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Update on Pest Management and Crop Development

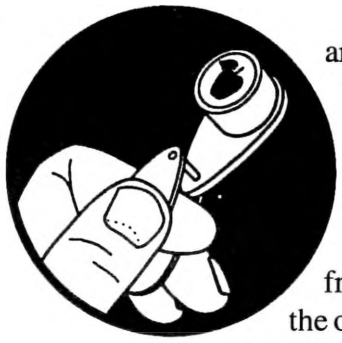
FRUIT JOURNAL

June 28, 1999 VOLUME 8, No.15 Geneva, NY

INSECTS

HAVE STRAW, WILL TRAVEL

A BUNCH OF SUCKERS
(Art Agnello, Entomology, Geneva)



Comstock Mealybug

❖❖ The first Comstock mealybug adult males of the season showed up last Friday (6/25) in our Wayne Co. pheromone traps, so it shouldn't be long before we start seeing some adult females in pear foliage, followed by their invasive crawler offspring. For those with a history of infestations of this pest in their pears, the crawlers are the most susceptible stage for chemical control, which we expect sometime during the 2nd to 3rd week of July in the Hudson Valley, and shortly thereafter in western N.Y. The following information is taken from the Comstock Mealybug IPM Fact Sheet, No. 22:

There are two generations of Comstock mealybug in New York, each taking 60 to 90 days to complete, depending on seasonal temperatures. The egg is generally thought to be the primary overwintering stage, but some nymphs and adult females from the second (summer) generation may also overwinter, with eggs being laid in the spring rather than the previous fall. Adult females and males emerge at the same time, from late June to mid-July for the first (overwintering) generation, and late August to mid-September for the second (summer) generation. Adult females are present for a total of 4–6 weeks, and oviposit for about one week after mating. Males survive for only a few days after emerging.

The elongate, orange-yellow eggs are laid in jumbled masses along with waxy filamentous secretions in protected places such as under bark crevices, near pruning cuts, and occasionally in the calyx of fruit. The summer-generation eggs are laid from mid-June through late July, and the overwintering eggs from mid-August into October. The early larval instars of the CMB are similar to adult females (wingless and elongate-oval in shape, with a many-segmented body) except that they are smaller, more oval-shaped, lack the long body filaments, and are orange-yellowish because they have less wax covering. Later instars are similar in appearance, but become progressively browner and redder.

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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 processors who buy New York fruit, 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 problem also occurs on peaches 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 be monitored best by wrapping white, double-sided carpet tape around low scaffold branches and inspecting for crawlers that have been caught on the tape. They can be recognized with a hand lens or, with some experience, by the unaided eye.

When we detect crawlers in some problem blocks we are monitoring, we'll advise an application of a material such as Penncap-M, Provado, Diazinon, Lannate, or (on apples only) Lorsban to control this insect.

Woolly Apple Aphid

We have already begun noticing infestations of this nuisance pest in eastern N.Y. orchards. The woolly apple aphid (WAA), *Eriosoma lanigerum*, 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

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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/scafolds/

scars and later become numerous in the outer portion of the tree canopy, usually during late July to early August. Their (somewhat limited) presence now can serve as an indication of potential trouble spots later on.


Wingless adult

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. Starting sometime in early 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. Resistant rootstocks such as MM.106, MM.111, and Robusta are the only means of controlling underground infestations of WAA on apple roots. 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 that are effective include Lorsban, Thiodan, and Penncap-M.

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INSECT TRAP CATCHES (Number/Trap/Day)

Geneva, NY

	6/21	6/24	6/28
Spotted tentiform leafminer	153	741	819
Redbanded leafroller	0	0	0.8*
Oriental fruit moth	1.3	0.8	5.1*
Lesser appleworm	0.5	0.8	3.4
Codling moth	8.4	5.3	6.5
American plum borer	0	0	0.1
Lesser peachtree borer	1.3	2.5	1.1
Pandemis leafroller	0	0.2	0
Obliquebanded leafroller	0.4	0.5	0.6
Peachtree borer	1.6	1.0	0.6
Dogwood borer	0	0.7*	0.5
Apple maggot	–	0	0.06*

Highland, NY

	6/14	6/21	6/28
Spotted tentiform leafminer	38.5	10.3	34.9
Redbanded leafroller	0.1	0.9	2.6*
Oriental fruit moth	0.4	0.4	0.6
Codling moth	1.0	0.5	1.3
Lesser appleworm	0.4	0.6	0.8
European red mite(#/leaf)	5.2	17.8	10.2
Two-spotted spider mite(#/leaf)	3.0	5.8	7.8
San Jose scale	0.4	0	0
Fruitree leafroller	0	0	0.1
Obliquebanded leafroller	5.1	4.8	3.4
Tufted apple budmoth	4.0*	3.7	6.7
Variegated leafroller	2.3*	0.7	1.1
Sparganothhis fruitworm	2.1*	1.9	1.1
Apple maggot	–	0	0

