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Update on Pest Management and Crop Development

FRUIT JOURNAL

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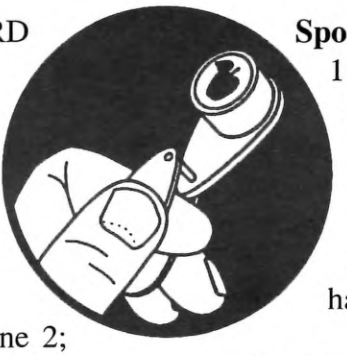
INSECTS

EN GARDE

ORCHARD RADAR DIGEST



Geneva Predictions:

Roundheaded Appletree Borer

RAB adult emergence begins: June 2; Peak emergence: June 17.

RAB egglaying begins: June 12. Peak egglaying period roughly: July 2 to July 16.

Lesser Appleworm

1st LAW flight, first trap catch expected: May 14; Peak trap catch: May 25.

Mullein Plant Bug

Expected 50% egg hatch date: May 23, which is 4 days before rough estimate of Red Delicious petal fall date.

The most accurate time for limb tapping counts, but possibly after MPB damage has occurred, is when 90% of eggs have hatched.

90% egg hatch date: May 26.

Obliquebanded Leafroller

1st generation OBLR flight, first trap catch expected: June 14.

Oriental Fruit Moth

Optimum 1st generation first treatment date, if needed: May 25.

Redbanded Leafroller

Peak trap catch and approximate start of egg hatch: May 8.

San Jose Scale

First adult SJS caught on trap: May 23.

Spotted Tentiform Leafminer

1st STLM flight, peak trap catch: May 15.

1st generation sapfeeding mines start showing: May 27.

Optimum sample date is around May 27, when a larger portion of the mines have become detectable.

White Apple Leafhopper

1st generation WALH found on apple foliage: May 18.

Highland Predictions:

Roundheaded Appletree Borer

RAB adult emergence begins: May 27; Peak emergence: June 11.

RAB egglaying begins: June 6. Peak egglaying period roughly: June 26 to July 10.

continued...

IN THIS ISSUE...

Lesser Appleworm
1st LAW flight peak trap catch expected: May 17.

Mullein Plant Bug
Expected 50% egg hatch date: May 17, which is 3 days before rough estimate of Red Delicious petal fall date.
The most accurate time for limb tapping counts, but possibly after MPB damage has occurred, is when 90% of eggs have hatched.
90% egg hatch date: May 23.

Obliquebanded Leafroller
1st generation OBLR flight, first trap catch expected: June 7.

Oriental Fruit Moth
Optimum 1st generation first treatment date, if needed: May 16.
Optimum 2nd generation first treatment date, if needed: May 30.

San Jose Scale
First adult SJS caught on trap: May 14.

Spotted Tentiform Leafminer
1st generation sapfeeding mines start showing: May 18.
Optimum sample date is around May 19, when a larger portion of the mines have become detectable.

White Apple Leafhopper
1st generation WALH found on apple foliage: May 10.

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CLASS CLOWNS

COMMENCEMENT
(Art Agnello, Entomology, Geneva)

❖❖ It's been a relatively cool and gradual progression, but the buds have eventually commited to their developmental path, so they're slowly making progress to where they should be for this time of year. Most of the state is pretty into the apple bloom period, which started last week in the Hudson Valley and should reach the rest of NY growing areas this week. While the pollinating activities are moving along, here are some of the nearly imminent petal fall pest management decisions to keep in mind.

Plum Curculio

Adults move into orchards from overwintering sites in hedgerows or the edges of woods and adults are active when temperatures exceed 60°F. Adult females oviposit in fruit during both day and night but feed mostly at night. Depending on temperature, overwintering adults remain active for two to six weeks after petal fall. Because adults are not highly mobile, orchards near overwintering sites, wood-

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lands, and hedgerows are most susceptible to attack. Fruit damage is usually most common in border rows next to sites where adults overwinter. Although initial post-bloom sprays for plum curculio control should begin at petal fall, growers are often unsure how many additional sprays will be necessary to maintain protective chemical residues to prevent subsequent damage throughout the PC oviposition cycle, which varies according to temperatures and weather patterns after petal fall.

