scaffolds

Update on Pest Management and Crop Development

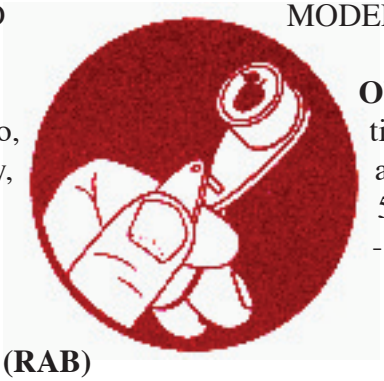
F R U I T J O U R N A L

July 20, 2009 VOLUME 18, No. 18 Geneva, NY

INSECTS

SKY CAM

ORCHARD RADAR DIGEST (Art Agnello, Entomology, Geneva)



MODEL BUILDING

Obliquebanded Leafroller (% estimated egg hatch in DD base 43°F after biofix: 25% hatch - 450 DD; 50% hatch - 630 DD; 90% hatch - 810 DD:

Location	Biofix	DD (as of 7/19)
Albion	6/11	899 (as of 7/18)
Appleton-S	6/15	787
Clifton Park	6/18	759
Geneva	6/11 (estimated)	888
Highland	5/31	1119
Lafayette	6/23	590
Lockport	6/12	841
Lyndonville	6/17	768
Sodus (inland)	6/8	732
Walworth	6/15	765
Waterport	6/17	803
Williamson	6/15	700 (as of 7/16)

❖❖ Geneva Predictions:

Roundheaded Appletree Borer (RAB)
Peak hatch roughly: July 13 to August 5.

Codling Moth
Codling Moth development as of July 20: 2nd generation adult emergence at 2% and 1st generation egg hatch at 99%.

Oriental Fruit Moth
2nd generation – second treatment date, if needed: July 25.

Redbanded Leafroller
Peak catch and approximate start of egg hatch: July 17.

Spotted Tentiform Leafminer
Second optimized sample date for 2nd generation STLM sapfeeding mines: July 24.

❖❖

IN THIS ISSUE...

[NOTE: Consult our mini expert system for arthropod pest management, the
NEWA Apple Insect Models Degree Day Calculator:
http://newa.nrcc.cornell.edu/newaModel/apple_pest
Find accumulated degree days for the current date with the
Degree Day Calculator:
http://newa.nrcc.cornell.edu/newaLister/dday
Powered by the NYS IPM Program's NEWA weather data and ACIS, Northeast Regional Climate Center] ❖❖

OOH, THAT SMELL

CAN'T YOU SMELL THAT SMELL – Stink Bugs in the Hudson Valley
(Peter Jentsch, Entomology, Highland)

❖❖ Stink bugs (Heteroptera: Pentatomidae) are generally native to our region and are notable examples of locally migratory insects that live on a broad complex of plant hosts. Principal hosts found along the orchard edge or resident within herbicide strips include mullein, mustard, dock, plantain, milkweed, mallow, morning glory, thistles, vetch, and velvet grass. These adult "seed-feeders" most often enter our orchards during the dry periods of the season as host plants dry out. Irrigated tree fruit becomes very attractive to the stink bug complex during drought conditions, leading to late season feeding damage in pear, apple and peach orchards. Their mouthparts are designed to pierce the fruit skin and draw out the cellular contents of the fruit flesh, leaving behind dry cell walls that appear as corking when peeled.

The complex of stink bugs includes the green, brown and brown marmorated stink bug (*Acrosternum hilare*, *Euschistus servus* and *Halyomorpha halys*, respectively). The green and brown stink bugs are native to the region and are found throughout the state, while the brown marmorated stink bug is a newly emerging pest on fruit in the northern mid-Atlantic region and lower New York State (Images 1, 2 & 3). As you might suspect,

