



Dan Gilrein
dog1@cornell.edu

Volume 3 Number 8 April 2018

Preventive Learning About Pests Before Experience Takes Over

“...what’s past is prologue...”

- W. Shakespeare, *The Tempest*

In areas with cooler climates or seasons protected enclosures can extend a crop production period, promote earlier harvest, and improve quality when (some) disease problems are reduced. However, these generally warmer, drier environments with well-fed plants and no natural enemies (biological controls) are also great for pests like spider mites, thrips, whiteflies, and aphids. While it’s only natural that increasing interest in greenhouse and high-tunnel food crop precedes inquiries about managing infestations, experienced growers usually have plans for them. Since those new to the business can be in for unpleasant surprises with sometimes really severe consequences, here are some ideas that may head those off.



Potato aphid is a common and frustrating pest of greenhouse tomatoes

2018 Sponsors



Funding Generations of Progress
Through Research and Scholarships



P.L. LIGHT SYSTEMS
THE LIGHTING KNOWLEDGE COMPANY



FARM CREDIT EAST



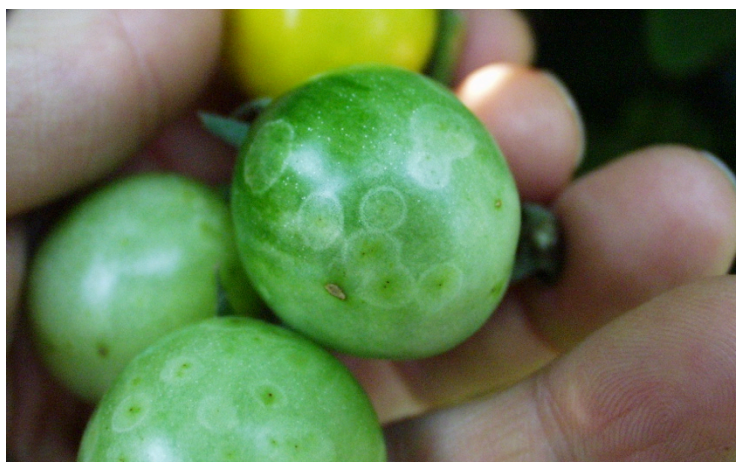
www.e-gro.org

Like other Extension Entomologists, I assist both new and experienced growers with pest management plans. Important considerations include the crop(s) and area in production, whether organic or otherwise, if biological controls are to be used, and whether there are any personal preferences or limitations. I try to get a sense of how much attention will be focused on managing pests and who will be responsible for that aspect of the business. It is also good to see the site and get an overview of the production plan, which can reveal other important details like the overlooked houseplants or other crops (i.e. potential sources of infestation) being maintained in the same range. I also scope out the general environment outside the range (ditto).

I like to see a good level of sanitation, meaning: no weeds in the greenhouse, a weed-free perimeter around the house if possible, no water ponding, good ventilation and air movement. Are there yellow sticky cards and are they being used to monitor (someone looks at them regularly) for flying pests like whiteflies and thrips, and are detections acted upon? Is any other kind of scouting or monitoring being done? Are precautions taken to avoid introducing pest or disease problems and is there some awareness of what those are and where the risks come from? I often help new growers with recognizing early signs, symptoms, and sources of infestation and how to look for them if they have little or no experience. Many are excellent, dedicated horticulturists and business managers but just need a bit more information.

Established growers have learned the value of raising seed-grown plants isolated from others, if possible (pests such as aphids and spider mites are not seed-borne). Vegetatively propagated material or older stock plants that can't be grown separately need to be examined closely for insects and mites and treated, if necessary, so they don't pose a potential threat to long-term moneymakers like greenhouse tomatoes or cucumbers.

Experience has also shown that biological control (use of natural enemies like *Aphidius colemani* wasps to control green peach aphid) can be a valuable and effective tool but requires conscious investments of time and knowledge. The biocontrols are released starting before infestations are too far along, matched with the target pest(s), and checked on



Haloed and necrotic spots from western flower thrips.



Pale flecking and yellowish discoloration may be early signs of twospotted spider mite on tomato



... and on cucumber

arrival to be sure they are alive and in the stated number. I find that growers often skip this last step, but it's obviously critical if relied upon for such an important job: only employees that show up are helpful.

Many growers will need to use insecticides or miticides (organic or not) eventually, and care need to be taken in selecting among the options. Many products now are somewhat to highly selective, controlling one or few kinds of pests. Some will be more compatible than others with biological controls, and at least in NY a 'restricted-use' designation (which often relates to labeling for commercial growers and not necessarily toxicity) means an applicator license will be needed for purchase and use. It goes without saying that the intended *crop* (tomato, pepper, cucumber, etc.) MUST be on the label, although some states (not NY) are more relaxed about whether the *target pest* (aphids, whiteflies, etc.) must also be listed. Regardless, find out about the control options, their efficacy and safety precautions (for crops and workers), and what might work best in your operation for the range of pests encountered. Pay close attention to personal protective equipment required for both application and early entry to treated areas, as well as re-entry and pre-harvest intervals.