Following from the fact that PC activity and oviposition are greatly affected by temperature, an oviposition model has been developed to determine when control sprays after petal fall are no longer necessary to protect fruit from PC damage. This model is based on the assumption that residues from control sprays after petal fall only need to be maintained on fruit and foliage until PC adults stop immigrating into orchards, which corresponds with when about 40% of the oviposition cycle is complete. This is predicted by the model to occur at 308 DD (base 50°F) after petal fall. [NOTE: This number used to be advertised as 340 DD, but that figure was the result of an incorrect metric conversion that had gone undetected until just this year.] Probably, this strategy works because, after 40% of PC oviposition is complete, adults usually are not moving into the orchard from outside sources, or moving around within orchards from tree to tree. Therefore, by this time, adults residing in treated trees have already been killed by insecticide residues and are unable to complete the remainder of their normal oviposition cycle.

In order to use this strategy: (1) Treat the entire orchard at petal fall with a broad spectrum insecticide. (2) Start calculating the accumulation of DD after petal fall (base 50°F). (3) No additional sprays are necessary whenever the date of accumulation of 308 DD falls within 10–14 days after a previous spray. In cherries and other stone fruits that are already at shuck fall, sprays should start at the first opportunity (i.e., like last week).

European Apple Sawfly

This primitive bee and wasp relative shows a preference for early or long-blooming varieties with a heavy set of fruit. This insect is generally a pest mainly in eastern N.Y., although it has been slowly making its presence known in the more western sites, progressing even as far as Wayne Co. The adult sawfly emerges about the time apple trees come into bloom and lays eggs in the apple blossoms. Young larvae begin feeding just below the skin of the fruits, creating a spiral path usually around the calyx end. This early larval feeding will persist as a scar that is very visible at harvest. Following this feeding, the larva usually begins tunneling toward the seed cavity of the fruit or an adjacent fruit, which usually causes it to abort. As the larva feeds internally, it enlarges its exit hole, which is made highly conspicuous by a mass of wet, reddish-brown frass. The frass may drip onto adjacent fruits and leaves, giving them an unsightly appearance. The secondary feeding activity of a single sawfly larva can injure all the fruit in a cluster, causing stress on that fruit to abort during the traditional "June drop" period.

Certain insecticides that control these pests also adversely affect bees, which can pose a problem at petal fall because certain apple varieties lose their petals before others. In blocks of trees where petal fall has occurred on one variety but not the others, the variety that has lost its petals is likely to sustain some curculio or sawfly injury until the insecticide is applied. Two recently registered insecticides with activity against both plum curculio and sawfly, Avaunt and Actara, may have a slight advantage in this case. Although highly toxic to bees exposed to direct treatment, they are relatively non-toxic when dried. A more recently registered product, Assail, gives yet another option for controlling sawfly (it's not very active against plum curculio, but will do a good job against rosy apple aphid, tarnished plant bug, and spotted tentiform leafminer, as well as sawfly, at this timing). As mentioned in previous articles this spring, Assail can be applied during bloom, which may give it the chance to persist into

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the period when newly set fruitlets are first susceptible to injury. To minimize the hazard to honey bees, apply any pesticide only when no bees are actively foraging on blooming weeds (evening is better than early morning).

Mites

If you elected and were able to get an oil or miticide applied during our very brief prebloom mite control window, you're in good shape. If not, and you are concerned about early buildup in certain problem blocks, Apollo, Savey and Zeal are just as appropriate to consider at petal fall as is Agri-Mek, which is one of the normally recommended materials at this time. Because of the (at times) cool temperatures up to this point, nymphal populations are likely to be small enough to be effectively handled by any one of these materials, if they fit into your product rotation schedule (i.e., they weren't used last year).

Obliquebanded Leafroller

Because these insects overwintered as 1st or 2nd stage larvae, they probably haven't had enough warm weather to encourage them to feed and grow as much by now as they have in recent years, and may be somewhat smaller than they usually are by petal fall. This translates into potentially higher control efficacy with whatever product is used against them, as smaller larvae are generally easier to kill. Scout the blossom clusters for larvae feeding within both the flowers and rolled leaves; a 3% infestation rate could justify a petal fall treatment to minimize overwintered fruit damage and help reduce summer populations. Among the selective insecticides available, Intrepid is the recently registered replacement for Confirm, and B.t. products, which can be used while blossoms are still present, include Dipel, Deliver, Agree and Javelin. Pyrethroids such as Asana, Danitol, or Warrior can also be effective, depending on past use history, but be aware of their broad-spectrum effects, which can work both for and against you, according to how many beneficial mites and insects you can afford to lose.

Oriental Fruit Moth

Biofix generally occurred around May 8–10 in western NY, and trap numbers should be starting to build once we get into some continuously warmer temperatures. To maximize the efficacy of 1st brood control, peach growers in western N.Y. could probably wait at least until next week before starting a program such as Asana or Warrior, backed up 10–14 days later. In apples, a number of the petal fall selection of insecticides will do an acceptable job of controlling this generation, including the OP's, pyrethroids, Intrepid, and Assail.