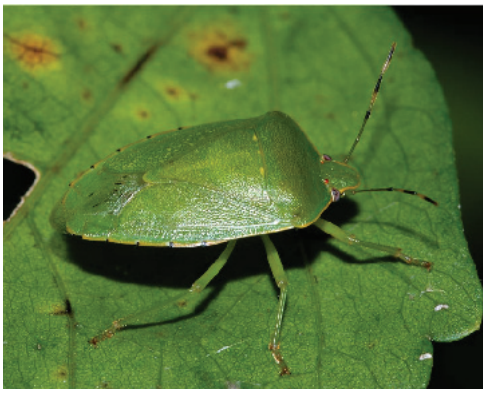


Image 1. The green stink bug *Acrosternum hilare*. Photo by Susan Ellis

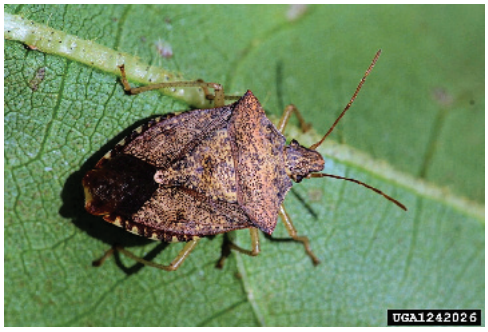


Image 2. The brown stink bug *Euschistus servus*. Photo by Russ Ottens, University of Georgia

continued...

scaffolds
is published weekly from March to September by Cornell University—NYS Agricultural Experiment Station (Geneva) and Ithaca—with the assistance of Cornell Cooperative Extension. New York field reports welcomed. Send submissions by 3 pm Monday to:

scaffolds FRUIT JOURNAL
Dept. of Entomology
NYSAES, Barton Laboratory
Geneva, NY 14456-1371
Phone: 315-787-2341 FAX: 315-787-2326
E-mail: ama4@cornell.edu

Editors: A. Agnello, D. Kain

This newsletter is available online at:
http://www.nysaes.cornell.edu/ent/scaffolds/

Image 3. The brown marmorated stink bug.
Photo by David R. Lance, USDA APHIS PPQ

stink bugs derive their name from the production of pungent and offensive chemicals released when they are disturbed. Relatively mild winters and reduced insecticide programs may help in fostering their overwintering success.

The new addition to the complex, the brown marmorated stink bug, made its appearance in Highland, NY during the fall of 2008. A handful of specimens were brought into my office by a distraught gentleman looking for a way to rid them from his home. This species' native range is China, Japan, Korea, and Taiwan; it evidently is a first-class hitchhiking pest, observed in cargo containers from Asia, and is able to maintain its grip to automobile radio antennas racing along the Pennsylvania turnpike. It has now been identified in parts of New Jersey, Maryland, Delaware, Connecticut, and the southern tier of New York.

The brown marmorated stink bug has distinct alternating light and dark bands on the antennae, and darker bands on the overlapping membranous area at the rear of the front pair of wings. It has copper, bluish-metallic tinted depressions on the head and pronotum not exhibited in other species of regional stink bugs (Image 3). It is known to feed on a wide variety of host plants, including apple, peach, fig, mulberry, citrus fruits and persimmon, along with ornamental plants, weeds, and soybeans. It has been observed feeding on tree fruits in the U.S., resulting in the characteristic "catfacing," on peaches, which renders fruit unmarketable. It also can be an urban nuisance pest, as it seeks protected overwintering sites in and around homes.

Methods for scouting and managing the stink bug complex can be elusive, due to the lack of technical monitoring tools and the economic thresholds traditionally used in insect pest scouting and management. The first level of management for this pest is determining the level of damage your farm has experienced over the past five years. Drought conditions in the Hudson Valley during the latter part of the last few growing seasons have provided ideal conditions for adult stink bug migration and subsequent fruit injury. Weeds can play an important role in stink bug abundance, thus field proximity to weedy areas often results in higher populations and damage.

It's important to note that stink bug feeding differs dramatically among stone fruit, apple and pear. "Catfacing" injury to peaches by stink bug is very similar to that of the plant bug complex. Stone cells naturally occurring in pears are more pronounced in fruit with stink bug feeding injury as cell contents are removed and the thickened cell walls of stone cells remain. However, on apple, fruit damage appears as shallow, circular, light brown to white spongy pockets in the fruit flesh, usually from 5–10 mm in circumference, and 5–8 mm in depth. Stink bug feeding can easily be mistaken for cork spot (bitter pit). Typical feeding injury tends to be on the stem end or sides of the fruit, as those parts of the fruit surface are easier for the insect to stand on, and most likely to be covered by foliage, which provides protection as the bug feeds.

