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Update on Pest Management and Crop Development

June 20, 2005 VOLUME 14, No. 14 Geneva, NY

INSECTS

SUMMER MOTHS

ORCHARD RADAR DIGEST

Geneva Predictions:

Roundheaded Appletree Borer
Peak egglaying period roughly: June 25 to July 9.
First RAB eggs hatch roughly: June 23.

Dogwood Borer
First Dogwood borer egg hatch roughly: June 27.

Codling Moth
Codling moth development as of June 20: 1st generation adult emergence at 90% and 1st generation egg hatch at 49%.

Obliquebanded Leafroller
Where waiting to sample late instar OBLR larvae is not an option (OBLR is known to be a problem, and will be managed with early application of an insecticide only effective against young larvae): The optimum date to begin 2 to 4 weekly low-rate Bt applications for small OBLR larvae is: June 20.
The optimum date for application of Intrepid, SpinTor or other insecticide with comparable efficacy against OBLR (with possible follow-up at 10-14 days) is: June 25.
Where waiting to sample late instar OBLR larvae to determine need for treatment is an option, or to check on results from earlier sprays: Optimum sample date for late instar summer generation OBLR larvae: July 4.

Oriental Fruit Moth
2nd generation OFM flight begins around: June 30.
Optimum 2nd generation - first treatment date, if needed: July 6.

Redbanded Leafroller
2nd RBLR flight begins around: July 1.

San Jose Scale
1st generation SJS crawlers appear: June 18.

Spotted Tentiform Leafminer
Rough guess when 2nd generation sap-feeding mines begin showing: July 6.

Highland Predictions:

Roundheaded Appletree Borer
RAB peak egglaying period roughly: June 23 to July 7.
First RAB eggs hatch roughly: June 23.

Dogwood Borer
First Dogwood borer egg hatch roughly: June 26.

continued...

IN THIS ISSUE...

Codling Moth
Codling moth development as of June 20: 1st generation adult emergence at 94% and 1st generation egg hatch at 62%.

Lesser Appleworm
2nd LAW flight begins around: July 6.

Obliquebanded Leafroller
Where waiting to sample late instar OBLR larvae is not an option (OBLR is known to be a problem, and will be managed with early application of an insecticide only effective against young larvae): The optimum date to begin 2 to 4 weekly low-rate Bt applications for small OBLR larvae is: June 16.
The optimum date for application of Intrepid, SpinTor or other insecticide with comparable efficacy against OBLR (with possible follow-up at 10-14 days) is: June 22.
Where waiting to sample late instar OBLR larvae to determine need for treatment is an option, or to check on results from earlier sprays: Optimum sample date for late instar summer generation OBLR larvae: July 1.

Oriental Fruit Moth
2nd generation OFM flight begins around: June 27.
Optimum 2nd generation - first treatment date, if needed: July 2.

San Jose Scale
1st generation SJS crawlers appear: June 15.

Spotted Tentiform Leafminer
Rough guess of when 2nd generation sap-feeding mines begin showing: July 2.

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RED BALL EXPRESS

ON THE FLY
(Harvey Reissig & Art Agnello, Entomology, Geneva)

❖❖ Once again, it is nearly time to expect the first appearance of apple maggot (AM) flies in volunteer apple stands and abandoned orchards, particularly in eastern N.Y.; western N.Y. could be about a week later, or not, depending on what kind of temperatures we get over the next week or so. Crop scouts and consultants have been using traps to monitor AM populations for a long time, but this tactic, useful as it is, nevertheless is not recommended in all cases. Some orchards have such high or such low AM populations that monitoring for them is a waste of time. That is, sprays are needed predictably every season in some blocks, and on a calendar basis; conversely, they are rarely needed at all in other blocks. However, most commercial N.Y. orchards have moderate or variable pressure from this pest, so monitoring to determine when

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damaging numbers of them are present can reduce the number of sprays used in the summer with no decrease in fruit quality.