Hudson, NY

	6/14	6/21	6/28
Spotted tentiform leafminer	8.5	7.6	12.8
Oriental fruit moth	2.1	1.3	0.8
American plum borer(cherry)	1.5	1.3	1.4
Lesser peachtree borer(peach)	0.8	6.3	3.0
Peachtree borer	0.9	3.2	3.3
Tarnished plant bug	0	0.2*	1.0

* first catch

Potato Leafhopper

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 regulators, 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 New York 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.

BEETLES AND BORERS

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. Mike Villani indicates that the overwintered grub population this season is larger than last year's (although not as large as in 1995), and adults have already been seen flying after emergence from upstate N.Y. lawns as of last week, which is pretty much right on schedule. 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. 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 Sevin or Penncap-M when the first beetles appear.

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Dogwood Borer

Dogwood borer moths were flying last week, so they should be laying eggs in susceptible apple orchards soon (those with succulent burrknot tissue or suckers). The larva of this clearwing moth feeds on apple trees, primarily on burrknot tissue on clonal rootstocks. Dilute trunk applications of an insecticide with good residual activity can provide control of established infestations. At this point in the season, a spray of Lorsban 50WP or Thiodan 50WP would be the most effective materials if applied in July and August; refer to p. 72 in the Recommends for specific rates and dates.❖❖

DISEASES

DRY ROTS

CONTROLLING SUMMER DISEASES IN A DRY YEAR (Dave Rosenberger, Plant Pathology, Highland)

❖❖ Controlling apple diseases in wet years can be frustrating, but disease control in dry years is perhaps more complex. In wet years like 1998, everyone knows that continual fungicide protection is essential. In a dry year like 1999, anxieties arise because of the unknowns involved in NOT spraying.

In dry years, midsummer (late June — early July) is a good time for apple growers to save on fungicides. Apple scab is now inactive, even in orchards where scab appeared on leaves in late May. Lesions that appeared in May have probably received two fungicide cover sprays by now. The fungicides, hot weather, and the aging process of existing lesions have reduced production of viable conidia in existing lesions. Trees have (or soon will) set terminal buds, thereby terminating the production of susceptible new tissue for scab infection. Fruit have now reached a size where they are more resistant to scab than they are during the first 30 days after petal fall. Some of the scab on leaves could re-activate if we encounter a multi-day period of cool and wet weather, especially during late August or September. However, scab is of little concern given our current dry weather patterns. Even a few showers during midsummer (which would be welcome) will not reactive scab enough to cause problems.

Sooty blotch and flyspeck are the two diseases that generally require regular sprays during summer, but these diseases are also inactive during late June and July in dry years. Most of the inoculum for sooty blotch and flyspeck comes from wild hosts in orchard perimeters. Ascospores of the flyspeck fungus mature shortly after bloom. Visible symptoms appear on fruit only after fruit have been wet for a cumulative total of approximately 270 hours following infection.

Release of ascospores by the flyspeck fungus 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. The secondary infections produce conidia in wild hosts (presumably after about 270 hours of accumulated wetting). These conidia are blown into apple orchards and cause the infections on apple fruit that appear during late summer, after another 270 hours of accumulated wetting from the time of infection.

Summer fungicides for controlling flyspeck are not needed from the end of the scab season until the time when 270 hours of wetting have accumulated counting from 10 days after petal fall. At that point, flyspeck conidia will become available in the orchard perimeter and will begin blowing into the orchard.

In dry years, a single fungicide application in late July sometimes provides adequate control of

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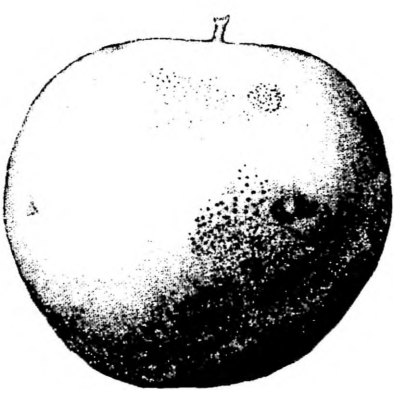
flyspeck. Depending on a single application is risky, however, because effectiveness of a single spray depends on achieving perfect spray coverage. A safer approach, even in dry years, is to use a minimum of two summer fungicide applications with one timed for mid- to late July, and the second about three weeks later in early to mid-August. These sprays will also help to prevent lenticel infection of fruit by the black rot fungus. A slightly earlier timing may be advisable in orchards where poor pruning and/or an exceptionally heavy crop load will make it impossible to get good spray coverage by mid-August. If August is exceptionally wet, an additional late-August application may be needed in orchards where a lot of primary scab lesions (May infections) are present in the orchard. More conservative application schedules are also advised for those "hot spots" where flyspeck is a perennial problem.