On apple, stink bug feeding and cork spot are distinguishable by several differences in the depressions on the apple surface. With stink bug feeding, the edge of the depression on the fruit surface is gradual instead of abrupt, as observed with cork spot. The corky flesh is always immediately beneath the skin in stink bug injury, and often separates from the skin (Image 4). Stink bug injury always has a small puncture near the center of the feeding depression, requiring magnification to

continued...

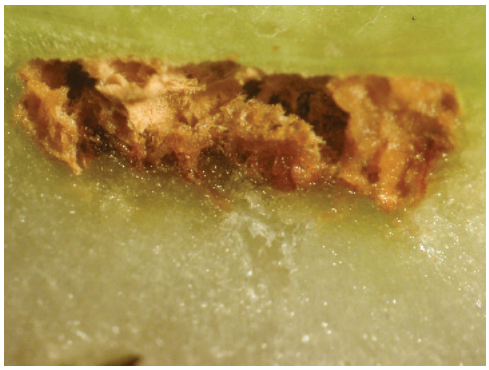


Image 4. Corky flesh immediately beneath the skin in stink bug injury.

observe the feeding site (Image 5). Occasionally, stink bug feeding may leave a "feeding sheath" within the flesh and protruding above the fruit surface (Image 6).

Mark Brown, research entomologist at the USDA Appalachian Fruit Research Station in Kearneysville, WV, found that most stink bug damage occurs between 26–60 days before harvest. He has observed that 'Braburn', 'Jonagold', 'Granny Smith' and 'Stayman' tend to have high stink bug injury levels at harvest, whereas 'Imperial Gala', 'Lawspur Rome', and 'Red Fuji' have been observed to have lower levels of stink bug injury.

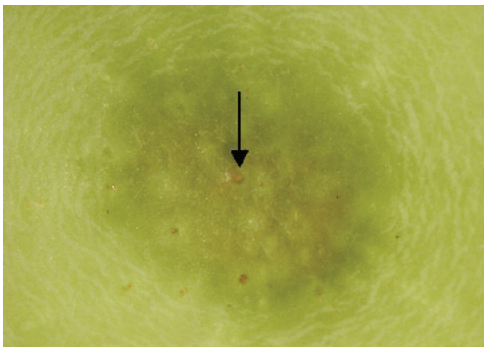


Image 5. A small feeding puncture near the center of the depression.

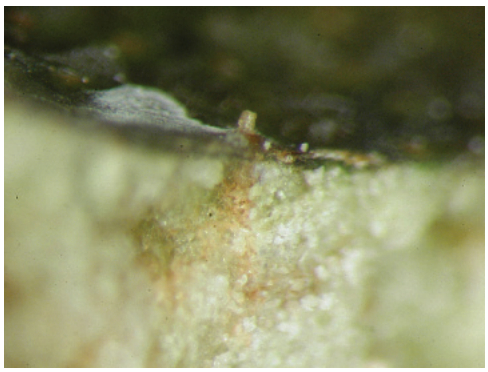


Image 6. Feeding sheath on pear deposited after stink bug feeding is complete.

Stink bugs are very difficult to manage for a number of reasons. They have a broad host range, including many crops and broadleaf weeds. They are highly mobile, frequently moving between weed hosts and fruit trees. They tend to be more active in the evening and during the night. Insecticide applications made during the day may not come in direct contact with the insect, subsequently reducing the effectiveness of the materials. Therefore, stink bugs are not continually exposed to insecticide residues for long periods of time, as are most other insect pests in managed orchards. Consequently, effective management of stink bug points toward repeated applications of insecticides, especially along the borders of orchards during the period of "adults in flight" late in the season.

