scaffolds

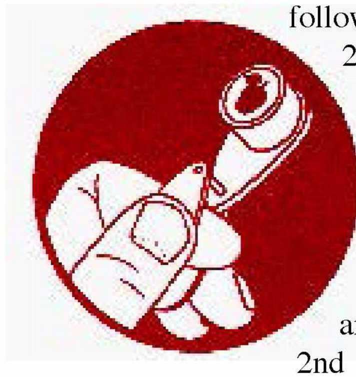
Update on Pest Management and Crop Development

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

June 23, 2014 VOLUME 23, No. 14 Geneva, NY

WINGIN' IT

ORCHARD RADAR DIGEST



[H = Highland; G = Geneva]:

Roundheaded Appletree Borer
Peak RAB egglaying period roughly: June 23 to July 7 (H)/June 27 to July 12 (G). First RAB eggs hatch roughly: June 20 (H)/June 23 (G); peak hatch roughly: July 8 to July 27 (H)/July 12 to August 1 (G).

Dogwood Borer
First DWB egg hatch roughly: June 23 (H)/June 27 (G). Peak hatch roughly: July 27 (H)/August 1 (G).

Codling Moth
Codling moth development as of June 23: 1st generation adult emergence at 95% (H)/90% (G) and 1st generation egg hatch at 66% (H)/49% (G).

Lesser Appleworm
2nd generation LAW flight begins around: July 8 (H)/July 13 (G).

Obliquebanded Leafroller
Where waiting to sample late instar OBLR larvae is not an option (= where OBLR is known to be a problem, and will be managed with an insecticide against young larvae): early egg hatch and optimum date for initial application of an insecticide effective against OBLR (with follow-up applications as needed): June 22 (H)/June 26 (G).
Optimum sample date for late instar summer generation OBLR larvae: July 1 (H)/July 6 (G).

Oriental Fruit Moth
2nd generation OFM flight begins around: June 26 (H)/July 1 (G).
2nd generation first treatment date, if needed: July 3 (H)/July 9 (G).

Redbanded Leafroller
2nd RBLR flight begins around: June 27 (H)/July 1 (G).

Spotted Tentiform Leafminer
Rough guess of when 2nd generation sap-feeding mines begin showing: July 3 (H)/July 7 (G).

❖❖

IN THIS ISSUE…

TOO MUCH SUN

SOLSTICE STEW
(Art Agnello, Entomology, Geneva; ama4@cornell.edu)

Obliquebanded Leafroller

❖❖ Assuming a biofix (1st adult catch) of OBLR this year from about June 8–16, sites around the state have accumulated a total of 320–345 DD (base 43°F) in the most advanced sites, with perhaps 135 DD in later northerly regions. First egg hatch is generally expected at about 360 DD, which should occur sometime between June 28–July 1 in most sites; the 630 DD point in the insect's development roughly corresponds to 50% egg hatch, and at 720 DD, the earliest emerging larvae have reached the middle instars that are large enough to start doing noticeable damage to foliar terminals and, eventually, the young fruits. This is also the earliest point at which visual inspection for the larvae is practical, so sampling for evidence of a treatable OBLR infestation would be recommended at that time in orchards where pressure has not been high enough to justify a preventive spray.

Guidelines for sampling OBLR terminal infestations can be found on p. 71 in the Recommends, using a 3% action threshold that would lead to a recommended spray of an effective leafroller material. Delegate, Belt, Altacor and Proclaim are our preferred choices in most cases; Rimon, Intrepid, a B.t. material or a pyrethroid are also options, depending on block history and previous spray efficacy against specific populations. If the average percentage of terminals infested with live larvae is less than 3%, no treatment is required right away, but another sample should be taken three to five days (100 DD) later, to be sure populations were not underestimated.

Green Aphids

Although small numbers of green aphids (Spirea aphid, Aphis spiraecola, and Apple aphid, Aphis pomi) may have been present on trees early in the season, populations have been increasing regularly as the summer weather patterns gradually become established. Both species are common during the summer in most N.Y. orchards, although no extensive surveys have been done to compare their relative abundance in different production areas throughout the season. It's generally assumed that infestations in our area are mostly Spirea aphid.