As explained below, the July-August applications should include Benlate or Topsin M (in combination with captan or ziram) to maximize both eradicant and residual activity against flyspeck. In dry years, however, Benlate should be avoided before mid-July. If a sudden heavy rain breaks the drought, fruit will size very rapidly. Rapid growth following drought stress often causes "lenticel splitting". Lenticels that "split" appear as enlarged and roughened lenticels on fruit at harvest. Benlate sometimes increases the severity of this phenomenon. The interaction between Benlate and lenticel splitting is probably related to Benlate applications made during June, but later applications may also be involved.

Captan and ziram do not have any eradicant activity against flyspeck and therefore must be applied before the conidia cause infections, i.e., before 270 hours of wetting have accumulated. The benzimidazole fungicides (Benlate and Topsin M) provide about 100 wetting hours of eradicant activity against flyspeck. As a result, development of flyspeck on fruit can be arrested if Benlate or Topsin M is applied sometime between 270 and 370 hours of accumulated wetting counting from 10 days after petal fall.

Captan and ziram provide good control of flyspeck under New York conditions if they are applied on a 14-day interval. Shorter intervals may be needed to compensate for wash-off by rains. Benlate, Topsin M, and the combination of ziram plus sulfur (1 lb. of each per 100 gal) provide excellent residual protection that will control flyspeck for about 30 days or through three to four inches of rain during summer. Benlate, Topsin M, and the ziram-sulfur combination generally provide adequate control of flyspeck during the preharvest interval if applied within 45 days of harvest. The ziram-sulfur combination provides excellent residual activity against flyspeck, but it does not provide any eradicant activity and therefore must be in place before the first flyspeck conidia arrive in the orchard. Combinations involving Benlate or Topsin M will provide better control of black rot than ziram-sulfur.❖❖



PEST FOCUS

Geneva:
Ist catch of **Comstock mealybug** adults occurred 6/25 in Wayne County. 1st **apple maggot** trap catch. **Redbanded leafroller, lesser appleworm** and **Oriental fruit moth** 2nd flights began today. **Spotted tentiform leafminer** 2nd flight began 6/10. DD(base 43°F) accumulated since then = 438. 1st catch of **obliquebanded leafroller** = 6/2. DD(base 43°F) accumulated since then = 645. Degree days (base 50°F) accumulated since 1st **codling moth** trap catch = 714. Control of the 2nd generation is timed at 1260 DD_{50} from 1st catch. Degree day accumulations have been just a little above "normal" so far this season, but are now beginning to look more like sizzlers 1998 and 1991.

Highland:
High numbers of **tarnished plant bug** observed in traps. **Spotted tentiform leafminer** 2nd flight began 6/7. DD(base 43°F) accumulated since then = 576. 1st **obliquebanded leafroller** catch was on 6/2. DD(base 43°F) accumulated since then = 705. (Expect first hatch @ 360) Degree days (base 50°F) accumulated since 1st **codling moth** trap catch = 886. Control of the 2nd generation is timed at 1260 DD_{50} from 1st catch. Drought stress symptoms appearing in apples.

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–6/28):	1420	909
(Geneva 1998 1/1–6/28):	1558	997
(Geneva "Normal" 1/1–6/28):	1261	873
Hudson (3/17–6/28):	1483	939
(Highland 1/1–6/28):	1658	1070
Coming Events:	**Ranges:**	
Obliquebanded leafroller summer larvae hatch	1076–1513	630–980
Comstock mealybug 1st flight peak	1528–1782	824–1185
Spotted tentiform leafminer 2nd flight peaks	1295--2005	824–1355
American plum borer 2nd flight begins	906–1876	973–1337
Codling moth 1st flight subsides	1112–2124	673–1412
Oriental fruit moth 2nd flight begins	1152–1819	772–1215
Peachtree borer flight peak	864–2241	506–1494
San Jose scale 2nd flight begins	1449–1975	893–1407

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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