# scaffolds FRUIT JOURNAL

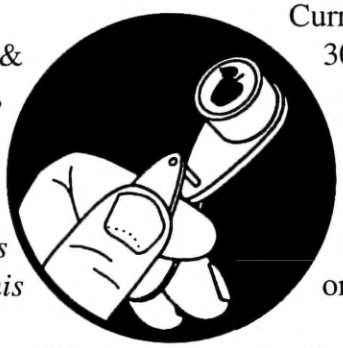
Update on Pest Management and Crop Development

June 26, 2000 VOLUME 9, No. 15 Geneva, NY


INSECTS

## INSECT BITES

A BUG'S LIFE (Art Agnello & Harvey Reissig, Entomology, Geneva)



**Green Aphids:** Apple aphid, *Aphis pomi* De Geer, Spirea aphid, *Aphis spiraecola* Patch

❖❖ Although small numbers of these aphids may be present on trees early in the season, populations generally start to increase in mid- to late June. This trend has been particularly evident this year, as the plentiful rains have resulted in a profusion of succulent terminal growth much favored by these insects. Large numbers of both species may build up on growing terminals on apple trees during summer. Both species are apparently 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.

Nymphs and adults of both species 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 the season starting in mid-June. Inspect 10 rapidly growing terminals from each of 5 trees throughout the orchard. Record the percentage of infested terminals. No formal studies have been done to develop an economic threshold for aphids in New York orchards. Currently, treatment is recommended if 30% of the terminals are infested with either species of aphid, or 50% terminal infestation and less than 20% of the terminals with predators. An alternative threshold is given as 10% of the fruits containing 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 5 (p. 35) and 12 (p. 42) in the Recommends for toxicity ratings of common spray materials. Both aphids are resistant to most organophosphates, but materials in other chemical classes control these pests effectively, including Dimethoate, Lannate, Lorsban, Provado, Thiodan, and Vydate.

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## IN THIS ISSUE...

**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, usually during late July to early August.

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.

During late May and June, water sprouts, pruning wounds, and scars on the inside of the tree canopy should be examined for WAA nymphs. During mid-July, 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: WAA: 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 Lorsban and Thiodan.

**Potato Leafhopper (PLH)**, *Empoasca fabae* (Harris)

This insect is generally a more serious problem in the Hudson Valley than in western N.Y. or the Champlain Valley; however, the recent weather fronts have resulted in a sprinkling of reports in areas that are not normally affected, so it doesn't hurt to tour observantly through a few orchards now. PLH does not overwinter in the northeast but instead migrates on thermals (warm air masses) from the south. Because PLH come in constantly during the season, there are no distinct broods or generations and the pest may be present continuously in orchards from June through harvest.

PLH feeds on tender young terminal leaves. Initially, injured leaves turn yellow around the edges, then become chlorotic and deformed (cupping upward) and later turn brown or scorched. Damage is caused by a toxin injected by PLH while feeding. PLH also occasionally causes symptoms similar to the effects of growth regu-

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**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
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This newsletter available on CENET at: news://newsstand.cce.cornell.edu/cce.ag.tree-fruit
and on the World Wide Web at:
http://www.nysaes.cornell.edu/ent/scaffolds/

lators, such as excessive branching preceding or beyond the point of extensive feeding. PLH damage is often mistaken for injury caused by herbicides, nutrient deficiency, or overfertilization. PLH injury may not be serious on mature trees but can severely stunt the growth of young trees.

Nymphs and adults should be counted on 50–100 randomly selected terminal leaves in an orchard. Older trees should be sampled approximately every three weeks during the summer. Young trees should be sampled weekly through July. PLH nymphs are often described as moving sideways like crabs, whereas WALH generally move forward and back. No formal studies have been conducted in N.Y. to determine the economic injury level for PLH on apples, so we suggest a tentative threshold of an average of one PLH (nymph or adult) per leaf. Little is known about the natural enemies of PLH, but it is assumed that they cannot effectively prevent damage by this pest in commercial N.Y. orchards.

