scaffolds Update on Pest Management and Crop Development

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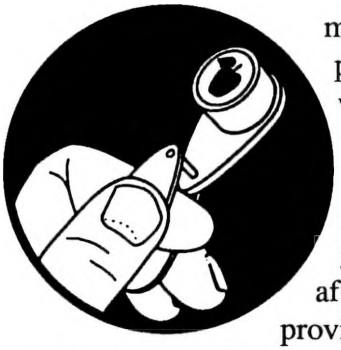
INSECTS

ORIGINAL SIN

BITES OF THE APPLE (Art Agnello, Entomology, Geneva)



Codling Moth

❖❖ Most New York apple growers have traditionally ignored the potential threat to their crop posed by this widely endemic orchard resident, as the regular OP sprays for plum curculio and apple maggot between petal fall and mid-August make fruit infestations by codling moth relatively rare. During the past few years, however, with the advent of trapping-based spray decisions for apple maggot, and a resulting decrease in cover sprays in some cases, there have been more opportunities for an unwelcome return of the worm in the apple, which is all the more unacceptable because it is a fairly easy problem to prevent. To that end, we will again publicize suggested codling moth treatment windows this season, for those growers who don't necessarily spray certain blocks for maggot each year, and who have evidence (or suspicion) that codling moth is starting to pose a significant threat.

The Michigan model for predicting this insect's development gives fairly accurate predictions of codling moth activity in N.Y. As many as two insecticide applications may be made for each of the two generations per year, depending on the severity of pressure. Degree days are accumulated from the date of first sustained moth catch, and the first spray is applied at 250 DD (base 50°F), which corresponds with predicted 3% egg hatch. A second spray may be applied 10–14 days later. If pressure is not too severe, one spray will suffice, applied instead at 360 DD after the biofix date (which we're calling May 7 in Geneva and May 4 in Highland). To control the second generation, the timing is 1260 DD after this same biofix date. We will be providing regular updates in the **Pest Focus** section to identify imminent spray dates.

San Jose Scale

The San Jose scale (SJS) is a pest of tree fruit that attacks not only apple, but also pear, peach, plum, and sweet cherry. The minute SJS adult males emerge in the spring from beneath scale covers on the trees, usually during bloom, and mate. The first of this year's adults started showing up on May 11 in our traps at Geneva. The females produce live crawlers within 4–6 weeks of mating; these are bright yellow, very tiny insects resembling larval spider mites. About 24 hours after birth, the crawlers have walked or drifted to new sites and settled in by inserting their mouthparts into the tree and secreting a white waxy covering that eventually darkens to black.

SJS infestations on the bark contribute to an overall decline in tree vigor, growth, and productivity. Fruit feeding causes distinct red-purple spots that decrease the cosmetic appeal of the fruit. Control measures for SJS are recommended when the scale or their feeding blemishes have been found on fruit at harvest during the previous season. Insecticidal sprays are most effective when directed against the first genera-

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tion crawlers, specifically timed for the first and peak crawler activity, which are usually 7–10 days apart.

The most reliable method of determining first appearance of the crawlers in your specific area is by putting sticky-tape traps on the tree limb near encrusted areas and checking them at least twice a week, starting about the second week of June. Alternatively, a degree-day accumulation of 310 (50°F base) from the date of first adult catch has also been shown to be reliable if the degree-days are known with some accuracy.

Effective materials for SJS control include Lorsban 50WP, Guthion, Imidan and Penncap-M. These sprays may also help in the control of OBLR, apple maggot, and codling moth. Coverage and control are generally better if the pesticide is applied dilute and in every row. SJS is frequently more of a problem in larger, poorly pruned standard size trees that do not receive adequate spray coverage. Dormant or delayed-dormant sprays of oil, or 1/2-inch green applications of Lorsban 4EC or Supracide will have helped prevent populations from getting established. Early season pruning is important for removing infested branches and suckers, as well as for opening up the canopy to allow better coverage in the tree tops where SJS are often concentrated.

Stone Fruit Aphids

Although green peach aphids are not always a serious problem every year, this could be one of those seasons that are favorable for their growth, and the colonies of greenish, smooth-looking aphids can start showing up in peach blocks around this time. They cause curled leaves that may turn yellow or red in severe cases. The young aphids begin to hatch about the time of peach bloom and remain on the trees for 2–3 generations, until early summer, when they seek other hosts (mainly vegetable truck crops). Green peach aphids suck the sap from the new fruits and twigs, and are also found on plum, apricot, cherry, and many ornamental shrubs. These insects are difficult to control; Lannate or Thiodan are recommended postbloom, before excessive leaf curling occurs, in order to maximize the spray's effectiveness. Also, keep an eye out for black cherry aphid in your cherry trees after shuck fall. If colonies are building up on the foliage, recommended materials include Sevin, Imidan (tart cherries only), and Penncap-M.