White Apple Leafhopper

We haven't spotted any yet, but WALH nymphs can be numerous in some blocks at petal fall, especially in the eastern part of the state. Nymphal populations of 1 or more per leaf can result in stippling damage to the leaves. Besides Provado, Actara, Avaunt and Assail have proven to be effective against this pest, and a petal fall application of any of these materials also gives leafminer control. Rosy apple aphids can similarly be cleaned up with this strategy (for all of the above except Avaunt), although petal fall is often too late to prevent fruit damage that their feeding may have caused. Growers using Sevin in their thinning sprays will get some WALH control at the 1 lb rate. Alternative choices include Thionex and Lannate; Agri-Mek or Carzol used for mites now will also do the job, but Carzol will be harmful to predator mites. The damage potential of this first generation should be evaluated carefully before deciding on the need for a specific control of this pest. ❖❖

WINTER IN SPRING

WHAT'S EATIN' YA THIS SPRING? POSSIBLY WINTER MOTH

(Peter Jentsch, Entomology, Highland)

❖❖ The period leading up to bloom of apple in the Hudson Valley has its share of the 'usual suspects', and pink applications to manage early season insect pests have been considered a standard practice. The insects driving these early season applications may be yearly culprits such as green fruitworm or rosy apple aphid, or those that have slipped through the previous years' schedules, as we've seen with increasingly common San Jose scale infestations. Prebloom applications have also included management of insects resistant to seasonal cover sprays of organophosphates and requiring newer chemistries for effective control, such as those used for obliquebanded leafroller. Pink applications are often used in mixed variety blocks to reduce plum curculio populations from damaging earlier fruit-setting cultivars, allowing bees to continue working on the later varieties in years of extended bloom periods.

It's uncommon that we find an insect that doesn't fit the bill. This spring in the Hudson Valley, however, we've been finding unusually high numbers of an uncommon pest known as winter moth, *Operophtera brumata* (L.). The larva, which may possibly be mistaken for the speckled green fruitworm, feeds on the flowering buds and terminal cluster leaves of apple, with feeding damage and webbing signs that field scouts typically come to expect from the overwintering OBLR larva. It also resembles the green pug, *Chloroclystis rectangulata*, particularly in the first 2 instars, but may be distinguished by the several white stripes in later instars of the winter moth, as opposed to the single reddish dorsal stripe in the green pug.

The winter moth is in the family Geometridae, a group of Lepidoptera noted for their 'looper' or inchworm-like movements. A non-native species, the moth was introduced to North America from Europe, where it continues to be a commercial fruit pest. It is common to eastern Canada, British Columbia and Vancouver, Oregon, Washington, and coastal Massachusetts and Rhode Island, with pockets of infestations in various parts of New England. Its occurrence in the Hudson Valley is not a first-time event, yet given its dramatic presence and the damage it appears to be causing this year, it is certainly noteworthy. These insects are most likely to be found in commercial orchard apple blocks that did not receive a prebloom pyrethroid or OP application this season.

As is often the case with newcomers, the occurrence may be in part due to a shift away from traditional commercial management practices of prebloom applications, as well as the insect's diverse feeding habits and unique ability to relocate under windy conditions. The larva will feed on a variety of plants of both deciduous and coniferous species, appearing to prefer fruiting species such as apple, blueberry, cherry, and crabapple. They have also been found to feed on the oaks, maples, basswood, ash, and certain spruces such as Sitka spruce (in Scotland).

Winter moth eggs hatch early in the spring when temperatures average 55°F, occurring when approximately 20–50 DD (base 50°F) have accumulated. The larvae tunnel into buds where they begin their feeding. Once a bud has been consumed from within, the caterpillar will migrate to other buds and repeat the process. In years such as this, when cool weather conditions delay tree phenology, delayed bud opening can lead to bud death as the caterpillars have a longer time to feed. The older larvae will feed in the expanding leaf clusters and may cause severe defoliation in high populations. In these later stages they may eat flower buds and feed on developing fruitlets. Damaged sites heal, and appear at harvest as a flat or concave area with a corky surface, or if severe feeding occurs, damage results as a deep corky cleft.

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Newly hatched larvae often crawl up tree trunks and produce a long strand of silk, which makes them buoyant in the air. This type of dispersal method is known as "ballooning", and allows larvae to be transported to areas where they are not expected to be a problem, such as the center of orchard blocks.