Hudson Valley Laboratory studies conducted on apple in 2006 demonstrated reductions in stink bug feeding damage with Thionex 50WP (endosulfan), Warrior 1CS (lamda-cyhalothrin) and Danitol 2.4EC (fenpropathrin) treatments at 2-week intervals. The use of Thionex against aphids and leafhoppers will provide incidental control of stink bug (which is not on the label). Thionex has a 21-day PHI, with a maximum of 2 applications during the fruiting season at a maximum labeled rate of 5.0 lbs/A and a maximum seasonal use limit of 6.0 lbs/A. Danitol has a 14-day PHI, does include stink bug on the label, and (in NY) has a 16.0 fl oz/A rate allowed for stink bug, with a maximum limit of 32 fl oz/A per season. Danitol will control European red mite, apple maggot, the internal lep complex and the leafhopper complex. Warrior has a 21-day PHI, also includes stink bug on the label, with a 2.56–5.12 fl oz/A use range for stink bug, and a maximum use rate of 20.48 fl oz/A per year post-bloom. Warrior will control apple maggot, the internal lep complex and the leafhopper complex. Pyrethroids in general are less effective in hot weather and may cause late season mite flare-up. ❖❖

DISEASES

HELLO INDAR!

INDAR FUNGICIDE MAY BE USEFUL FOR CONTROLLING APPLE SUMMER DISEASES AND BROWN ROT ON PLUMS

(Dave Rosenberger, Plant Pathology, Highland)

❖❖ Indar fungicide was recently registered for use on apples and plums in New York State. Indar is a DMI or "sterol inhibitor" fungicide, but performs much differently than Rubigan or Rally. Indar can protect apple fruit from scab and sooty blotch/flyspeck (SBFS), whereas Rubigan and Rally were never very effective for protecting fruit.

In New York State, Indar is still available in the original 75WSP formulation that has been labeled for many years on cherries, peaches, and apricots. That formulation is now labeled for use on apples at 2.67 oz/A and on plums/prunes at 2 oz/A. The manufacturer is transitioning to Indar 2F which is labeled on apples at 6–8 fl oz/A and on stone fruits (including plums and prunes) at 6 oz/A. On apples, Indar has a 14-day preharvest interval, whereas on stone fruits it has a 0-day PHI. New York growers using Indar 75WSP on apples, prunes and plums will need to have the supplemental label in-hand. If instead they use Indar 2F on the same crops, they will need to have the Indar 2F Section 3 label in-hand.

Warning!! Growers who might consider using Indar for summer diseases face a critical decision. Using DMI fungicides during summer will almost certainly speed selection for DMI-resistant strains of apple scab. In orchards where DMI fungicides are still effective for controlling apple scab, neither Indar nor any other DMI fungicide should be used after mid-June. Thus, anyone using Indar on apples during July and August is tacitly agreeing that they no longer expect DMIs to provide scab control in those orchards.

We know that DMIs are no longer effective against apple scab in many orchards, so it makes sense to consider Indar as an option for summer disease control in these orchards. Summer applications of Indar may be especially useful if apples will be marketed to buyers that do not permit late-season use of Topsin M. However, we have relatively little data on the best strategies for using Indar during summer. The following paragraphs provide a summary of relevant research along with my "best guesses" for optimal use of Indar during summer.

Question #1: Should I use Indar alone or in combination with another fungicide? When used alone, Indar has controlled SBFS as well as our traditional Topsin/Captan combination in most tests (Table 1). However, Indar is not labeled for controlling summer fruit rots. Published data suggests that Indar applied to control SBFS will suppress black rot, but I am not certain how well it will do on cultivars like Cortland where fruit can be exposed to high black rot inoculum from fruitlet mummies that are retained in the tree. Also, I doubt that Indar will control bitter rot. Thus, it seems prudent to combine Indar with another fungicide that will protect against summer fruit rots.

Combining Indar with Topsin M should give excellent activity against black rot but virtually no activity against bitter rot, and that combination provides no advantage for those wishing to avoid late-season applications of Topsin M. The most logical combination would be with Captan (perhaps 2 lb/A of Captan-80). However, Captan labels warn against using spray adjuvants that enhance penetration, whereas Indar may work better when used with a good non-ionic surfactant (see Question #2). A combination of Indar plus Ziram would allow use of a non-ionic surfactant, but zi-

continued...

ram tends to leave a lot of visible residue on fruit. Thus, none of these options are ideal. I would opt to use an Indar/Captan combination.