Pear Psylla

The pear psylla is a "flush feeder", meaning that the nymphs feed and develop primarily on the newer, more tender growth. By midway through the growing season, the majority of leaves are hardened off and psylla development then may be limited primarily to the water sprouts. Once the nymph begins to feed, a honeydew drop forms over the insect; the psylla develops within this drop for the first few instars. Honeydew injury occurs when excess honeydew drips onto and congregates on lower leaves and fruit. The honeydew is a good medium for sooty mold growth. When it occurs on the fruit, it russets the skin and makes the fruit unsaleable. Ladybird beetles, lacewings, syrphids, snakeflies (Raphidiidae), and predatory bugs have been

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Dept. of Entomology
NYSAES, Barton Laboratory
Geneva, NY 14456-0462
Phone: 315-787-2341 FAX: 315-787-2326
E-mail: ama4@nysaes.cornell.edu

Editors: A. Agnello, D. Kain

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recorded feeding on the psylla. There are also two chalcid parasites of pear psylla in the U.S. However, to obtain commercially acceptable fruit in New York, pear psylla generally must be controlled with insecticides.

For psylla control, we have historically recommended an application of an effective insecticide when nymphs start to build to the level of 1–2 per leaf after petal fall. More than one application of some material is often necessary. In the most recent past, the pyrethroids and Mitac have been the most widely used psylla products in our area. During the past 5 years, we have additionally been able to use Agri-Mek under Section 18 exemptions and as a Special Local Need use; last year, it became available under a full federal and state label. This chemical is absorbed into the leaf tissue and kills the psylla when it feeds; its mode of action is also different from the other contact toxicants. In field trials, it has provided 4–6 weeks or more of protection under normal growing conditions.

Current guidelines call for it to be applied within the first 1–2 weeks after petal fall, which means that the effectiveness of a single application may not carry through the entire season, depending on how late the spray is made and how absorptive the tissue is at the time of application. Our spate of warm temperatures so far this season has probably aged the pear foliage relatively quickly, similar to what occurs more often on the west coast, so the succulent tissue required for adequate absorption of the material may not last long. The Agri-Mek label allows for the option of a second spray, but considering the cost, late summer leaf condition, and resistance factors (and the fact that this is not a good contact material), a better approach would be to keep a watchful eye on the trees in mid- to late July, and switch to something different if needed, such as Provado, Pyramite or Mitac.❖❖

CAN YOU SPOT THE ENEMY?

LEAF SPOTTING ON APPLES

(Dave Rosenberger, Plant Pathology, Highland)

❖❖ Circular brown leaf spots are showing up on apple terminal leaves in some orchards. Leaf spotting will probably be more prevalent than usual in 1998. The extended wetting periods that occurred during the last two weeks provided ideal conditions for development of leaf spots.

Apple leaf spots contribute to grower anxiety, but they generally cause only cosmetic damage to apple trees in the northeastern United States. By the time the leaf spots become visible, the events that contributed to their development are history and it is too late to apply control measures. Fortunately, the fungi causing leaf spotting in the northeast do not have secondary cycles on leaves. Therefore, the most of the spotting will be limited to those leaves that became infected during the extended wetting periods prior to petal fall or first cover.

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DISEASES

PEST FOCUS

Geneva: Degree days (base 50°F) from 1st **codling moth** catch (5/7) = 145. Control sprays for **plum curculio** are no longer necessary whenever the last spray has been applied within 10–14 days after 340 DD_{50} have accumulated since McIntosh petal fall (5/11). 106 DD_{50} have accumulated since then.

Highland: Degree days (base 50°F) from 1st **codling moth** catch (5/4) = 253. DD_{50} since McIntosh petal fall (5/4) in the Hudson Valley, for use in **plum curculio** spray decision = 160.
1st lesser appleworm trap catch.
Faberia & **black rot leaf spot** observed in pears

Leaf spots can be caused by spray injury or by a variety of different fungi that attack leaves during wet weather. The exact causes of leaf spotting are often difficult to determine because spots attributable to various causes all look very similar. Most leaf spots are uniformly circular and one to four millimeters in diameter. Individual leaves may have a single spot or as many as 30–50 spots. Severely affected leaves will turn yellow and drop from the tree within the next several weeks, but the number of leaves lost is usually insignificant and does not adversely affect fruit growth. Where spotting is limited to only a few spots per leaf, the leaves will survive and remain green.