Spring larvae are pale green caterpillars with a white longitudinal stripe running down each side of the body. Winter moth larvae have just 2 pairs of prolegs and move in a typical inchworm-looping pattern. The green head and prolegs are useful scouting keys. The larvae reach approximately one inch in length at full maturity. They will continue to feed until mid-June, at which time they migrate into the soil for pupation. They will stay in the pupal stage until they emerge in late fall as moths.

Adults of the winter moth emerge from the soil typically in late November and can be active into January. The adults are attracted to lights and can often be found flying around streetlamps at night. The male moths are small, light brown to tan in color and have four wings that are fringed with small elongate scales, giving the hind margins a fringed appearance. The female is gray, with small vestigial wings and is unable to fly. She is usually found at the base of trees, where she emits a sex pheromone that attracts numerous male moths. After mating, the female deposits an egg cluster on tree trunks and branches, in bark crevices, under bark scales, or elsewhere. After oviposition, the adults die, leaving the egg to overwinter.

A dormant oil spray to the trunks and branches of trees may be helpful in killing the overwintering eggs before they hatch. Egg clusters are often laid beneath bark flaps and loose lichen and may be well protected from oil sprays. Caterpillars may also invade host plants by ballooning onto them after treatment has been applied.

Dipel is one of the few materials registered for managing winter moth. *Bacillus thuringiensis* (B.t. *kurstaki*), specific to caterpillars of butterflies and moths, works very well on the younger larvae of winter moth while they are free feeders (not in the buds). Spinosad, another biorational compound, works well against larvae and would be effective against the complex of lepidopteran larvae on apple during the prebloom period. Insecticides such as Lorsban (also registered on winter moth) and the pyrethroids used to manage the prebloom insect complex will also be effective in controlling the winter moth. ❖❖

PHENOLOGIES

Geneva:
Apple (McIntosh): Bloom
Apple (Red Delicious): Bloom
Apple (Empire): Bloom
Sweet cherry: Fruit set
Tart cherry (Mont.): 75% petal fall
Pear: Petal fall
Plum: Petal fall

Highland:
Apple (McIntosh): Petal fall, King fruit 5mm
Apple (Red Delicious): 75% petal fall
Apple (Empire): Petal fall, King fruit 5mm
Sweet cherry: Fruit set
Apricot: Fruit 20mm
Pear: Petal fall – fruit set
Plum: Fruit set
Peach(early): Fruit set, shucks off
Peach(late): Fruit set, shucks on

PEST FOCUS

Highland:
Pear psylla nymphs above threshold. **Rose leafhopper** nymphs observed on multiflora rose. **San Jose scale** model degree days (base 50°F) since March 1 = 256.6 **Oriental fruit moth** degree days (base 45°F) since biofix = 48.0

Geneva: 1st **Oriental fruit moth** trap catch, 5/16. 1st **mullein plant bug** nymphs observed 5/12.

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–5/16):	378.4	190.2
(Geneva 1/1–5/16/2004):	516	295.6
(Geneva "Normal"):	466	237
(Geneva 5/23 Predicted):	452	228
(Highland 1/1–5/16):	501	259

Coming Events:	**Ranges(Normal± StDev):**	
Comstock mealybug 1st gen. crawlers	215–441	80–254
Lesser appleworm 1st catch	239–537	104–286
STLM 1st sap-feeders present	343–601	165–317
American plum borer 1st catch	325–527	139–281
Codling moth 1st catch	389–587	188–324
Oriental fruit moth 1st flight peak	331–511	161–271
McIntosh at petal fall	444–528	230–286
Red Delicious at petal fall	480–640	260–326
Peach at petal fall	337–447	169–239
Pear at fruit set	469–559	248–300
Plum at fruit set	442–522	225–285
Tart cherry at fruit set	479–591	258–316

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INSECT TRAP CATCHES
(Number/Trap/Day)

Geneva, NY

	5/9	5/12	5/16
Redbanded leafroller	3.6	22.8	2.5
Spotted tentiform leafminer	12.5	17.7	3.8
Oriental fruit moth	0.0	0.0	0.3*
Lesser appleworm	0.0	0.0	0.0

Highland, NY

	5/9	5/16
Green fruitworm	0.0	0.0
Redbanded leafroller	4.4	2.9
Spotted tentiform leafminer	28.2	–
Oriental fruit moth	0.4	6.0
Lesser appleworm	0.0	0.6
San Jose scale	0.0	0.0
Codling moth	0.0	0.0
Obliquebanded leafroller	0.0	0.0

* 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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