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Update on Pest Management and Crop Development

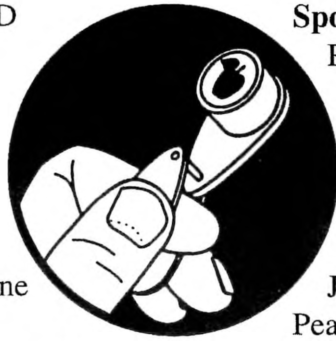
F R U I T J O U R N A L

June 28, 2004 VOLUME 13, No. 15 Geneva, NY

INSECTS

SPACE INVADERS

ORCHARD RADAR DIGEST



Geneva Predictions:

Roundheaded Appletree Borer
Peak egglaying period roughly: June 29 to July 14.
Peak hatch roughly: July 14 to August 3.

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

Codling Moth
Codling moth development as of June 28: 1st generation adult emergence at 94% and 1st generation egg hatch at 62%.

Lesser Appleworm
2nd LAW flight begins around: July 11.

Obliquebanded Leafroller
Where waiting to sample late instar OBLR larvae (to determine need for treatment) is an option: Optimum sample date for late instar summer generation OBLR larvae: July 4.
If first OBLR late instar larvae sample is below threshold, date for confirmation follow-up sample: July 8.

Oriental Fruit Moth
2nd generation OFM flight begins around: July 3.
Optimum 2nd generation - first treatment date, if needed: July 9.

Redbanded Leafroller
2nd RBLR flight begins around: July 4.

Spotted Tentiform Leafminer
Rough guess when 2nd generation sap-feeding mines begin showing: July 7.

Highland Predictions:

Roundheaded Appletree Borer
RAB peak egglaying period roughly: June 17 to July 3.
Peak hatch roughly: July 2 to July 23.

Dogwood Borer
Peak Dogwood borer egg hatch roughly: July 25.

Codling Moth
Codling moth development as of June 28: 1st generation adult emergence at 100% and 1st generation egg hatch at 92%.

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

continued...

IN THIS ISSUE...

Obliquebanded Leafroller

Where waiting to sample late instar OBLR larvae (to determine need for treatment) is an option: Optimum sample date for late instar summer generation OBLR larvae: June 29.
If first OBLR late instar larvae sample is below threshold, date for confirmation follow-up sample: July 2.

Oriental Fruit Moth

2nd generation OFM flight begins around: June 23.
Optimum 2nd generation - first treatment date, if needed: June 26.
Optimum 2nd generation - second treatment date, if needed: July 8.

Redbanded Leafroller

2nd RBLR flight begins around: June 24.
Peak catch and approximate start of egg hatch: July 5.

Spotted Tentiform Leafminer

Rough guess when 2nd generation sap-feeding mines begin showing: June 26.
Optimum first sample date for 2nd generation STLM sapfeeding mines: July 3.

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HATCH WATCH

MODEL BUILDING

Oriental Fruit Moth. This pest's development is tracked using a 45°F DD model from biofix, defined as the first sustained moth catch. We are currently between the first and second brood, for which the first catch is not expected to occur for another 5–7 days in WNY; 2nd brood flight should have begun already in ENY.

Codling Moth. We are currently between the first and second brood control windows for this pest. With 1260 DD (base 50°F) from the 1st catch of the season as a first spray date for the second brood, we currently have:

Geneva (1st catch May 17) - 520
Albion (1st catch May 17) - 473
Williamson (1st catch May 18) - 449

Obliquebanded Leafroller. First hatch is predicted at approximately 360 DD (base 43°F) from the 1st catch, and 25% egg hatch at 450 DD. Our sample numbers so far:

Geneva (1st catch June 7) - 440
Albion (1st catch June 8) - 391
Sodus (1st catch June 10) - 348
Williamson (1st catch June 9) - 354

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INSECT BITES

THE NEXT BUG THING
(Art Agnello & Dave Kain, Entomology, Geneva)

San Jose Scale

❖❖ The first crawlers of the season should be showing up any day now, so this would be an advisable time for the first application of an effective insecticide against the most susceptible stage of this recently rejuvenated pest. Materials recommended include OP's such as Guthion and Imidan, as well as Provado and Esteem.