The most common causes of leaf spotting are the black rot fungus (*Botryosphaeria obtusa*), the cedar apple rust fungus (*Gymnosporangium juniperi-virginianae*), other weakly pathogenic fungi (*Alternaria* species, *Phomopsis* species), or spray injury from oil sprays and/or from captan.

The black rot fungus is probably the most common cause of leaf spotting. Spotting caused by the black rot fungus is called "frog-eye leaf spot" because the lesions are dark brown with an almost black center and a yellow halo around the edge. As already noted, other fungi can cause similar symptoms, so the spots themselves are not diagnostic. However, frog-eye leaf spot can often be identified based on its irregular distribution within the tree. Inoculum usually originates with small mummified fruitlets that remained in the tree after the fruitlet was killed by the previous year's thinning treatments. Inoculum can also originate with dead twigs left in the tree during pruning. Frog-eye leaf spot on the new foliage is usually concentrated in a cone pattern beneath one of these inoculum sources.

The same fungus that causes frog-eye leaf spot also causes black rot fruit decay. However, the fungus does not appear to spread from the leaves to the fruit. Rather, fruit infections that appear as a calyx-end rot when the apples begin to ripen are probably initiated at the same time and from the same inoculum sources as are the leaf infections that are appearing now. Fruit infections can remain quiescent during summer because the green fruit have natural inhibitors that limit growth of the fungus. These natural inhibitors disappear as the fruit begins ripening.

The presence of frog-eye leaf spot is an indication that the early season spray program was not adequate to prevent infections around the inoculum sources. In orchards with extensive leaf spotting at petal fall or first cover, there may be some benefit to applying Benlate or Topsin M to eradicate quiescent infections in fruitlets. However, the effectiveness of eradicant sprays with these fungicides has not been documented.

Rust-induced leaf spotting can occur on cultivars such as Empire, Cortland, and Liberty that are considered resistant to cedar apple rust. If these cultivars are sprayed with a fungicide that does not control rust (e.g., captan), then the rust fungus may initiate infections even though the trees will never develop typical rust lesions. The rust fungus invades a few cells and may even appear macroscopically as a pinpoint yellow or orange spot on the upper leaf surface. However, the infected leaf cells soon die because of the natural resistance of these cultivars. The cells killed or damaged by the rust infections are subsequently invaded by *Botryosphaeria, Alternaria,* or *Phomopsis*. These fungi use the dead or dying cells as a food base and then invade adjacent healthy tissue. The resulting leaf spots are indistinguishable from frog-eye leaf spot except that rust-induced leaf spots are usually more uniformly distributed throughout the tree canopy. Sometimes the original orange-yellow rust lesion is visible in the center of the brown leaf spots initiated by rust infections.

Prebloom oil applications can cause leaf spotting if the oil spray is applied just before or after frosts. However, such oil injury usually shows up during bloom and it frequently causes more irregular lesions rather than the round lesions described above.

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Captan can cause leaf spotting that is indistinguishable from frog-eye leaf spot or rust-induced leaf spotting. Captan is phytotoxic to apple leaves if it is absorbed into the leaf. Captan applied alone can cause leaf spotting if it is applied at high rates to very succulent foliage (e.g., after a week of cloudy weather). Red Delicious trees are more susceptible to captan injury than most other cultivars. If captan and oil are applied together or within several days of one another, the spray oil increases uptake of captan and can contribute to phytotoxicity on many apple cultivars. As with rust-induced leaf spotting, the original injury caused by captan may involve only a few cells. However, these damaged cells provide an entry point for other fungi that enlarge the leaf spot and cause the typical round leaf spots.

What is the minimum interval between captan and oil sprays that is necessary to avoid phytotoxocity problems? That question is especially important for growers wishing to apply Agri-Mek with oil and still use captan for scab control. No single answer applies, and there is little research to provide guidance. If foliage is very succulent because of cool cloudy weather, then the potential for phytotoxicity is greater and the interval between captan and oil sprays (or oil sprays and captan) should probably be at least 7 days and perhaps 10 days. Oil is likely to volatilize and disappear more quickly in hot weather, so captan could probably be applied 4–7 days after oil if warm sunny weather prevailed in the interim. Rainy weather that removes captan residue could similarly reduce the likelihood of damage for oil sprays applied following captan. Again, Red Delicious trees are likely to develop more phytotoxicity than other cultivars.