Populations of all leafhopper species in New York are best controlled with materials such as Provado, Sevin, Thiodan, Carzol, Lannate, or Vydate. However, many of these pesticides, primarily the latter three, are toxic to beneficial mites, so make your treatment decision with these factors in mind.❖❖

## PEST FOCUS

Geneva: **Spotted tentiform leafminer** 2nd flight began 6/15. Degree days (base 43°F) since then = 306. **Obliquebanded leafroller** flight began 6/8. Degree days (base 43°F) since then = 468. **Codling moth** flight began 5/19; DD50 since then = 454. **Redbanded leafroller** 2nd flight began today. **Peachtree borer** and **dogwood borer** flights began 6/22.

Highland: **Aphid** numbers increasing rapidly. **Codling moth** flight began 5/8; DD50 since then = 960. **Obliquebanded leafroller** flight began 6/5. Degree days (base 43°F) since then = 509. **Spotted tentiform leafminer** 2nd flight began 6/12. DD43 since then = 350. **Redbanded leafroller** 2nd flight began today. **Rose leafhopper** and **potato leafhopper** on apple.

## DOG TIRED

INITIALS IN THE TREE
(Dick Straub, Entomology, Highland)

❖❖ Infestations in apples of dogwood borer, a clearwing moth, are almost always located in burrknots or graft unions that are planted too high above ground level. 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.

The adult seeks out these spots to lay eggs, particularly if they are surrounded by vegetation or protected by something, such as mouse guards. Moreover, mouse guards may frequently house weeds, and shield the lower trunk from incidental exposure to insecticide cover sprays. Sustained feeding by dogwood borer at the graft union may severely weaken the tree at this juncture, or girdle the trunk and cause a slow decline in tree health. Orchards in which mouse guards are emplaced should be examined for signs of damage.

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. Dilute trunk applications of an insecticide with good residual activity can provide control of established infestations. Lorsban 50WP or Thiodan 50WP are the most effective materials if applied during the period between July 15 and August 15, bearing in mind the specific pre-harvest intervals.❖❖

DISEASES

## FIRE FIGHTING

FIRE BLIGHT RUNDOWN
(Dave Rosenberger, Plant Pathology, Highland)

❖❖ In the last three weeks, severe fire blight has been reported in a number of apple orchards throughout the Hudson Valley. The blight outbreak this year has several unusual characteristics. Pear blocks are mostly unaffected because pears were at petal fall when the blight infections occurred. In apples, most of the fire blight in the Hudson Valley has developed in Gala blocks where trees are three to five years old. In several cases, Gala blocks are so severely affected that several hundred trees have already been removed and many more will be lost to rootstock blight.

At this point, the incidence of blight appears manageable in adjoining blocks of other cultivars including Cortland, Rome, Spartan, Macoun, and Delicious. The distribution of blight strikes in cultivars adjacent to affected Gala blocks suggests that Gala acted as a source of inoculum for other cultivars. The number of blight strikes in those blocks is greatest immediately adjacent to or downwind from the Gala trees. In several of the Gala blocks, we discovered evidence of over-wintering cankers from last year or point-sources for this year's infections, even though the growers involved were not aware that fire blight had been present in the orchard last year.

The good news is that the fire blight epidemic in the Hudson Valley is still limited to relatively few orchards. The devastating hailstorms that occurred beginning May 19 did not generate the disaster that would have developed if blight inoculum had been present in all orchards. The hailstorms did contribute to spread of blight to adjacent cultivars in some of the affected orchards, but there are still many orchards, including Gala blocks, that do not have any fire blight at this time.

What is the best way to deal with fire blight in young orchards where blight was not completely controlled during bloom? No single answer can be applied to all situations, and there is considerable room for debate on many details relating to blight management during summer. Dr. Paul Steiner at the University of Maryland has posted some excellent articles about fire blight on the World Wide Web at <www.caf.wvu.edu/kearneysville/wvufarm10.html>. However, none of the articles answers all of the questions that arise after blight appears in an orchard. Answers for many questions are lacking because the appropriate research has not been done or because research results have been inconsistent.

