants (tomato and poinsettia) that may be sensitive to the liquid formulation.

Endeavor, a U.S. EPA reduced-risk insecticide, has performed extremely well in Cornell University aphid control studies. It is also a useful material for whiteflies. In one test on heavily infested plants, the greenhouse benches were covered with a snowy layer of dead silverleaf whiteflies the morning after application. At higher rates there may be some whitish residue, but that has not affected sales.

Aria, labeled only for greenhouse use, has also been exceptional for aphid control. Some pansy cultivars have shown sensitivity to Aria, but results in trials and from grower reports are outstanding.

The introduction of neonicotinoid insecticides brought a new class of materials highly effective against aphids. With very rare exceptions, this class of compounds also shows a high level of safety to flowers and foliage and most leave little or no apparent residue as sprays. These products have familiar names: Marathon (and generic versions), Flagship, Safari, Celero and TriStar. Except for TriStar, which is also classed as reduced-risk by U.S. EPA, the labels also allow systemic (container drench or broadcast granular) uses to control aphids. TriStar

can be used as a growing medium "sprench" for fungus gnats. Spray applications of these materials are very useful for quick knockdown, where infestations are heavy, if plants lack a good root system for systemic uptake and where cost or labor for granular or drench application a consideration.

Drench (or granular) applications provide weeks of control and are best applied after there is good root growth. I have observed efficacy five days after application with a Marathon drench to 4-inch impatiens. Generally, it takes a week to show results on potted annuals or even longer on older plants and plants with poorly developed root systems. Safari is an exception, perhaps due to its high water solubility, showing results within just a few days following drench treatment. If using granulars, lightly water in several times after application and take care to avoid leaching pots for a couple of week when systemic control products are applied.

Natural enemies, if introduced early before infestations are apparent, can be quite effective against aphids.

CONTACT INFORMATION

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Biologicals & Chemicals

Banol (Bayer): The fungicide is now registered in California.

Cease (BioWorks): This liquid formulation helps to control fungal pathogens and is also a broad-spectrum root biofungicide to control soil-borne diseases. It's based on a naturally occurring patented strain of *Bacillus subtilis* (strain QST 713).

Configure (Fine Americas): The plant growth regulator is now registered in California.

Ronstar Flo (Bayer): The herbicide is now registered in California.

Stature SC (BASF): This is a new liquid flowable formulation of Stature DM fungicide. It can be used to control phytophthora and downy mildew.