Sticky yellow panels have been in use for over 30 years, and can be very helpful in determining when AM flies are present. These insects emerge from their hibernation sites in the soil from mid-June to early July in New York, and spend the first 7-10 days of their adult life feeding on substances such as aphid honeydew until they are sexually mature. Because honeydew is most likely to be found on foliage, and because the flies see the yellow panel as a "super leaf", they are naturally attracted to it during this early adult stage. A few of these panels hung in an orchard can serve as an early warning device for growers if there is a likely AM emergence site nearby.

Many flies pass this period outside of the orchard, however, and then begin searching for fruit only when they are ready to mate and lay eggs. That means that this advance warning doesn't always have a chance to take place — the catch of a single (sexually mature) fly then indicates a spray is necessary immediately to adequately protect the fruit. This can translate into an undesirable risk if the traps are not being checked daily, something that is not always possible during a busy summer.

To regain this time advantage, researchers developed newer traps that have the form of a "super apple" — large, round, deep red, and sometimes with the smell of a ripe apple — in an attempt to catch that first AM fly in the orchard. Because this kind of trap is so much more efficient at detecting AM flies when they are still at relatively low levels in the orchard, the traps can usually be checked twice a week to allow a one- or two-day response period (before spraying) after a catch is recorded, without incurring any risk to the fruit. In fact, research done in Geneva over a number of years indicates that some of these traps work so well, it is possible to use a higher threshold than the old "one fly and spray" guidelines recommended for the panel traps. Specifically, it has been found that sphere-type traps baited with a lure that emits apple volatiles attract AM flies so efficiently that an insecticide cover spray is not required until a threshold of 5 flies per trap is reached.

The recommended practice is to hang three volatile-baited sphere traps in a 10- to 15-acre orchard, on the outside row facing the most probable direction of AM migration (towards woods or abandoned apple trees, or else south). Then, periodically check the traps to get a total number of flies caught; divide this by 3 to get the average catch per trap, and spray when the result is 5 or more. Be sure you know how to distinguish AM flies from others that will be collected by the inviting-looking sphere. There are good photos for identifying the adults on the Apple Maggot IPM Fact Sheet (No. 102GFSTF-I8); see p. 226 of the Recommends for details on obtaining any that may still be in print, or else check the web version at: http://www.nysipm.cornell.edu/factsheets/treefruit/pests/am/applemaggot.html. In home apple plantings, these traps can be used to "trap out" local populations of AM flies by attracting any adult female in the tree's vicinity to the sticky surface of the red sphere before it can lay eggs in the fruit. Research done in Massachusetts suggests that this strategy will protect the fruit if one trap is used for every 100–150 apples normally produced by the tree (i.e., a maximum of three to four traps per tree in most cases), a density that makes this strategy fairly impractical on the commercial level.

A variety of traps and lures are currently available from commercial suppliers; among them: permanent sphere traps made of wood or stiff plastic, disposable sphere traps made of flexible plastic, and sphere-plus-panel ("Ladd") traps. The disposable traps are cheaper than the others, of course, but only last one season. Ladd traps are very effective at catching flies, but are harder to keep clean, and performed no better than any other sphere trap in our field tests. Brush-on stickum is available to facilitate trap setup in the orchard. Apple volatile lures

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are available for use in combination with any of these traps. These tools are available from a number of orchard pest monitoring suppliers, among them:

- Gempler's Inc., 100 Countryside Dr., PO Box 328, Belleville, WI 53508; 608-424-1544, Fax, 608-424-1555
- Great Lakes IPM, 10220 Church Rd. NE, Vestaburg, MI 48891; 800-235-0285, Fax 989-268-5311
- Harmony Farm Supply, 3244 Gravenstein Hwy, No. B, Sebastopol, CA 95472; 707-823-9125, Fax 707-823-1734
- Ladd Research Industries Inc., 83 Holly Court, Williston, VT 05495; 800-451-3406, Fax 802-660-8859
- Olson Products Inc., PO Box 1043, Medina, OH 44258; 330-723-3210, Fax 330-723-9977
- Scenturion Inc., P.O. Box 585, Clinton, WA 98236; 360-341-3989, Fax 360-341-3242