Nymphs and adults suck sap from growing terminals and water sprouts. High populations cause leaves to curl and may stunt shoot growth on young trees. Aphids excrete large amounts of honeydew, which collects on fruit and foliage. Sooty mold fungi that develop on honeydew cause the fruit to turn black, reducing its quality.

Aphids should be sampled several times throughout this season starting now. Inspect 10 rapidly growing terminals from each of 5 trees throughout the orchard, noting the percentage of infested terminals, including rosy aphid-infestations, since they tend to affect the foliage similarly to the green

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scaffolds
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species at this time of the year. No formal studies have been done to develop an economic threshold for aphids in N.Y. orchards. Currently, treatment is recommended if 30% of the terminals are infested with either species of aphid, or at 50% terminal infestation and less than 20% of the terminals with predators (below). An alternative threshold is given as 10% of the fruits exhibiting either aphids or honeydew.

The larvae of syrphid (hoverflies) and cecidomyiid flies (midges) prey on aphids throughout the summer. These predators complete about three generations during the summer. Most insecticides are somewhat toxic to these two predators, and they usually cannot build up sufficient numbers to control aphids adequately in regularly sprayed orchards. Check Tables 7.1.1 (p. 63) and 7.1.2 (p. 65) in the Recommends for ratings of efficacy and impact on beneficials for common spray materials. Both aphid species are resistant to most organophosphates, but materials in other chemical classes that control these pests effectively include: Admire, Asana, Assail, Aza-Direct, Beleaf, Calypso, Danitol, Lannate, Movento, Proaxis, Pyrenone, Thionex, Vydate and Warrior.

Woolly Apple Aphid

WAA colonizes both aboveground parts of the apple tree and the roots and commonly overwinters on the roots. In the spring, nymphs crawl up on apple trees from the roots to initiate aerial colonies. Colonies initially build up on the inside of the canopy on sites such as wounds or pruning scars and later become numerous in the outer portion of the tree canopy, usually during late July to early August, but you may already begin to notice these aerial colonies in high pressure orchards in the region. Refer to the June 9 issue of Scaffolds for an overview of some control recommendations.

Potato leafhopper

PLH is generally a more serious problem in the Hudson Valley than in western New York or the Champlain Valley; however, healthy populations can be found in WNY as well this season. Refer to the June 16 issue of Scaffolds for an overview of its biology and some control recommendations.

Japanese Beetle

This perennial pest overwinters as a partially grown grub in the soil below the frost line. In the spring the grub resumes feeding, primarily on the roots of grasses, and then pupates near the soil surface. Adults normally begin to emerge during the first week of July in upstate N.Y. The adults fly to any of 300 species of trees and shrubs to feed; upon emergence, they usually feed on the foliage and flowers of low-growing plants such as roses, grapes, and shrubs, and later on tree foliage. On tree leaves, beetles devour the tissue between the veins, leaving a lacelike skeleton. Severely injured leaves turn brown and often drop. Adults are most active during the warmest parts of the day and prefer to feed on plants that are fully exposed to the sun.

Although damage to peaches is most commonly noted in our area, the fruits of apple, cherry, peach and plum trees may also be attacked, all of which have been suffering increasing damage from these insects in recent years. Fruits that mature before the beetles are abundant, such as cherries, may escape injury. Ripening or diseased fruit is particularly attractive to the beetles. Pheromone traps are available and can be hung in the orchard in early July to detect the beetles' presence; these products are generally NOT effective at trapping out the beetles. Fruit and foliage may be protected from damage by spraying an insecticide such as Assail, Calypso, Sevin or Voliam Xpress (in apple) or Admire, Assail, Sevin, Endigo, Leverage or Voliam Xpress (in cherries or peaches) when the first beetles appear. ❖❖

(Information adapted from: Johnson, W.T. & H.H. Lyon. 1988. Insects that feed on trees and shrubs. Cornell Univ. Press.; and Howitt, A.H. 1993. Common tree fruit pests. Mich. State. Univ. Ext. NCR 63.)