Comstock Mealybug

It also shouldn't be long before we start seeing some adult Comstock mealybugs in pear foliage, followed by their invasive crawler offspring. The crawlers are the most susceptible stage for chemical control, which we expect sometime during the next couple of weeks, especially in the Hudson Valley.

The overwintered eggs hatch from mid-April through May and the nymphs (crawlers) migrate from the oviposition sites to their feeding sites on terminal growth and leaf undersides of trees and shrubs. This hatch is completed by the petal fall stage of pears. Nymphs that hatch from these overwintered eggs are active from roughly early May to early July. As the nymphs approach the adult stage, they tend to congregate on older branches at a pruning scar, a node, or at a branch base, as well as inside the calyx of pears. Second- (summer) generation nymphs are present from about mid-July to mid-September.

The Comstock mealybug poses two major concerns for the pear processing industry of New York: First, the emergence of crawlers and adult females from the calyx of pears at the packinghouse creates a nuisance to workers. Second, pears to be made into puree typically are not peeled or cored by New York processors, so infestations can potentially result in unacceptable contamination of the product.

Another problem, of concern to apple growers in the 1930s and 1940s, and again in the Hudson and Champlain Valleys in the early 1980s, is that the honeydew secreted by the crawlers is a substrate for sooty molds growing on the fruit surface. This type of damage has also been noted on peaches in Niagara Co. and in Ontario, Canada. These molds result in a downgrading of the fruit, and are therefore an additional cause of economic loss.

To date, the Comstock mealybug has been a problem to growers of processing pears because of the contamination and aesthetic reasons noted. An infestation generally requires one or more insecticide sprays during the growing season, directed against the migrating crawlers. Examine the terminal growth for crawler activity periodically throughout the summer. Crawler and adult female activity can also be monitored by wrapping double-sided tape such as white carpet tape around low scaffold branches and inspecting for crawlers that have been caught by the tape. They can be recognized with a hand lens or, with some experience, by the unaided eye.

Sometime in early August, we'll advise an application of a material such as Provado, Diazinon, Actara, Assail or Lannate to control this insect.

Dogwood Borers

Adults should be laying eggs in susceptible apple orchards now (those with succulent burrknot tissue or suckers). The larva of this clearwing moth feeds on apple trees, primarily on burrknot tissue on clonal rootstocks. Burrknots are aggregations of root initials that can develop on the above-ground portion of the rootstock; all commercial dwarfing and semi-dwarfing rootstocks have a tendency to develop burrknots. Some chemicals with hormone effects, such as NAA, can increase the expression of burrknots, as will failure to keep the area around the trunk weed-free and open to sunlight. White latex paint brushed on the exposed portion of the rootstock will prevent new infestations of the borers, and also protect against southwest injury to the bark.

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Dilute trunk applications of an insecticide with good residual activity can provide control of established infestations. Lorsban 4E or 50W may now be used postbloom as a directed trunk spray in N.Y. for borer control in apples. We feel that Lorsban is the best tool we presently have for this use, and mid-July would be a good time to take advantage of this welcome opportunity to use it on apples to control both dogwood borer and the second generation of American plum borer. Another option at this point in the season is an application of Thiodan 50WP applied once during this first week of July, and again one month later at the beginning of August. We would also note that, in case you didn't follow the strategy of using Lorsban as a prebloom trunk spray for American plum borer, these treatments will also serve as the last opportunity for a control measure against this pest.

Peachtree Borers

If you're not using pheromone disruption ties against peachtree and lesser peachtree boreres, this is the time of the season when a second trunk application of a pesticide should be made against these pests in cherries and peaches. A coarse spray directed at the trunk and scaffold branches gives the best protection against ovipositing adults; shutting off all but the bottom nozzles on a speed sprayer won't do an effective job. Use Lorsban 4EC, Thiodan, or a pyrethroid (Ambush, Asana, Pounce, or Warrior; Danitol is NOT registered in stone fruits). Do not spray the fruit.