Growers dealing with fire blight must make daily management decisions even when scientists do not have enough data to provide research-based recommendations. Therefore, I have provided below my "best guesses" for some of the questions raised by growers. Much of this information may come too late to be useful for this season, but it may help to stimulate discussion and awareness concerning the best approaches for managing shoot blight in the future.

**1. Q:** Should I try to prune out fire blight when it appears in young trees?

**A:** Absolutely, unless blight is so severe that the orchard is beyond hope. Strikes should be pruned out as soon as possible after they appear. Failure to do so increases the likelihood that blight will continue to spread both to adjacent trees and into the rootstocks of affected trees. Pruning out infections in mature trees may not be practical, but mature trees with a full crop will set terminal shoot buds earlier than young trees. When trees set terminal buds, blight stops spreading both between trees and within the affected trees.

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In order to remove strikes before cankers extend too far into the tree, trees must be examined at least two or three times weekly until the epidemic begins to slow. In sections where trees are severely affected, it may be more cost-effective to immediately remove entire trees, especially if trees are a susceptible cultivar like Gala. Pulling out badly affected trees will allow blight removal crews to focus their efforts on trees that can be salvaged.

Blight removal crews should be trained to recognize the early symptoms of blight on terminal shoots. On terminals just beginning to show symptoms, the first or second fully expanded leaf will droop and closer examination will show blackening along the midvein at the base of the leaf blade. The entire shoot tip may appear to be slightly yellowed. Remove such shoots by cutting back into two-year-old wood at least 8–12 inches below the last visible symptoms. If a spur or shoot on the central leader shows signs of blight, immediately remove the central leader down to 8–12 inches below the last visible symptom. Immediate and aggressive removals reduce the need for repeated pruning in the same tree and may result in fewer trees lost to root stock blight.

**2. Q:** Is it necessary to disinfect pruning tools between cuts?

**A:** Dr. Paul Steiner has shown that disinfecting pruning tools is a waste of time because minute cankers often form on the ends of cuts even when pruners are disinfected. Instead of wasting time disinfecting pruning tools, Paul recommends making all cuts into at least 2-year-old wood where bacteria will be less able to multiply. Also, leave "ugly stubs" by cutting branches between nodes and at least several inches away from the central leader. Small cankers that form on these stubs can then be removed during winter pruning whereas a canker that forms at a flush cut on the central leader will be missed during winter pruning.

An extension specialist in California reported that he failed to transmit fire blight with pruning tools when he purposely made cuts through active cankers in dry weather. However, he succeeded in transmitting blight on pruning tools when pruning was done in wet weather. Blight removal operations should usually be suspended in wet weather, but that is not always possible. (See question #4 below). As a precaution, perhaps pruning tools should still be disinfected if blight removal must be done in wet weather.

**3. Q:** Should prunings be removed from the orchard?

**A:** I haven't found any recent recommendations addressing this question (although I admit my search was not exhaustive). My personal recommendation is to place prunings in the row middles and allow them to thoroughly dry before running a mower over them. "Thoroughly dry" means that the bark no longer slips on the branches that have been removed, and the out bark and cambium have turned brown. With today's tightly spaced orchards, I am concerned that carrying prunings out of the orchard may spread more blight than occurs when prunings are left to dry in the row middles.

**4. Q:** What about pruning out blight in damp or rainy weather?

**A:** In the ideal world, blight removal would only be done in dry weather. However, when a week of rain is predicted just as the first symptoms of blight appear, one must weigh the risks of spreading blight by pruning in wet weather versus the risks of giving the epidemic a full week, or even a two- or three-day head start. With highly susceptible cultivars like Gala, I would opt to remove blight as quickly as possible, even if that meant that some removal would be done in less than ideal weather.

