Pest e-alerts

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Managing Greenhouse Pests without Neonicotinoid Insecticides

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Research in Europe and North America has shown that very low concentrations of neonicotinoid insecticides (e.g., less than 50 parts per billion) can have negative effects on the health of bee colonies and the foraging ability of worker bees. Public awareness of this issue peaked in 2012 following a case in Oregon that killed thousands of bumble bees following exposure to the insecticide dinotefuran. Neonicotinoids are a group of insecticides that have a chemical structure similar to nicotine, which itself was once a widely used insecticide. Neonicotinoid products used in greenhouses include the active ingredients imidacloprid, acetamiprid, dinotefuran, and thiamethoxam. Neonicotinoid products are advantageous for managing sucking pests such as aphids and whiteflies because they are long lasting and systemic, circulating throughout plant tissues after being absorbed by the roots and/or across the leaf membrane. However, it is the systemic nature of neonicotinoids that poses a risk to bees and other pollinators because the active ingredient can move into nectar and pollen. Retailers around the country are concerned about the impact on sales from public demand for neonicotinoid-free landscape plants. While little is known of the risk neonicotinoids pose to pollinators after establishment of annuals and other plants, it is time to consider alternatives to neonicotinoids in greenhouse production.

Start with Integrated Pest Management (IPM)

Growers looking for alternatives to neonicotinoids should start with non-chemical methods of pest control. Oklahoma Cooperative Extension Service publications E-1011: *Arthropod Pest Management for Greenhouses and Interiorscapes* and HLA-6710: *Integrated Pest Management in Commercial Greenhouses* provide detailed information about implementing IPM in the greenhouse (see references below). However, general strategies to prevent pest problems in the first place include:

- Inspecting all plant material for insects and disease symptoms prior to moving them in to the greenhouse
- Sanitation; keeping all floors and benches free of plant debris, soil, and other growing media that could serve as reservoirs for pests
- Keeping the greenhouse interior and surrounding exterior areas free of weeds, which could serve as a reservoir for pests
- Maintaining plant health to minimize stress such as water and nutrient deficiency
- Regular monitoring for pests through trapping and visual observation
- Implementing biological control when possible

For biological control to be successful, a good scouting program is critical, and predators and parasitoids should be released early in the crop before pests build to outbreak levels. Biological control agents should not be released onto plants previously treated with pesticides due to the presence of toxic residue. Also, plants should not be sprayed with insecticides when biological control agents are active in the greenhouse. Some insecticides are more compatible with biological control, so check with a biocontrol supplier before purchasing any product.

Alternative Chemistries

I have made a list of alternative products known to be effective against key greenhouse pests (see Table 1). Most of these products need to be applied as foliar sprays when pest populations exceed tolerable levels. Not all pesticide options are listed (e.g., pyrethroids) because broad-spectrum materials can disrupt biological control. Also, read all labels for important information about phytotoxicity and how to use for maximum efficacy.

Additional Resources

Rebek, E. and M. Schnelle. Arthropod Pest Management in Greenhouses and Interiorscapes. Oklahoma Cooperative Extension Publication E-1011.

Rebek, E. and R. Cloyd. Management of Insects and Mites in Greenhouse Floral Crops. Oklahoma Cooperative Extension Publication CR-6718.

Schnelle, M. and E. Rebek. Integrated Pest Management in Commercial Greenhouses: an Overview of Principles and Practices. Oklahoma Cooperative Extension Publication HLA-6710.

Schnelle, M. and E. Rebek. IPM: Scouting and Monitoring for Pests in Commercial Greenhouses. Oklahoma Cooperative Extension Publication HLA-6711.

Table 1. Alternative chemistries to neonicotinoids for key arthropod pests of greenhouse crops.

Trade Name	Active Ingredient(s)	Thrips	Aphids	Whiteflies	Scales	Mealybugs	Spider Mites	Broad Mites/ Cyclamen Mites
Aria	Flonicamid	X	X	X		X		
Azatin/ Ornazin	Azadirachtin	X	X	X	X	X		
Botanigard/ Mycotrol	*Beauveria bassiana*	X	X	X		X	X	
Avid	Abamectin	X	X	X			X	X
Orthene/ Precise	Acephate	X	X	X	X	X		
Mesurol	Methiocarb	X	X					
Preferal/ NoFly	*Isaria fumosoroseus*	X	X	X		X		
Enstar	Kinoprene	X	X	X	X	X		
Endeavor	Pymetrozine		X	X				
Distance	Pyriproxyfen		X	X	X			
Kontos	Spirotetramat		X	X		X	X	
Ultra-Pure Oil/ SuffOil-X	Petroleum oil		X	X	X	X	X	
Sunspray UFO	Paraffinic oil	X	X	X	X	X	X	
Triact Oil	Neem oil		X	X	X	X	X	
M-Pede	Insecticidal soap		X	X	X	X	X	
Hachi-Hachi	Tolfenpyrad	X	X	X	X			
Pedestal	Novaluron	X		X				
Overture	Pyridalyl	X						
Conserve	Spinosad	X						
Pylon	Chlorfenapyr	X					X	X
Adept	Diflubenzuron			X				
Preclude	Fenoxycarb	X	X	X	X			
Talus	Buprofezin			X	X	X		
Floramite	Bifenazate						X	
Shuttle	Acequinocyl						X	
Ovation	Clofentazine						X	
TetraSan	Etoxazole						X	
Magus	Fenazaquin			X			X	
Akari	Fenpyroximate						X	X
Hexygon	Hexythiazox						X	
Met52	*Metarhizium anisopliae*	X		X			X	X
Sanmite	Pyridaben			X			X	X
Judo	Spiromesifen						X	X

This article is adapted for e-Pest Alerts with written permission from Dr. David Smitley, Michigan State University, author of an article written for Michigan State University Extension News entitled, "Greenhouse insect management without neonicotinoids" posted February 27, 2014.

Wheat Disease Update

Bob Hunger, Extension Wheat Pathologist

No foliar diseases of significance to report in Oklahoma. Wheat is mostly just coming out of dormancy, and cold/dry conditions have not favored initiation of foliar diseases. My soilborne/spindle streak nursery is starting to show symptoms of these virus diseases. The wheat is just starting to "green-up," so symptoms of this virus complex will become evident over the next couple weeks if a susceptible variety was planted in areas where these diseases are present.

Texas: Dr. Amir Ibrahim (Prof, Small Grains Breeding and Genetics, Texas A&M University) 07-Mar-2014: Our rust evaluation nursery was planted at Castroville, TX, about 12 miles west of San Antonio. The wheat crop is now at Feeks stage 7-9. There is a mild buildup of leaf rust (*Puccinia triticina*) in the lower canopy of the spreader rows throughout the field. At this time last year, leaf rust was already 50S on 'TAM 110'. The unusually cold weather that we have encountered this year did not favor rapid spread, but the disease seems ready to move if the weather starts to warm up. Stripe rust (*Puccinia striiformis*) has been detected on some plots located in the middle of the field, and is mostly limited to a 600 ft^2 area. Night temperatures for next week will range from 39 – 48 F, which will favor new infections by urediniospores and pick up in sporulation.

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