Woolly apple aphid (WAA), *Eriosoma lanigerum* (Hausmann)

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. Most nymphs are born alive to unmated females on apple trees during the summer. 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; although these are not always noticed until later in the summer, we have already seen healthy populations in a number of plantings around the state.

Aerial colonies occur most frequently on succulent tissue such as the current season's growth, water sprouts, unhealed pruning wounds, or cankers. Heavy infestations cause honeydew and sooty mold on the fruit and galls on the plant parts. Severe root infestations can stunt or kill young trees but usually do not damage mature trees. Large numbers of colonies on trees may leave sooty mold on the fruit, which annoys pickers because red sticky residues from crushed WAA colonies may accumulate on their hands and clothing.

Water sprouts, pruning wounds, and scars on the inside of the tree canopy should be examined for WAA nymphs. Any new growth around the outside of the canopy should be examined for WAA colonies. No economic threshold has been determined for treatment of WAA.

Aphelinus mali, a tiny wasp, frequently parasitizes WAA but is very susceptible to insecticides and thus does not provide adequate control in regularly sprayed commercial orchards. Different rootstocks vary in their susceptibility to WAA. The following resistant rootstocks are the only means of controlling underground infestations of WAA on apple roots: MM.106, MM.111, and Robusta.

WAA is difficult to control with insecticides because of its waxy outer covering and tendency to form dense colonies that are impenetrable to sprays. WAA is resistant to the commonly used organophosphates, but other insecticides are effective against WAA, including Diazinon and Thiodan. ❖❖

DISEASES

SKIN DEEP

SOOTY BLOTCH AND FLYSPECK
(Bill Turechek and Dave Rosenberger, Plant Pathology, Geneva and Highland)

❖❖ Sooty blotch and flyspeck (SBFS) are two of the most important summer diseases of apple in New York. The diseases do not result in direct losses in yield, but rather they cause a reduction in fruit quality, which can lead to economic loss due to downgrading in fresh market fruit. Losses can exceed 25%, especially in warm humid climates such as those experienced in southeastern NY, southern New England, and the mid-Atlantic and southern states. Until recently, sooty blotch was thought to be caused by the fungus *Gloeodes pomigena*. However, recent studies have shown that sooty blotch is a disease complex caused by at least 3 different fungi: *Peltaster fruticola*, *Leptodontium elatius*, and *Geastrumia polystigmatis*. All three fungi are not necessarily present in all sooty blotch lesions. Flyspeck is caused by the fungus *Schizothyrium pomi* (=*Zygophiala jamaicensis*).

Symptoms

Sooty blotch appears as various shades of olive-green on the surface of the fruit. Colonies range in shape from nearly circular with distinct margins to rather large, amorphous blotches with diffuse margins. The variation in shapes and color can be attributed to the differences among the three fungi causing the disease and environmental conditions, specifically temperature and relative humidity. Fruit infection typically occurs in June and the first symptoms are generally apparent 20 to 25 days after infection, but can be visible as soon as 8 to 12 days after infection if conditions are warm and wet.

Flyspeck appears as distinct groupings of shiny, black fungal bodies (called thyriothecia) on the surface of the fruit. The number of thyriothecia associated with a single infection ranges from a few to over fifty. Although flyspeck thyriothecia appear to exist individually, close examination reveals mycelium connecting the individual structures. The primary spores are discharged starting around 2 weeks after petal fall and symptoms may be visible 10–12 days after infection under optimal conditions, but may not be visible for 1 month under less than ideal conditions. These primary infections will give rise to conidia, which initiate secondary cycles of infection throughout the remainder of the season. Numerous observations in the field have shown that warm and wet or humid conditions are needed for the development of disease. For both flyspeck and sooty blotch, the causal fungi grow only within the wax cuticle of the fruit and are quite superficial. Rubbing the fruit with a cloth will often be enough to "clean-up" an apple that is only lightly affected.