**5. Q:** Can I do hand thinning or bud pinching while blight is active in the orchard?

**A:** Avoid these activities until after terminal bud set. Delaying hand thinning may result in some loss of fruit size, but risks of spreading blight outweigh the benefits of early hand-thinning. One local grower demonstrated that pinching buds as part of tree training for the vertical axe system is a great way to

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spread blight. Even though we no longer recommend disinfecting pruning tools between cuts, one can still spread blight on one's fingers while pinching buds (and presumably while hand-thinning). Pinching is done to succulent shoot tips that are highly susceptible to blight, whereas cuts made to remove blight are made in wood that is at least two years old.

**6. Q:** What can be done to stop the spread of blight to new terminal shoots?

**A:** No good answers here. Anything that helps to shut down tree growth will help to limit the spread of blight since the epidemic stops when terminal buds are set. Lucky growers never get blight, but if they do, they only get it in drought years when trees stop growing in mid-June. (This is not a lucky year!) Obviously, blocks with blight should not be trickle-irrigated until well after terminal bud set. Allowing weed regrowth beneath trees may increase competition for water and nutrients, thereby helping to slow tree growth.

Fig. 1. Early symptoms of fire blight on a terminal shoot. Note the blackened mid-vein at the base of the leaf blade.

The new plant growth regulator called "Apogee" may prove useful for arresting blight epidemics. This product has a Federal label, but it is not yet registered in New York State. Apogee causes trees to set terminal buds beginning about two weeks after it is applied. To control vegetative growth in overly vigorous blocks, Apogee application will be recommended at late bloom or at petal fall. In young orchards, however, early cessation of terminal growth is undesirable except when blight is present. If Apogee is applied after the first symptoms of blight appear in an orchard, two applications will probably be needed to rein in the growth process and blight will continue to spread for at least two weeks after the first Apogee application. In highly susceptible cultivars, blight may reach the rootstocks in many trees before Apogee can shut down terminal growth and make the tree more resistant to blight. In dry years, untreated trees may stop growing on their own about the same time that Apogee takes effect. The earlier cessation of shoot growth triggered by Apogee will help control blight in wet years, but the combined cost for the two Apogee treatments may exceed $150 per acre. Cost-effectiveness of Apogee for fire blight remains to be determined.

Until the mid 1980's, fire blight experts recommended reducing action thresholds for aphids and leafhoppers in orchards with blight because of concerns that these insects might spread blight during summer. Research in the Mid-Atlantic States has shown that aphids and white apple leafhoppers cannot vector blight. The role of potato leafhoppers (PLH) is less clear. A spray of Provado or carbaryl to control PLH may be helpful. However, complete control of PLH is impossible in a season when thunderstorms regularly drop new immigrant PLH adults into orchards.

Streptomycin sprays should NOT be applied during summer because summer applications will result in rapid development of streptomycin-resistant strains of the blight pathogen. The only exception is that streptomycin should be applied immediately after any hailstorm if there is active blight in the orchard (i.e., orchards where blight was present this year and terminal shoots are still growing).

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Copper sprays applied in summer theoretically should inactivate blight bacteria on plant surfaces and thereby help to reduce inoculum and slow the epidemic. However, attempts to document the benefits of summer copper sprays have provided inconsistent results. Proponents of using copper during summer admit that benefits of copper will be limited because copper is not systemic and therefore will not affect bacteria inside plant tissue. Furthermore, actively growing terminal shoots "outgrow" the copper residue, thereby leaving the blight-susceptible shoot tips unprotected within several days after an application. Copper applied in summer is also phytotoxic to fruit, with injury appearing as necrotic black spots at fruit lenticels. Thus, copper sprays are not acceptable where the crop is destined for fresh market. In young orchards, salvaging the crop may be less important than salvaging the trees. This is especially true this year when many orchards in the Hudson Valley already have severe hail damage.