A bit of leaf spotting on terminal foliage is not detrimental to the tree or the crop. However, apple growers who are using Agri-Mek plus oil probably should use a fungicide other than captan during the week before or after the Agri-Mek application to minimize the potential for severe captan-related leaf spotting.❖❖

WHERE YA BEEN?

DIDJA MIDGE ME?
(Art Agnello, Entomology, Geneva)

❖❖ The pear midge is an old pest not commonly seen in blocks under a "standard" spray schedule; however, there are indications that this season its damage may turn up more frequently than in the past. Infested fruits at first become abnormally enlarged and later stunted and deformed, with black sting marks on the surface. This insect is usually controlled by chemical applications for other pests, and in most cases of fruit infestation, the problem comes down to the proper timing of an insecticide spray. The pear midge overwinters as a pupa in the soil, and the adults emerge in the lake plains area of NY in early May. The first flies will generally appear when Bartlett and Clapps are in the tight cluster bud stage, but no successful egg-laying occurs until the flower buds are a little more developed. The critical period for chemical control begins when the sepals have spread apart enough to show the first appearance of pink (the folded petals underneath), and continues until just before most of the blossoms are open. The flies disappear by the time of Bartlett full bloom. Larvae may be present inside the fruitlets on the tree, and do not affect fruitlet color. Full-grown larvae may leave the fruit or remain inside until it drops to the ground. In June and July, the maggots exit from the fruit (on the tree or the ground) and burrow into the soil as much as 3 inches to pupate later.

We know of no practice, either chemical or cultural (such as roto-tilling), that is effective enough to recommend for controlling the insects in the ground. These insects emerge in very large numbers, especially in a block continuously infested from year to year, and it is much easier to protect the fruit than to eliminate the pests at their source. If your pear block has a history of midge infestation and you wish to limit the area requiring chemical

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sprays, concentrate on those portions of the orchard most protected from the wind by trees, high ground, or buildings, as the midges tend to be most numerous in these spots. The most effective materials to use for midge sprays are organophosphates like azinphos-methyl; at least 2 sprays are recommended, *one at* first separation of the sepals, and one 7 days later (or at white bud, whichever comes first). ❖❖

INSECT TRAP CATCHES (Number/Trap/Day)

Geneva, NY

	5/11	5/15	5/18
Spotted tentiform leafminer	85.5	67.6	56.0
Redbanded leafroller	4.8	3.4	1.0
Oriental fruit moth (apple)	3.3	2.4	1.5
Lesser appleworm	7.0	6.8	23.2
Codling moth	1.4	7.0	5.7
San Jose scale	0.5*	51.3	214
American plum borer	1.1	2.9	3.3
Lesser peactree borer	0.1	5.4	5.3
Peachtree borer	-	0.1*	2.3

HVL, Highland, NY

	5/4	5/11	5/18
Pear psylla eggs/leaf	12.8	2.1	15.1
Pear psylla nymphs/leaf	0.2	0.3	1.8
Spotted tentiform leafminer	18.3	7.4	4.1
Redbanded leafroller	7.4	2.3	1.1
Oriental fruit moth	3.0	1.0	0.9
Lesser appleworm	0	0	0.4*
Codling moth	0.1*	0.1	0.9
Obliquebanded leafroller	0	0	0

* 1st catch

(Dick Straub, Peter Jentsch)

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1- 5/18):	673	385
(Geneva 1997 1/1-5/18):	351	158
(Geneva "Normal" 1/1-5/18):	450	225
(Highland 1/1-5/18):	829	467

Coming Events(Geneva):	**Ranges:**	
Redbanded leafroller 1st flight subsides	518–1104	255–658
Adult rose leafhopper on multiflora rose	668–916	336–519
STLM 1st flight subsides	489–978	270–636
Oriental fruit moth 1st flight peak	259–606	96–298
San Jose scale 1st flight peak	581–761	308–449
American plum borer 1st flight peak	360–962	134–601
Codling moth 1st flight peak	547–1326	307–824
European red mite summer eggs hatch	773–938	442–582
Lesser appleworm 1st flight peak	372–851	181–483
Mirid bug hatch complete	532–720	252–390

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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Dept. of Entomology
NYS Agricultural Exp. Sta.
Barton Laboratory
Geneva, NY 14456-0462