By preparing now for the apple maggot season, you can simplify the decisions required to get your apples through the summer in good shape for harvest.❖❖

SEE SPOTS RUN

TIMING SPRAYS FOR FLYSPECK AND SOOTY BLOTCH

(Dave. Rosenberger, Plant Pathology, Highland)

DISEASES

❖❖ Flyspeck and sooty blotch infect apple fruit during summer and cause blemishes that can make fruit unmarketable. These diseases are caused by unrelated fungi, but both diseases are favored by extended periods of wet weather during mid- to late summer. Sooty blotch is easily suppressed by fungicides, but flyspeck is more difficult to control in northeastern United States. In abandoned or unsprayed trees, sooty blotch may appear on fruit before flyspeck does. However, flyspeck usually appears first in commercial orchards and causes more commercial losses than sooty blotch.

Most of the inoculum for sooty blotch and flyspeck comes from wild hosts in orchard perimeters. Ascospores of the flyspeck fungus

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INSECT TRAP CATCHES (Number/Trap/Day)

Geneva, NY

	6/13	6/17	6/20
Redbanded leafroller	0.0	0.0	0.0
Spotted tentiform leafminer	0.6	0.9	2.0
Oriental fruit moth	0.3	0.0	0.0
Lesser appleworm	1.5	0.8	0.2
San Jose scale	1.6	0.4	0.8
Codling moth	0.3	0.0	0.0
American plum borer	0.4	0.8	0.2
Lesser peachtree borer	3.6	0.9	0.8
Peachtree borer	0.1	0.0	0.0
Pandemis leafroller	1.5	1.3	0.7
Obliquebanded leafroller	1.1*	2.0	0.8

* first catch

Highland, NY

	6/13	6/20
Redbanded leafroller	0.0	0.0
Spotted tentiform leafminer	11.6	55.6
Oriental fruit moth	0.8	0.1
Lesser appleworm	2.4	0.9
San Jose scale	0.0	0.0
Codling moth	0.5	0.4
Obliquebanded leafroller	0.9	0.4

mature in wild hosts shortly after apples begin bloom. Release of ascospores peaks about 10 days after petal fall. However, only a few ascospores land on apple fruit, and most of these are killed by fungicides used to control apple scab. Although ascospores do not play much of a role in commercial orchards, they are important because they initiate secondary infections in the border areas.

Brown and Sutton in North Carolina showed that flyspeck becomes visible on apple fruit only after fruit have been wet for a cumulative total of approximately 270 hr following infection. If we assume that flyspeck has a similar incubation period on wild hosts, then the primary infections initiated by ascospores will begin producing conidia on non-orchard hosts after approximately 270 hr of Accumulated Wetting counting from Petal Fall (hr-awpf). The conidia produced on non-orchard hosts are continuously blown into apple orchards beginning at 270 hr-awpf, and these conidia cause the majority of infections that appear on apple fruit during late summer. However, another 270 hr of accumulated wetting are required before flyspeck becomes visible on apple fruit. Thus, most infections on fruit will become visible only after 540 hr-awpf. The various steps between ascospore release at petal fall and appearance of fruit symptoms are outlined in Fig. 1 using actual 2004 wetting data from the Hudson Valley Lab.

Because flyspeck spores do not enter orchards in significant numbers until 270 hr-awpf, summer fungicides for controlling flyspeck are not needed during early summer. Furthermore, Topsin M, Flint, and Sovran (and probably Pristine) all provide post-infection activity that will eradicate flyspeck infections that have accumulated less than 100 hr of wetting after infection. Given that conidia begin blowing into orchards at 270 hr-awpf and that fungicides can provide post-infection activity through another 100 hr of wetting, summer fungicides should not be needed between the end of scab season and the time that the orchard reaches 370 hr-awpf. However, summer sprays probably should not be delayed beyond about 320 hr-awpf to allow for errors in

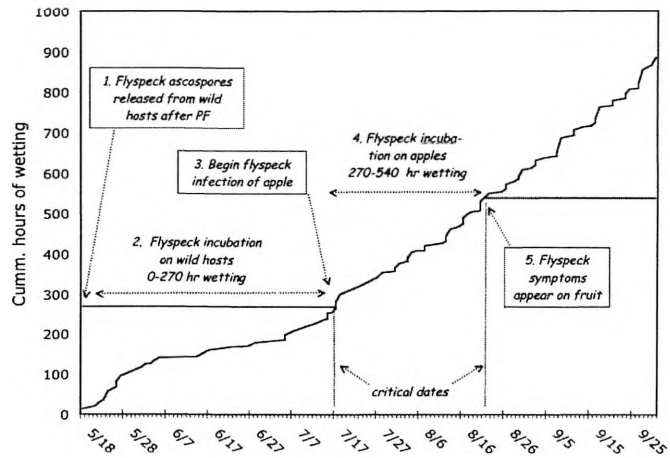

Fig. 1. Chronology of flyspeck development in trees left unsprayed during summer of 2004 based on hours of wetting measured at the Hudson Valley Lab in Highland, NY.

measuring wetting periods and to ensure that a lengthy wetting period will not suddenly cause the 370 hr threshold to be exceeded.

In dry years, 320 hr-awpf may not occur until mid-August, but summer sprays should not be delayed beyond July 20–25 in New York State for two reasons. First, summer fungicides may be needed in late July to protect fruit against black rot and white rot, especially on cultivars that mature in late August or early September. Second, complete spray coverage becomes increasingly difficult as apples increase in size, especially on cultivars such as Redcort that tend to produce two short-stemmed fruit on a single cluster. Complete spray coverage also becomes more difficult as limbs bend downward under heavy crop loads.

In dry years, a single fungicide application in late July can sometimes provide adequate control of flyspeck for the whole season. Depending on a single application is risky, however, because effectiveness of a single spray depends on achieving perfect spray coverage. A safer approach in dry years is to use a minimum of two summer fungicide applications with one timed for mid- to late July and the second about three weeks later in early to mid-

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August. A slightly earlier timing may be advisable in orchards where poor pruning and/or an exceptionally heavy crop load make effective spray coverage impossible after mid-August. More than two applications will be needed in wet years when 320 hr-awpf is reached by late June.

Commercial losses to flyspeck usually occur when late summer rains remove fungicide protection from the "last spray" and then another 270 hr of accumulated wetting occurs prior to harvest. Under those conditions, flyspeck can suddenly appear on a high proportion of fruit within a few days. This scenario is illustrated with 2004 data from a field trial at the Hudson Valley Lab that was conducted in a small orchard surrounded by woodlots (Figure 2). The last fungicide sprays in test plots were applied on 17 Aug. Fungicide residues were removed by 2.15 inches of rain that occurred 20–22 Aug. Development of flyspeck on Golden Delicious fruit was monitored in each of four replicated plots per treatment by observing 25 fruit per plot. On 22 Sept., less than 10% of fruit had any flyspeck and most of the lesions observed were inconspicuous infections in stem-cups or calyx ends of fruit. Five days later, and after exactly 270 hr of accumulated wetting counting from the fungicide wash-off date of 22 Aug., incidence of flyspeck jumped to 27–64% in all except the Pristine plots. Data from this trial suggests that none of our fungicides (with the possible exception of Pristine) will provide fruit protection through more than 2 inches of rain, and the results verify the accuracy of the 270-hr incubation period for flyspeck.

As illustrated by data in Figure 2, the critical decision for controlling flyspeck is deciding when to respray orchards after heavy rains in August and September. September of 2003 was one of the wettest Septembers on record at the Hudson Valley Lab, and we accumulated 270 hr wetting in just 25 days. Thus, one might assume that a "worst-case" rule of thumb would be to recover apples following heavy rains in late August or early September if fruit will remain on the tree for another 25 days, especially if the fruit are adjacent to a good inoculum source.