Disease Management

Proper pruning and fruit thinning can have a huge impact on the effectiveness of fungicides used to control SBFS. In a 2-year study conducted in Massachusetts, Cooley et al. (1997) showed that summer pruning could reduce the incidence of flyspeck by nearly 50% in an unsprayed orchard. In the same study, they showed that the number of fruit downgraded from USDA Extra Fancy was reduced when summer pruning was done in commercial orchards. They concluded that summer pruning helped to decrease the incidence of flyspeck by reducing the number of hours of relative humidity >95% and allowing increased penetration of pesticides to the upper two-thirds of the canopy when applications were made with an airblast sprayer. Effective fruit thinning is also important for effective control of SBFS. When fruit are clustered together in groups of three or more, fruit surfaces in the middle of the cluster are slow to dry and become almost inaccessible to spray droplets as the fruit increase in size. Where necessary, hand thinning to break up fruit clusters will help to reduce the incidence of sooty blotch and flyspeck at harvest.

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The primary means of managing sooty blotch and flyspeck is via fungicide applications during July and August. Four or five summer fungicide applications may be needed to control these diseases in wet years, whereas only two or three well-timed applications are needed in dry years. Fungicides applied to control scab and mildew at petal fall and first cover are usually adequate for protecting apples from flyspeck ascospores. In the northeast, the fungi causing sooty blotch are generally more sensitive to fungicides than is the flyspeck fungus, so flyspeck almost always appears first in orchards with marginal fungicide protection. Summer fungicides timed to control flyspeck will almost always provide adequate control of sooty blotch.

Following discharge of flyspeck ascospores during the 2–3 weeks after petal fall, the risk of flyspeck infection is relatively low until the time when ascospore-initiated infections in hedgerows and woodlots begin producing conidia for secondary spread of the flyspeck fungus. This seems to occur after about 250–280 hr of accumulated wetting after petal fall (AW-PF) on apples. During this interval from 3 weeks after PF until 250 hr AW-PF, the risk of SBFS infection on apples is relatively low and fungicide coverage can usually be relaxed (provided, of course, that primary scab has been completely controlled). Beginning at 250 hr AW-PF, however, the risk of secondary flyspeck infections gradually increases until harvest.

Research has shown that Topsin M, Sovran, and Flint provide post-infection activity against sooty blotch and flyspeck. Their post-infection activity decreases as the time between infection and fungicide application increases. Although there are still some data gaps with Sovran and Flint, tests completed to date suggest that all three of these fungicides have reasonable activity against flyspeck infections if the fungicides are applied before infections are exposed to 100 hr of accumulated wetting. Working in North Carolina, Brown and Sutton (1995) showed that sooty blotch and flyspeck appear on fruit only after fruit are exposed to 275–300 hours of accumulated wetting following infection. Thus, it appears that Topsin M, Sovran, or Flint will provide post-infection control of flyspeck and sooty blotch so long as the infections are less than one-third of the way through the incubation period.

When Topsin M, Sovran, or Flint are used for July-August sprays, the period of relaxed fungicide coverage in June and early July can probably be extended until 350 hr AW-PF (250 hr for development of flyspeck conidia plus 100 hr of post-infection activity). Even in dry years, however, trees should probably be protected with fungicides during the latter half of July because fungicide spray coverage later in the season may be compromised as apple size increases (thereby increasing contact surface areas between adjoining fruit) and as limbs bend down under crop load. Should a dry summer suddenly turn wet in August, SBFS could cause huge losses in orchards that were not protected prior to the rains.

Pre-determining the timing for the last SBFS spray in August or September is impossible because the need for additional sprays during that period is based on the weather. Last year at the Hudson Valley Lab, we recorded nearly 3.5 inches of rain in the first two days of September and then accumulated 270 hr of wetting by 30 Sept. Growers who did not reapply a fungicide after the rains of 1–2 September noted that flyspeck seemed to appear overnight at the end of September on fruit that were not yet harvested. The trick to correctly timing the last fungicide spray in 2003 was to correctly guess how many hours of wetting would accumulate after the rains of 1–2 September and before fruit would be harvested. (Remember that 270 hr of wetting are required to complete the incubation period.) Growers who gambled on a dry or even a "normal" September lost that bet in 2003. Those who applied fungicide during the first week of September (on the assumption that September would be wet) were the winners in 2003.