STINK BUG SURVEY CLOSING SOON

❖❖ Got stink bugs? We need your help! We're surveying growers to assess the impact of BMSB on crops and gather information that will help us defeat this pest. Receive a free Guide to Stink Bugs* if you complete the 10-minute BMSB survey (https://cornell.qualtrics.com/SE/?SID=SV_5ssnjXLNhvp6v1H). Your participation will help us to help you Stop BMSB! The survey will be available until June 30th.

—The Outreach Team for "StopBMSB," a project focused on the biology, ecology, and management of the brown marmorated stink bug.
For more info: StopBMSB.org
[* see it at https://pubs.ext.vt.edu/444/444-356/444-356_pdf.pdf]
❖❖

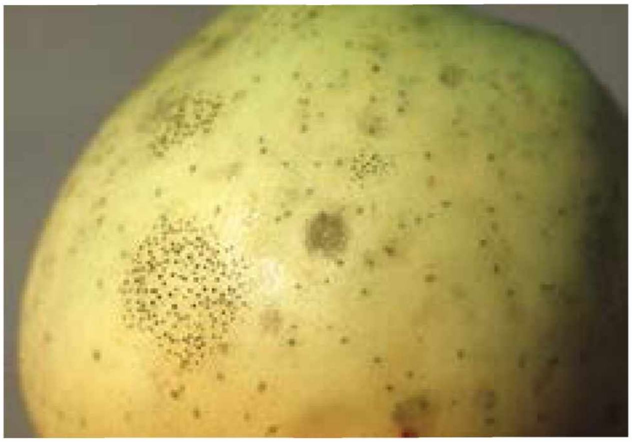
Fig. 1

SUMMER SKIN CARE

DISEASES

CONTROLLING SUMMER DISEASES ON APPLES
(Dave Rosenberger, Plant Pathology, Highland)

❖❖ Summer diseases on apples include the fungal surface blemishes known as sooty blotch and flyspeck (Fig. 1) and also the fungal fruit decays known as black rot, white rot, and bitter rot. More than 60 different fungi can cause sooty blotch and flyspeck (SBFS), but most of the SBFS in sprayed orchards is attributable to just a few of those species. Black rot and white rot are caused by *Botryosphaeria obtusa* and *B. dothidea*, respectively. Bitter rot is caused by one or more species of the fungal genus *Colletotrichum*. Strategies for timing sprays for SBFS have changed and evolved over the past 25 years. Those not interested in the history of proposed control measures for SBFS that are presented below should skip to the last section for current recommendations.

Development of SBFS models

Determining optimum timing for fungicides needed to control SBFS has been complicated by the long incubation period that separates infection from disease appearance on the fruit. In 1995, Brown and Sutton published results of field studies in North Carolina that showed that the incubation period for SBFS required 272 hours of accumulated leaf wetting, but they did not count wetting periods of less than three hours in duration. Work in Dan Cooley's lab at the University of Massachusetts showed that the fungus causing flyspeck began releasing ascospores sometime during bloom. At about the same time, observations in New York led me to believe that some fungicides (especially benomyl, which is no longer registered) could provide some post-infection activity against

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SBFS. Putting all of this information together, I proposed the following logic for determining when the first fungicides targeting SBFS might be needed during summer:

1- Fungicides applied to control apple scab also control SBFS during the initial inoculum release starting around petal fall.
2 - In sprayed orchards in the northeastern United States, flyspeck is more difficult to control than sooty blotch. Therefore, spray programs targeting flyspeck will also control sooty blotch. This observation allowed us to focus on timing of flyspeck ascospore release as studied in MA.
3 - The major risk of SBFS infection in sprayed orchards begins when secondary inoculum becomes available from wild hosts in the orchard perimeter.
4 - Combining research results from North Carolina on duration of the incubation period along with data from Massachusetts on the time of ascospore release for the fungus causing flyspeck, we suggested that the incubation period in wild hosts would be roughly 272 hours from apple petal fall. Thus, after 272 hours of accumulated wetting from petal fall (hr-AWPF), growers would need to protect orchards from the influx of SBFS inoculum that could be expected from orchard perimeters. To simplify calculations, we included all wetting periods rather than ignoring those of less than 3 hours duration as suggested by the work in North Carolina.
5 - We suggested that post-infection activity of fungicides would allow us to delay the first application to 350 hr-AWPF because initial infections from secondary inoculum could be eliminated via post-infection activity of the fungicides.