A common question I hear: what products can be used in greenhouses on food crops? The following discussion may be helpful: according to EPA, "for the purposes of the Worker Protection Standard (WPS), 40 CFR 170.3 defines "greenhouse" as "any operation engaged in the production of agricultural plants inside any structure or space that is enclosed with nonporous covering and that is of sufficient size to permit worker entry." EPA's "current position on greenhouse application is that in accordance with FIFRA section 2(ee) a label does not have to specify greenhouse as a site, provided the crop is on the label, in order to use the product in a greenhouse. ... States may further restrict the use of pesticides by enacting state requirements that do not contradict the federal labeling. For example a state could ban the use of a product at less than the labeled use rate, which FIFRA section 2(ee) normally would allow. A state could also place additional restrictions on the use of the product within the state to protect sensitive use sites such as greenhouses." ¹ Be sure you know the policy or interpretations of your state or region before proceeding and check back regularly in case positions change. Note some products labeled for vegetables *outdoors* include label restrictions against use on *greenhouse* crops. Radiant, for example, can be used on outdoor field-grown tomatoes but the label categorically prohibits use "in greenhouses or other enclosed structures used for growing crops." Never apply more often or at higher rates than labeled, which could result in residue violations, plant injury, and money wasted. To help our growers choosing among products we have compiled a list of options specifically

labeled for greenhouse food crops and target pests – check with your Extension specialist for what's allowed in your area.

Calculating application rates can be confusing. While some materials have label information easy to follow (e. g. "add 1/2 tsp. per gallon of water"), other specify application rates on a per-acre basis requiring more effort and some basic math to figure out. Try spraying, say, 4 gal. of water to the crop to just wet the foliage (f using a foliar spray product), then measure the square footage of ground area just covered (adjustments will be needed as crops grow of course). The dosage is now easy to calculate. For example, Kanemite 15SC is labeled for use on greenhouse cucumbers at 31 fl oz per acre. If you found 4 gallons of water covers a crop grown over 700 sq ft, then add 0.5 fl oz (= 1 level tablespoon) of Kanemite to 4 gal of water to equal the label rate of 31 fl. oz per acre. The following formula shows how that was calculated (43,560 square feet are in one acre):

$$\frac{700 \text{ sq ft for 4 gal water}}{43,560 \text{ sq ft/A}} = \frac{X \text{ fl oz for 4 gal water}}{31 \text{ fl oz/A}}$$

You can re-write this as: $(700 \div 43,560) \times 31 = X$

Doing the math, we get $X = 0.5 \text{ fl oz}$. For dry products, you may need a scale or other way to measure weight. If any of this is still confusing or you need help, check with Extension staff who can assist if needed.

First close encounters with pests don't need to be of the third kind, when there is already a lot of experience to build upon. Including pest management in the business plan pays off.

Reference

¹EPA Pesticide Labeling Questions and Answers, <https://www.epa.gov/pesticide-labels/pesticide-labeling-questions-answers> accessed 4-12-2018.



P.L. LIGHT SYSTEMS
THE LIGHTING KNOWLEDGE COMPANY



Project Sponsors

e-GRO Alert

www.e-gro.org

CONTRIBUTORS

Dr. Nora Catlin
Floriculture Specialist
Cornell Cooperative Extension
Suffolk County
nora_catlin@cornell.edu

Dr. Chris Currey
Assistant Professor of Floriculture
Iowa State University
ccurrey@iastate.edu

Dr. Ryan Dickson
Extension Specialist for Greenhouse
Management & Technologies
University of New Hampshire
ryan.dickson@unh.edu

Thomas Ford
Commercial Horticulture Educator
Penn State Extension
tf2@psu.edu

Dan Gilrein
Entomology Specialist
Cornell Cooperative Extension
Suffolk County
dpg1@cornell.edu

Dr. Joyce Latimer
Floriculture Extension & Research
Virginia Tech
jlatime@vt.edu

Heidi Lindberg
Floriculture Extension Educator
Michigan State University
wollege@anr.msu.edu

Dr. Roberto Lopez
Floriculture Extension & Research
Michigan State University
rglopez@msu.edu

Dr. Neil Mattson
Greenhouse Research & Extension
Cornell University
neil.mattson@cornell.edu

Dr. W. Garrett Owen
Floriculture Outreach Specialist
Michigan State University
wgowen@msu.edu

Dr. Rosa E. Raudales
Greenhouse Extension Specialist
University of Connecticut
rosa.raudales@uconn.edu

Dr. Beth Scheckelhoff
Extension Educator - Greenhouse Systems
The Ohio State University
scheckelhoff.11@osu.edu

Lee Stivers
Extension Educator - Horticulture
Penn State Extension
Washington County
ljs32@psu.edu

Dr. Paul Thomas
Floriculture Extension & Research
University of Georgia
palthomas@uga.edu

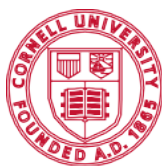
Dr. Ariana Torres-Bravo
Horticulture / Ag. Economics
Purdue University
torres2@purdue.edu

Dr. Brian Whipker
Floriculture Extension & Research
NC State University
bwhipker@ncsu.edu

Copyright © 2018

Where trade names, proprietary products, or specific equipment are listed, no discrimination is intended and no endorsement, guarantee or warranty is implied by the authors, universities or associations.

Cooperating Universities



Cornell University

**Cornell Cooperative Extension
Suffolk County**



**University of
New Hampshire**
Cooperative Extension

PENNSTATE



Cooperative Extension
College of Agricultural Sciences



**MICHIGAN STATE
UNIVERSITY**

UCONN

**PURDUE
UNIVERSITY**



The University of Georgia



**THE OHIO STATE
UNIVERSITY**

**NC STATE
UNIVERSITY**

IOWA STATE UNIVERSITY

In cooperation with our local and state greenhouse organizations

MAUMEE VALLEY GROWERS
Choose the Very Best.



Metro Detroit Flower Growers Association



**CONNECTICUT
GREENHOUSE
GROWERS
ASSOCIATION**



**Indiana
FLOWER
GROWERS
Association**