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Although an early September spray may be needed in exceptionally wet years, sprays applied during late August and September will not compensate for coverage gaps during July and August because none of our fungicides can completely eradicate SBFS after infections on fruit are older then 100 hr of accumulated wetting. Therefore, sprays between early July and mid-August remain the most critical timing for controlling SBFS under NY conditions in most years. Earlier and later sprays are needed in wet years, but two or 3 applications between 15 July and 15 Aug are almost always essential.

Literature cited:

Brown, E.M., and Sutton, T.B. 1995. An empirical model for predicting the first symptoms of sooty blotch and flyspeck of apples. *Plant Disease* **79**, 1165–1168.

Cooley, D.R., Gamble, J.W., and Autio, W.R. 1997. Summer pruning as a method for reducing flyspeck disease on apple fruit. *Plant Disease* **81**, 1123–1126.

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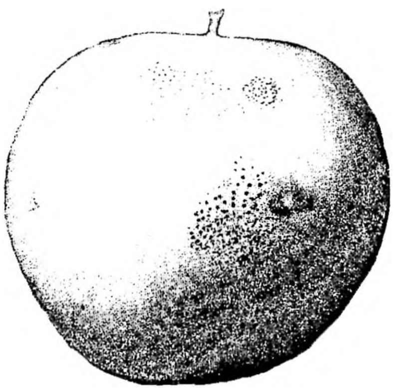

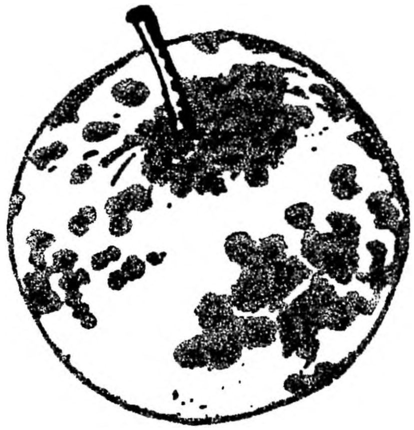

PEST FOCUS

Geneva:
1st **apple maggot** trap catch 6/24. **Oriental fruit moth** and **redbanded leafroller** 2nd flights beginning. **Obliquebanded leafroller** flight began 6/7. Sampling should take place at approx. 600 degree days (base 43 °F) following this event. DD43 °F since then = 440. **Spotted tentiform leafminer** 2nd flight began 6/17. The first sample of sap-feeding mines should be taken at 690 degree days (base 43 °F) following this event. DD43 °F since then = 179.

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UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–6/28):	1351	805
(Geneva 1/1–6/28/2003):	1184	675
(Geneva "Normal"):	1305	832
(Geneva 7/6 Predicted):	1531	938

Coming Events:	**Ranges:**	
Peachtree borer 1st catch	780–1338	445–829
American plum borer 1st flight subsides	1155–1555	694–1038
Obliquebanded leafroller summer larvae hatch	1038–1460	625–957
Comstock mealybug 1st adult catch	1308–1554	809–1015

INSECT TRAP CATCHES (Number/Trap/Day)

Geneva, NY

	6/21	6/24	6/28
Redbanded leafroller	0.0	0.0	0.4*
Spotted tentiform leafminer	18.4	14.2	12.8
Oriental fruit moth	0.0	0.0	0.3*
Lesser appleworm	0.0	0.0	0.0
Codling moth	0.3	0.2	0.1
San Jose scale	0.0	0.0	0.0
Obliquebanded leafroller	1.1	1.5	1.3
Pandemis leafroller	0.5	0.3	0.0
American plum borer	0.1	0.3	0.0
Lesser peachtree borer	3.0	4.0	0.8
Peachtree borer	0.0	0.0	0.0
Apple maggot	0.0	0.3*	0.2

Highland, NY

	6/21
Redbanded leafroller	0.0
Spotted tentiform leafminer	65.3
Oriental fruit moth	0.4
Codling moth	0.3
Lesser appleworm	1.5
Obliquebanded leafroller	1.1
Sparganothis fruitworm	2.0
Tufted apple bud moth	0.5
Variegated leafroller	0.1
Apple maggot	0.1*

* first catch

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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