Why the old model no longer applies

Three major changes have occurred that make the old model obsolete. First, the North Carolina model indicating an incubation period of 272 hours of accumulated wetting was based on string recorders, as were the subsequent suggestions for when growers in the Northeast should begin their SBFS sprays. However, NEWA stations are equipped with electronic recorders that are somewhat less sensitive to wetting that the old string recorders. Our current best estimate for the SBFS incubation period using electronic sensors is 185 hr of wetting (i.e., 272 hr on a string recorder = 185 hr on electronic sensors in the NEWA network).

The second reason for changing the model involves the need for protection against black rot. We have found that omitting fungicides for extended periods in late June and July can result in establishment of quiescent black rot infections that then develop into fruit decays as fruit approach maturity. These quiescent infections are more problematic on early-maturing as compared to late-maturing cultivars.

The third reason for changing the model is that continued field trials and observations at the Hudson Valley Lab have revealed that fungicides almost certainly do NOT provide the degree of post-infection activity that we initially thought we were observing. We have found that fungicides can arrest fungal development of pre-existing infections, but they never provide complete eradication. Once fungicide residues are depleted, many of the pre-existing SBFS colonies resume growth. Thus, if fungicide applications are delayed beyond 185 hr-AWPF (using NEWA data), then some colonies may become established and persist through summer. Those SBFS colonies may never show up on fruit if fungicide protection is maintained right up through harvest. However, in many years, fungicide protection will lapse a week or two prior to harvest and incubating SBFS infections will then appear suddenly prior to harvest because they got a jump-start early in the season. If there are no fungicide protection gaps during summer, then the preharvest protection gap can be as much as 185 hr of accumulated wetting before SBFS will appear on fruit, but any protection gaps during summer must be subtracted from the 185-hr "grace period". A protection gap occurs anytime that the interval between summer sprays exceeds either 2 inches of accumulated rainfall or 21 days.

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To illustrate, let's use conditions at the Hudson Valley Lab and data from the Highland NEWA station. I will use May 18 as the petal fall date for starting the SBFS model. (Be sure to set the petal fall date to match your own observations rather than using the default date that is entered at the top of the NEWA page for the SBFS model!) The NEWA model indicates that as of 22 June we have accumulated 170 hours of leaf wetness since petal fall. Let's assume that my last scab fungicide was applied on 2 June. Rainfall since 2 June totals 2.27 inches, so I know that my last scab fungicide is no longer providing any viable protection against SBFS. Rains predicted for later this week will probably push us over the 185 hr-AWPF threshold for the beginning of the SBFS spore influx from the orchard perimeter. To prevent establishment of any SBFS infections, I will want to apply my first SBFS fungicide sometime this week. However, the timing is not critical. If it is more convenient to delay my next fungicide until next week, that will still be OK so long as I remember that, if we get a lot of rain and a lot of hours of wetting later this week, I will end up using some of my total "grace period" which consists of 185 hr of wetting without fungicide protection between now and harvest.

Current recommendations for SBFS control

The NEWA model provides a reasonable estimate of when the SBFS risk period begins if the petal fall date is entered correctly at the top of the model. Timing of summer fungicides is not nearly so critical as timing for scab sprays, but I strongly recommend that growers avoid extended protection gaps after the NEWA model indicates that SBFS is active. Leaving trees unprotected after late June will increase the likelihood that black rot fruit decays and/or SBFS will appear shortly before harvest.

Fungicide recommendations for SBFS have not changed much in recent years. I will provide a more detailed summary of apple fungicide options for summer in next week's issue of Scaffolds. However, a quick summary is provided below:

Topsin M + Captan: Standard treatment for SBFS and summer fruit rots, but late-season applications of Topsin M are not acceptable for some markets, and the Topsin M label limits applications to a total of 64 oz/A/year. Most growers are finding that Topsin M must be applied at 12–16 oz/A for good results, so that means that this combination can be used no more than 4 or 5 times per year.