Question #2: Does Indar work better with a non-ionic surfactant (NIS)? In tests designed to evaluate Indar as a scab control fungicide, Dow (the manufacturer) has noted that using a good NIS with Indar can significantly increase its activity against leaf scab. In his research on brown rot of tart cherry, Dr. Wayne Wilcox noted that using a NIS with Indar improved control of brown rot. However, benefits of using a NIS with Indar were minimal or absent in trials on peaches that were conducted by Dr. Norm Lalancette in NJ. The current label for controlling brown rot on plums and prunes specifically recommends addition of a NIS. Although we do not know if using a NIS with Indar on apples will improve control of summer diseases, it seems likely that an Indar/NIS combination will work better on waxy, smooth-surfaced fruit than will Indar used alone.

Dr. Brian Olson with Dow pointed out that Indar is the least water soluble of all of the registered DMI fungicides. That lack of water solubility is probably part of the reason that it is active on fruit surfaces: More water-soluble DMIs like Rally and Rubigan are probably absorbed into and quickly diluted within fruit, whereas Indar stays on the fruit surface for a longer period of time. However, adding a NIS may increase penetration of the fruit cuticle just enough to improve residual activity and enhance activity against pathogens that penetrate beyond the fruit cuticle. In particular, I would expect that a good NIS would enhance penetration of Indar into fruit lenticels where black rot infections are usually initiated during summer.

Question #3: What is the best timing for using Indar during summer? Anytime during summer is probably okay, but I would NOT use Indar as the last fungicide of the season, because we lack data on its residual activity, especially as it relates to controlling black rot fruit decays. Residual activity against SBFS and black rot is critical during the prolonged interval between the last spray and harvest. Therefore, until further research is completed, I suggest that either Pristine or Topsin/Captan be used in the last spray of the season, especially for late-harvested cultivars and in regions and/or orchard blocks where late-season flyspeck is a concern. ❖❖

Table 1. Effectiveness of Indar for controlling flyspeck and summer fruit rots in recent trials conducted at the Hudson Valley Lab in Highland, NY.

Treatment and rate/100 gal of dilute spray (=1/3rd of rate/A)	% fruit with flyspeck at harvest 2007 Empire	2008* Redcort	2008* Golden Del.	% fruit with summer fruit rots at harvest 2008*: Golden Delicious
Unsprayed	97 d**	86 b	98 d	21 b
Captan-80 10 oz	22 c	22 a	17 c	1 a
Captan+Topsin M 5 oz	4 a	6 a	<1 a	0 a
Indar 2F 2.66 fl oz*	6 a	8 a	5 b	4 a

*In the 2008 trial, Indar was applied with LI-700 8 fl oz/100 gal.

** Means followed by the same letter do not differ significantly (Fisher's Protected LSD, P≤0.05)

GENERAL INFO

FIELD DAYS

EVENT REMINDERS

*LAKE ONTARIO SUMMER FRUIT TOUR, WAYNE CO.
Thursday, July 23 from 8:00 am
Registration and 1st stop at Van DeWalle Fruit Farm, Shaker Rd., Alton

Presented by Cornell Cooperative Extension and the NYS Agric. Expt. Sta., this tour will cover aspects of horticulture, entomology and plant pathology research projects and trials being conducted on grower farms in Alton, Sodus, and Williamson. Presentations by Terence Robinson, Kerik Cox, Andrew Landers, Robin Bellinder, Mark Lagoner, Dan Bennett (USDA-NRCS), Craig Kahlke, Art Agnello, Deb Breth, Tom & Alison DeMarree. Lunch and DEC credits available. RSVP to Kim Hazel (585-798-5265 ext 26; krh5@cornell.edu) by July 21.

*WAYNE CO. FRUITGROWER TOUR
Wednesday, August 12, from 11:00 am
Registration and 1st stop at KC Bailey Orchards, Williamson

Sponsored by agr.assistance, this large, informative and entertaining tour is in its 11th year, and will feature presentations on new apple plantings, pesticide storage regs, GAP programs, PGR and nutritional developments, equipment demos, and updates on fire blight, weed control, mating disruption, plus much more. Door prizes, lunch, high (and low) humor, BBQ/clambake dinner with a live band, growers and industry representatives from NY and surrounding states — tough to beat on a midsummer day.
Contact Lindsay LaMora (585-734-8904; lindsaylamora@agrassistance.com) for RSVP and tour information.