The bottom line: If I was managing a young Gala block with fire blight, I would be applying a low rate (about 4 oz/100 gallons dilute spray) of a fixed copper on a 7–10 day schedule until terminal buds are set. Copper sprays should be applied under good drying conditions. The alkaline nature of copper sprays means that they probably cannot be combined with other pesticides that are subject to alkaline hydrolysis.

**7. Q:** What determines how many trees will develop rootstock blight?

**A:** No one knows. Rootstock blight develops when bacteria move from strikes in the top of the trees down through the trunk and cause cankers in the rootstock. Because M.9 and M.26 rootstocks are highly susceptible to blight, rootstocks that become infected usually die. In the Hudson Valley, Gala orchards that showed the first symptoms of fire blight in early June now have many trees with bacterial ooze coming out of the rootstocks. Some of the trees with rootstock blight still have a reasonably intact canopy, but they will not survive. Some will die within several weeks, some will die later this fall, and some will survive until next spring when they will wilt and die soon after bud break. Incidence of root stock blight can range from less than 5% of trees to more than 80% in a severely blight block. Rootstock blight is most common in orchards less than 6 years old, but other factors that make trees susceptible to rootstock blight have not been determined. ❖❖

Fig. 2. Bacterial ooze on the rootstock portion of a Gala/M.9 tree indicates that fire blight has reached the rootstock.

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## UPCOMING PEST EVENTS

| | 43°F | 50°F |
|---|---|---|
| Current DD accumulations (Geneva 1/1–6/26): | 1324 | 780 |
| (Geneva 1999 1/1–6/26): | 1354 | 857 |
| (Geneva "Normal" 1/1–6/26): | 1248 | 834 |
| (Highland 1/1–6/26): | 1536 | 952 |

| **Coming Events:** | **Ranges:** | |
|---|---|---|
| Obliquebanded leafroller summer larvae hatch | 1076–1513 | 630–980 |
| Spotted tentiform leafminer 2nd flight peak | 1266–2005 | 775–1355 |
| Apple maggot 1st catch | 1045–1671 | 629–1078 |
| American plum borer 1st flight subsides | 848–1668 | 440–1205 |
| Oriental fruit moth 2nd flight begins | 1152–1819 | 772–1215 |
| San Jose scale 1st generation crawlers present | 987–1247 | 569–784 |

## INSECT TRAP CATCHES (Number/Trap/Day)

### Geneva, NY

| | 6/19 | 6/22 | 6/26 |
|---|---|---|---|
| Redbanded leafroller | 0 | 0 | 0.1* |
| Spotted tentiform leafminer | 174 | 547 | 378 |
| Oriental fruit moth | 0.3 | 0 | 1.0 |
| Lesser appleworm | 0.5 | 0 | 1.3 |
| Codling moth | 14.1 | 5.3 | 5.3 |
| San Jose scale | 0.1 | 0 | 0 |
| Pandemis leafroller | 2.1 | 0.5 | 0.3 |
| American plum borer | 0.1 | 1.0 | 0.4 |
| Lesser peachtree borer | 3.6 | 2.2 | 3.0 |
| Peachtree borer | 0 | 0 | 0.1* |
| Obliquebanded leafroller | 4.6 | – | 4.1 |
| Apple maggot | – | 0 | 0 |
| Dogwood borer | – | 0.2* | 0.1 |

* first catch

### Highland, NY

| | 6/19 | 6/26 |
|---|---|---|
| Redbanded leafroller | 0 | 0.6* |
| Spotted tentiform leafminer | 75.6 | 49.6 |
| Oriental fruit moth | 0.1 | 0 |
| Codling moth | 3.4 | 4.7 |
| Pear psylla (eggs/50 leaves) | – | 90 |
| Pear psylla (nymphs/50leaves) | – | 110 |
| Lesser peachtree borer | 0.1 | 0.3 |
| Lesser appleworm | 1.0 | 0 |
| Dogwood borer | 0 | 0 |
| American plum borer | 0.6 | 0.3 |
| Obliquebanded leafroller | 0.6 | 0.5 |
| Tufted apple budmoth | 0.6 | 1.1 |

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.