Captan plus a labeled phosphite fungicide: This combination is just as effective as Topsin + Captan against SBFS, but the phosphites have little or no activity against black rot. Thus, with this combination, control of black rot and other summer fruit rots is dependent on the rate of Captan that is applied.

Inspire Super + Captan: Inspire Super is very effective against SBFS, but like the phosphites, it is less effective than Topsin or strobilurin fungicides for controlling fruit rots. Using Inspire Super during summer may also contribute to selection pressure for DMI-resistant apple scab if primary scab was not completely controlled, although that assumption remains unproven.

Flint + Captan, Pristine + Captan, and Merivon + Captan all provide nearly equivalent control of both SBFS and summer fruit rots. The latter two have better long-term residual activity than Flint and are therefore preferred for the last spray in August or September, when a long residual is needed to cover the gap until harvest. All of these combinations include strobilurin fungicides (FRAC group 11) and have label limitations on the total number of applications per season and/or the number of sequential applications that are allowed.

Fontelis does not have much activity against SBFS and is not recommended during summer.

Captan applied alone can be effective if applied at higher rates (4 to 5 lb/A of Captan 80W) and at no more than 14-day intervals. However, mixing captan with one of the fungicides mentioned above generally provides better results.❖❖

PEST FOCUS

Geneva: **San Jose scale** crawlers emerging 6/18. **Spotted tentiform leafminer** 2nd flight began 6/19. **Peachtree borer** 1st catch today, 6/23.

Highland:
Obliquebanded leafroller eggs hatching. **Spotted tentiform leafminer** 2nd flight beginning. **San Jose scale** crawlers emerging, causing fruit damage. **Brown marmorated stinkbug** adults found feeding on pear and cherry.

INSECT TRAP CATCHES
(Number/Trap/Day)

Geneva, NY

	6/16	6/19	6/23
Redbanded leafroller	0.0	0.2	0.0
Spotted tentiform leafminer	0.8	4.7*	15.0
Oriental fruit moth	0.2	0.2	0.1
Codling moth	0.8	0.0	0.3
Lesser appleworm	1.3	1.5	1.0
San Jose scale	0.3	0.0	0.3
American plum borer	0.0	0.0	0.0
Lesser peachtree borer	0.2	0.7	0.0
Pandemis leafroller	5.2	5.0	0.9
Obliquebanded leafroller	0.8	0.3	0.8
Dogwood borer	0.0	0.7	0.1
Peachtree borer	0.0	0.0	0.1

* first catch

Highland, NY

	6/16	6/23
Redbanded leafroller	0.0	0.6
Spotted tentiform leafminer	14.6*	53.0
Oriental fruit moth	1.5	2.5
Codling moth	1.4	3.2
Lesser appleworm	0.4	1.3
Variegated leafroller	2.5	1.2
Tufted apple budmoth	1.8	4.7
Sparganothis fruitworm	0.9	0.1
Obliquebanded leafroller	1.7	5.9

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–6/23/14):	1162	726
(Geneva 1/1–6/23/2013):	1156	722
(Geneva "Normal"):	1245	720
(Geneva 1/1–6/30/14, predicted):	1360	875
(Highland 1/1–6/23/2014):	1384	870

Coming Events:	Ranges (Normal ±StDev):	
American plum borer 1st flight subsides	1199–1461	744–946
Codling moth 1st flight peak	561–991	306–586
San Jose scale 1st flight subsides	855–1227	508–760
Pandemis leafroller flight peak	874–1170	503–717
Obliquebanded leafroller 1st flight peak	830–1204	483–753
Obliquebanded leafroller summer larvae hatch	1038–1460	625–957
Cherry fruit fly 1st catch	755–1289	424–806
Oriental fruit moth 2nd flight begins	1275–1507	786–980
Lesser appleworm 1st flight subsides	990–1466	604–932
Pear psylla 2nd brood eggs hatch	967–1185	584–750
Redbanded leafroller 2nd flight begins	1232–1578	758–1028

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