*SEPTEMBER FIELD DAY

We're about one and a half months away from the annual N.Y. Fruit Pest Control Field Day, which will take place during Labor Day week on Sept. 9 and 10 this year, as dictated by tradition. These dates fall on the Wednesday and Thursday of the week, with the Geneva installment taking place first (Wednesday Sept. 9), and the Hudson Valley installment on the second day (Thursday Sept. 10). Activities will commence in Geneva on the 9th, with registration, coffee, etc., in the lobby of Barton Lab at 8:30 am. The tour will proceed to the orchards to view plots and preliminary data from field trials involving new fungicides, bactericides, miticides, and insecticides on tree fruits and grapes. It is anticipated that the tour of field plots will be completed by noon. On the 10th, participants will register at the Hudson Valley Laboratory starting at 8:30, after which we will view and discuss results from field trials on apples and other fruit crops. No pre-registration is required for either event.

CHEM NEWS

INDAR RECEIVES CHANGE IN LABEL REGISTRATION FOR APPLE, PLUM, PRUNE

❖❖ The DEC has announced the acceptance of a major change in labeled use for Indar 75WSP fungicide (Dow AgroSciences, EPA Reg. No. 62719-421) on apples, plums and prunes in NYS, to control apple scab, sooty blotch and flyspeck and brown rot. This product, which has the active ingredient fenbuconazole, belongs to the DMI or "sterol inhibitor" class of fungicides, but is more effective at protecting fruit than other members of this class. The manufacturer is transitioning to a new 2F formulation, but the 75WSP formulation can be used on the new crops if growers are in possession of the supplemental label. See Dave Rosenberger's article, above, for more details.

INSECT TRAP CATCHES (Number/Trap/Day)

Geneva, NY	7/13	7/16	7/20	Highland, NY	7/13	7/20
Redbanded leafroller	1.8	2.0	2.8	Redbanded leafroller	5.9	4.9
Spotted tentiform leafminer	6.4	13.2	13.0	Spotted tentiform leafminer	183	153
Oriental fruit moth	0.9	1.0	0.5	Oriental fruit moth	1.4	1.1
Lesser appleworm	0.0	0.0	0.0	Lesser appleworm	3.6	5.3
Codling moth	0.0	0.1	0.0	Codling moth	0.4	0.7
San Jose scale	0.0	0.0	0.5*	Lesser peachtree borer	0.2	0.4
American plum borer	0.1	0.1	0.1	Obliquebanded leafroller	2.4	0.6
Lesser peachtree borer	0.6	0.3	0.3	Dogwood borer	0.2	0.1
Peachtree borer	0.1	0.0	0.0	Peachtree borer	2.1	2.2
Obliquebanded leafroller	0.0	0.0	0.0	Tufted apple budmoth	0.4	0.1
Dogwood borer	–	6.8	–	Variegated leafroller	0.1	0.0
Apple maggot	–	–	0.0	Apple maggot	0.2	0.3

* first catch

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–7/20/09):	1757	1094
(Geneva 1/1–7/20/2008):	1970	1302
(Geneva "Normal"):	1919	1283
(Geneva 1/1–7/27 Predicted):	1955	1243
(Highland 3/1–7/20/09):	1965	1245

Coming Events:	Ranges (Normal ±StDev):	
Lesser appleworm 2nd flight begins	1393–1935	905–1275
Apple maggot 1st oviposition punctures	1605–2157	1144–1544
Oriental fruit moth 2nd flight peak	1468–1948	939–1303
Codling moth 1st flight subsides	1321–1871	850–1232
Codling moth 2nd flight begins	1552–2246	1012–1510
Spotted tentiform leafminer 2nd flight peak	1382–1796	866–1194
STLM 2nd gen. tissue feeders present	1378–2035	913–1182
American plum borer 2nd flight begins	1479–2019	978–1334
Obliquebanded leafroller 1st flight subsides	1612–1952	1048–1302
Redbanded leafroller 2nd flight peak	1540–1984	990–1330
San Jose scale 2nd flight begins	1583–1929	1025–1297
Comstock mealybug 1st flight subsides	1818–2132	1216–1418

NOTE: Every effort has been made to provide correct, complete and up-to-date pesticide recommendations. Nevertheless, changes in pesticide regulations occur constantly, and human errors are possible. These recommendations are not a substitute for pesticide labelling. Please read the label before applying any pesticide.

This material is based upon work supported by Smith Lever funds from the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture.