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Update on Pest Management and Crop Development

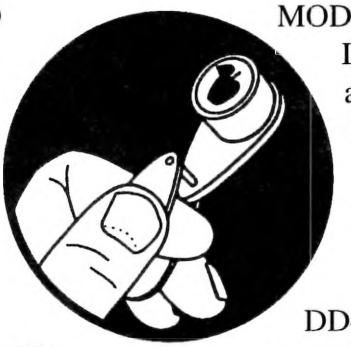
FRUIT JOURNAL

July 24, 2006 VOLUME 15, No. 19 Geneva, NY

INSECTS

MODEL CITIZENS

ORCHARD RADAR DIGEST



Geneva Predictions:

Roundheaded Appletree Borer

Peak hatch roughly: July 12 to July 30.

Dogwood Borer

Peak Dogwood borer egg hatch roughly: August 1.

Codling Moth

Codling moth development as of July 24: 2nd generation adult emergence at 33% and 2nd generation egg hatch at 5%.

2nd generation 7% CM egg hatch: July 25 (= target date for first spray where multiple sprays needed to control 2nd generation CM).

2nd generation 30% CM egg hatch: Aug 2 (= target date where one spray needed to control 2nd generation CM).

Spotted Tentiform Leafminer

Optimum third sample date for 2nd generation STLM sap-feeding mines: July 28.

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MODEL BUILDING:

Insect model degree day accumulations:

DD43 since 1st Obliquebanded Leafroller catch (90% hatch @ 810, 100% hatch @ 950):

GENEVA: 1048

HIGHLAND: (1272)

DD45 since 1st Oriental Fruit Moth 2nd generation catch, July 5 (15% egg hatch @ 485–510):

APPLETON: 484

ALBION: 481

SODUS: 439

WILLIAMSON: 486

DD50 since 1st Codling Moth 1st generation catch (2nd brood management sprays recommended @ 1260–1370):

APPLETON: 1115

ALBION: 1125

SODUS: 819

WILLIAMSON: 1065

HIGHLAND: (1177)

continued...

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[NOTE: Consult our mini expert system for arthropod pest management, the
Apple Pest Degree Day Calculator
http://www.nysaes.cornell.edu/ipm/specware/newa/appledd.php

Find accumulated degree days between dates with the Degree Day Calculator
http://www.nysaes.cornell.edu/ipm/specware/newa/

Powered by the NYS IPM Program's NEWA weather data and the Baskerville-Emin formula]
❖❖

MAGGOT WRAP-UP

BORDER SECURITY
(Harvey Reissig and Art Agnello, Entomology, Geneva)

❖❖ We're in the traditional 'peak activity' window for apple maggot right now, and there are more than a few sites where adults have been gathering on traps in noticeable numbers around the state, so this primer on maggot control strategies bears repeating at this time:

The apple maggot (AM), *Rhagoletis pomonella* (Walsh), is a native insect that originally infested hawthorn trees throughout the northeastern United States and Canada. The AM has been a major pest of apples since they were introduced into North America. In unsprayed habitats, it is not uncommon for nearly 100% of apple and hawthorn fruit to be infested by AM, because natural enemies do not reduce population levels of this pest in natural settings. Therefore, some type of control program will continue to be necessary to keep this pest at acceptable levels in commercial apple plantings for the foreseeable future.

Biology

The AM overwinters as a pupa in soil beneath apple trees. Adults emerge from the ground in late June or early July (first appearance this year was 6/19 in Highland, and 6/30 in Wayne Co.) and begin to lay eggs in the fruit after a 7–10 day pre-oviposition period. Adults remain active during July and August, and a few adults remain active throughout September and even in October in seasons when the weather is mild. AM females lay eggs underneath the skin of apples. These eggs hatch in about a week and larvae begin to tunnel throughout the fruit. Usually, particularly in cultivars with very hard fruit, larvae grow very slowly while the apple remains on the tree. Larvae usually complete their development after apples have dropped from the tree in the fall. Then they leave the fruit and tunnel into the soil to pupate, where they spend the winter.

General Management Principles

Organophosphate insecticides are very effective in controlling AM adults, and it is very rare to find detectable levels of AM injury in fruit sampled in commercial apple orchards in NY. Therefore, management programs for AM are based on the assumption that there are no indigenous populations of this pest inside orchards and are designed

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http://www.nysaes.cornell.edu/ent/scaffolds/

to prevent flies from immigrating into orchards from outside habitats. Unfortunately, in NY there are usually numerous hosts (abandoned or uncultivated apple and hawthorn trees) that are chronically heavily infested with AM and relatively close to commercial orchards. Apple maggot flies are capable of moving at least several hundred yards to infest other hosts and at least a few flies will always move longer distances of up to one mile.

Extensive research has been done to compare the biology and host preferences of AM reared from apple fruit and various species of hawthorn fruit. Populations living in these two different hosts are considered to be somewhat distinct and are called "host races". There is some disagreement among various authorities about whether or not flies infesting hawthorns will immigrate into commercial apple orchards and oviposit in apples. For all practical purposes, heavily infested hawthorn trees near apple orchards should be considered just as much a potential threat as heavily infested wild apple trees.

Elimination of Wild Hosts and Cultivar Differences

Since wild hosts (apples and hawthorns) in close proximity to commercial orchards are considered to be the only sources of potential infestations of AM flies, it is a sensible strategy to eliminate as many of these pest sources as possible. Obviously, it is desirable to create as large a "host-free" area around orchards as possible, but most authorities recommend removing alternate hosts for a distance of at least 100 m from the borders of commercial orchards. It is best to survey wooded areas surrounding apple orchards in the early spring when apples are in bloom because they are easier to detect at this time.

AM prefer to oviposit in certain cultivars of apples, and larvae survive better in some varieties of fruit than others. Early ripening, soft cultivars such as Wealthy, Cortland and Early McIntosh are generally more favored for AM oviposition and larval survival than harder, later-ripening cultivars such as Rome, Delicious, and Idared. Northern Spy, which is a cultivar with hard, late-ripening fruit, appears to be one exception to this general rule because it is reported to be a favorite cultivar for AM infestation. Although no commercially produced cultivars are immune to AM infestation, management strategies can be relaxed somewhat in less preferred, harder varieties.

Conventional Protective Control of Apple Maggot Flies

This program does not require monitoring of specific orchard blocks. Whenever it is determined that AM flies have first emerged in an unsprayed habitat (preferably in close proximity to the targeted orchard) the entire orchard should be sprayed initially with an organophosphate insecticide 7–10 days (their pre-oviposition period) later. Additional sprays should be applied at 10–14-day intervals until about the middle of August. Since flies emerge in late June to early July in NY, this protective program will usually require about 4 sprays annually. Usually, this type of program is only necessary in blocks in which detectable levels of AM-infested fruit have been found, or in orchards located adjacent to extensive numbers of heavily infested wild hosts.

Reduced Protective Spray Schedule for AM Control

This program also does not require monitoring of specific orchard blocks and is very similar to the conventional program, except that the first spray is applied on a calendar basis on July 15. Then, two more sprays will be applied, on August 1 and August 15. The delay of the first spray for AM control is based on the principle that extensive monitoring studies conducted in NY have shown that flies usually do not begin to immigrate into commercial apple orchards from wild habitats until about the middle of July. This type of program usually is quite effective unless environmental conditions result in a shortage of fruit on wild hosts outside of

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orchards. Then, AM flies may alter their usual behavior of initially ovipositing in fruit on wild host trees close to their emergence site and may immediately begin to disperse to find suitable oviposition hosts in commercial apple orchards.

Conventional AM Monitoring Program

This program is described in detail in the Apple IPM Scouting Manual (IPM Pub. No. 207, "Apple IPM: A guide for sampling and managing major apple pests in New York State"; also at: http://nysipm.cornell.edu/publications/apple_man) and is based on the idea that it is not necessary to spray an orchard unless a certain population level of flies (monitored by red sticky spheres) is detected immigrating into a monitored block. This technique has been used quite successfully by many growers in NY in "typical" orchards, and the average orchard monitored by this strategy will usually require 1–2 sprays annually for control of AM. Although many growers in NY use apple maggot traps hung along the edges of commercial orchards as a general indication of when to start spraying for AM, most do not adhere strictly to the formal recommendations described for the monitoring program. Some of the most common deviations from the protocol are: (1) Many growers use apple maggot traps only to determine when the first AM spray should be applied and then spray at 14-day intervals thereafter, regardless of subsequent trap catches; (2) Growers often monitor for apple maggots in one or two blocks and then spray the remainder of their orchards based on trap catches in the monitored blocks; (3) Many growers simply apply sprays whenever any flies are captured and ignore the recommended threshold level of 5 flies/trap.

Growers and consultants using an AM monitoring program often are concerned about late season catches of flies on traps during September and October in commercial apple orchards. Studies conducted in NY have not shown that there is any need to apply control sprays after the middle of August, even though flies can still be captured on traps after the estimated period of residual effectiveness of the last spray. Apparently, female AM active late in the season in apple orchards do not oviposit in fruit, even though most of them have completely developed eggs in their ovaries.

This monitoring program should not be used in "high risk" blocks that are adjacent to extensive sources of AM infestations from wild hosts. Using this program in such blocks will not only result in a potential risk of low levels of AM injury, but will also not result in any reduction of pesticide use because experience has shown that in such blocks the traps will simply indicate that a spray is needed every 10–14 days throughout the season after the traps are deployed.

Although there have never been any formal recommendations presented on exactly how many AM traps should be deployed to completely monitor a grower's entire acreage of apples, it should be noted that AM traps, in contrast to pheromone traps for moths, have a very short range of attraction (10-25 yards). Therefore, it is clearly unreasonable to expect that trap catches in any one particular block can be used to monitor fly immigration into another orchard 1–2 miles away! Also, there is some margin of safety built into the monitoring recommendations. The monitoring directions assume that the protective residue from an organophosphate spray will last 10–14 days before another spray is needed. Obviously, residues from organophosphate sprays gradually degrade and become less effective, so that the residual effectiveness in killing flies does not decline abruptly on the 14th day after a spray to become completely ineffective.

AM Monitoring, Border Spray Program

This strategy is similar to the standard recommended monitoring program, except that whenever trap catches indicate a need for an AM control spray, only the 3-4 border rows of the monitored block and the ends of rows are sprayed. This program is based on the principles that there are no indigenous populations of AM flies inside moni-

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tored orchards, and that AM flies immigrating into orchards from outside sources will be killed by residues on treated border rows trees before they can move into the interior of the orchard.

Although some growers and consultants have reported excellent success using border sprays for AM control, very little research has been done in NY to formally test the effectiveness of this type of program. Therefore, growers should be cautious in using this strategy. This program should probably be used only in "low risk" blocks that are not near sources of potential outside AM infestations and are planted to cultivars which are not favored for AM oviposition or larval survival.

New Insecticides and Tactics for AM Control

Organophosphate insecticides offer many advantages to growers for AM control. They are very effective, relatively inexpensive, generally not toxic to predaceous mites, provide good residual control, and there is no evidence to suggest that flies are becoming resistant to these compounds. However, changing pesticide regulations are resulting in either the loss of registration of some of these compounds or changes in the re-entry or pre-harvest intervals, which may adversely affect using these materials, particularly for late season control of AM.

Recent laboratory and field tests have shown that newer "reduced risk" compounds, such as SpinTor, Actara, Assail, Calypso and Provado, have activity against the AM. When these materials were tested in NY, they provided comparable control to a standard treatment of Guthion, but weekly sprays were necessary for SpinTor because of its short residual effectiveness. These materials, particularly Provado, have very little contact activity and must be ingested by the flies to be effective. Laboratory trials have shown that the effectiveness of Provado against AM can be increased by adding sugar as a feeding stimulant, but these same effects have not been demonstrated in the field. Ongoing work is being conducted on an improved feeding stimulant bait that can be mixed with these types of new insecticides to increase their effectiveness. Kaolin clay (Surround) has also shown good potential for use against AM, although application frequency and rate are key factors in its efficacy for this purpose.❖❖

LITTLE WORRY

BOUND TO BE FOUND, IF YOU KNOW WHERE
(Art Agnello, Entomology, Geneva)

❖❖ The first Comstock mealybug adult males of the season will have emerged somewhere around the start of the July 4th weekend, which means that the invasive crawlers are due to start showing up soon, probably by next week. For those with a history of infestations of this pest in their pears (or peaches), the crawlers are the most susceptible stage for chemical control, and generally make their appearance about this time in western N.Y. every year. If you don't have out sticky-tape traps on the scaffold branches, check green shoots and cut a few pears to see whether any are showing up in the calyx. An application of Actara, Assail, Calypso, Provado or Diazinon is recommended for this pest; refer to the Comstock Mealybug IPM Fact Sheet, No. 22 (online at: http://www.nysipm.cornell.edu/factsheets/treefruit/pests/cmb/cmb.asp) for photos and more information on its biology.

Larvae of both species of peachtree borers are still able to hatch and get into your stone fruit trees, and the second flight of American plum borer has just begun, so this is a timely period for any orchard on a seasonal control program of trunk sprays: Asana, Lorsban, Warrior/Proaxis, Thionex, Ambush, or Pounce are all options.

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Green Aphids

Recent increases in the local green aphid populations have prompted some questions and discussion about management options, so some updated information relating to this issue might be useful. Firstly, although we speak of the green aphid populations in apples as technically comprising both apple aphid (*Aphis pomi*) and spirea aphid (*Aphis spiraecola*), these two species are impossible to differentiate in the field, even under magnification. More importantly, recent regional surveys (by people who CAN tell them apart) have determined that *A. pomi* has been almost completely displaced by *A. spiraecola*, so it's very likely that nobody actually has "apple aphid" infestations anymore. In effect, they're all probably spirea aphids.

For management purposes, it may be of interest to know that laboratory slide dip trials showed no difference in susceptibility between the species to endosulfan (Thionex) and chlorpyrifos (Lorsban); however, spirea aphid was less susceptible to esfenvalerate (Asana) and methomyl (Lannate) than was apple aphid. One important regulatory note regarding endosulfan is that growers can no longer legally use ANY "Thiodan" branded product, with the exception of the obsolete Aventis registration (EPA reg. no. 264-638), because none of them are currently registered in the state anymore. This includes the older (and formerly common) FMC-labeled Thiodan 3EC and 50WP products; their registrations were suspended as of 12/31/05. This serves as a note to make the necessary corrections in your Recommends wherever "Thiodan/Thionex" appears.

Thiodan is/was a restricted-use material, so growers must keep records of use, of course. In the event of any inspections to check on such practices, a detection of any recent use of Thiodan (except EPA #264-638, if any such product ever was available) from an examination of spray records would result in a violation. So even if growers have Thiodan on hand, it would be advisable to hold it for disposal. (Our theanks to Dan Gilrein for this regulatory update.)❖❖

INSECT TRAP CATCHES (Number/Trap/Day)

Geneva, NY

	7/17	7/20	7/24
Redbanded leafroller	1.9	0.7	4.3
Spotted tentiform leafminer	26.3	19.8	9.5
Lesser appleworm	0.0	0.2	0.1
Oriental fruit moth	0.0	0.3	0.0
San Jose scale	283	243	314
American plum borer	0.0	0.0	0.5*
Lesser peachtree borer	0.1	0.3	0.1
Dogwood borer	1.9	–	3.0
Obliquebanded leafroller	0.0	0.0	0.0
Peachtree borer	0.3	0.2	0.0
Apple maggot	0.0	0.0	0.0

* first catch

Highland, NY

	7/17	7/24
Spotted tentiform leafminer	0.0	83.7
Oriental fruit moth	0.3	1.0
Codling moth	0.4	1.4
Obliquebanded leafroller	0.0	0.0
Fruit tree leafroller	0.0	0.0
Tufted apple budmoth	0.0	0.0
Variegated leafroller	0.0	0.0
Lesser peachtree borer	0.3	0.2
Dogwood borer	0.3	0.4
Lesser appleworm	0.6	1.1
Apple maggot	0.1	0.1
Redbanded leafroller	3.2	1.7

PEST FOCUS

Geneva:
San Jose scale 2nd flight increasing. **American plum borer** 2nd flight began today. **Redbanded leafroller** 2nd flight increasing.

Highland:
Pear psylla egg and nymph numbers increasing in Bartletts.

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–7/24/06):	2128	1409
(Geneva 1/1–7/24/2005):	2139	1457
(Geneva "Normal"):	2028	1328
(Geneva 1/1–7/31 Predicted):	2359	1591
(Highland 3/1–7/24/06):	2160	1444

Coming Events:	Ranges(Normal±StDev):	
Spotted tentiform leafminer 2nd flight subsides	2013–2393	1328–1672
Spotted tentiform leafminer 3rd flight begins	2281–2635	1522–1864
American plum borer 2nd flight peak	1958–2414	1310–1676
Redbanded leafroller 2nd flight peak	1524–2018	965–1353
Redbanded leafroller 2nd flight subsides	2169–2679	1469–1855
Codling moth 2nd flight begins	1555–2283	999–1529
Codling moth 2nd flight peak	2005–2835	1337–1977
Apple maggot 1st oviposition punctures	1528–2078	1021–1495
Obliquebanded leafroller 2nd flight begins	2273–2651	1528–1836
Oriental fruit moth 2nd flight subsides	2067–2533	1379–1771
San Jose scale 2nd flight peak	2103–2543	1432–1790
Apple maggot flight peak	2143–2579	1455–1763
Comstock mealybug 2nd gen. crawlers emerging	2234–2624	1505–1781

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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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