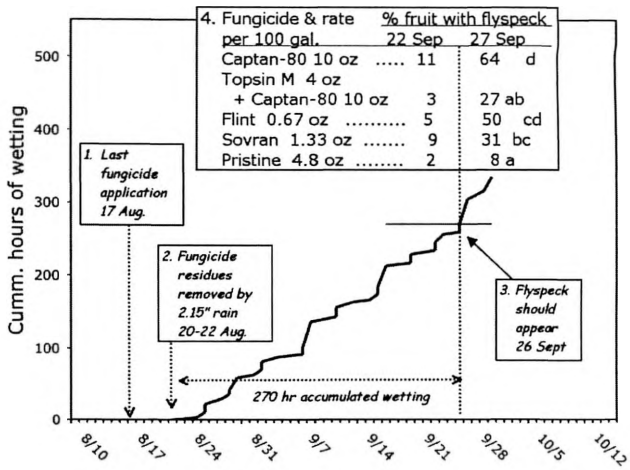

Fig. 2. Chronology of flyspeck development on Golden Delicious apples in fungicide test plots at the Hudson Valley Lab following the last fungicide application on 17 Aug 2004.

However, fungicides need not be reapplied immediately after a wash-off event in late August or early September because Topsin, Sovran, and Flint will all provide post-infection activity covering up to 100 hr of accumulated wetting after the wash-off event. Given the scenario in Figure 2, that means that if trees had been resprayed any time before 7 Sept. (when hours of accumulated wetting reached 100), then flyspeck should have been controlled through September. If another storm had delivered 3 inches of rain on 30 Aug., then a grower who reapplied fungicides on 25 Aug might have needed yet another application in September to protect fruit through September whereas an application on September 4th would have sufficed to eradicate infections from both the 20–22 Aug. and 25 Aug. rain events while at the same time providing protection on through September.

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Conclusions: Fungicides for flyspeck are not needed between the end of scab season and 320 hr-awpf, so fungicide schedules can often be stretched during June if orchards are scab-free at second cover. Control failures with flyspeck usually occur either because of poor spray coverage during the latter part of the growing season or because trees were left unprotected through more than 270 hr of wetting during the preharvest interval. Fungicide protection on fruit is exhausted after 2 inches of rain, so fungicide sprays may be needed in September if heavy rains occur with more than 25 days remaining before fruit will be harvested. ❖❖

PEST FOCUS

Geneva: Degree days (base 43°F) since first **obliquebanded leafroller** trap catch = 194.

Highland:
San Jose scale crawlers observed on fruit. **Rose leafhopper** adult s ovipositing on apple. **Spotted tentiform leafminer** sap-feeding mines observed on apple. 2nd generation **pear psylla** nymphs approaching threshold. Degree days (base 50°F) since first **codling moth** trap catch =502. Degree days (base 45°F) since first **oriental fruit moth** trap catch = 738. Degree days (base 50°F) since first **San Jose scale** trap catch = 423. Degree days (base 43°F) since first **obliquebanded leafroller** trap catch = 426.

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–6/20):	1103	683
(Geneva 1/1–6/20/2004):	1191	717
(Geneva "Normal"):	1109	668
(Geneva 6/27 Predicted):	1281	796
(Highland 1/1–6/20):	1258	789

Coming Events:	**Ranges(Normal± StDev):**	
Cherry fruit fly 1st catch	755–1289	424–806
Lesser appleworm 1st flight subsides	950–1372	570–874
Pandemis leafroller flight peak	878–1048	512–606
Obliquebanded leafroller 1st flight peak	943–1317	564–830
Pear psylla 2nd brood hatching	967–1185	584–750
San Jose scale 1st flight subsides	850–1170	516–718
San Jose scale 1st generation crawlers present	1033–1215	619–757
Spotted tentiform leafminer 2nd flight begins	947–1181	557–739
Apple maggot 1st catch	1186–1590	747–1029
American plum borer 1st flight subsudes	1159–1551	695–1033
OBLR 1st brood larvae hatch	1038–1460	625–957
Oriental fruit moth 1st flight subsides	830–1286	484–814
Oriental fruit moth 2nd flight begins	1266–1560	780–1018
Redbanded leafroller 2nd flight begins	1245–1657	768–1074

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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.

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