scaffolds Update on Pest Management and Crop Development

FRUIT JOURNAL

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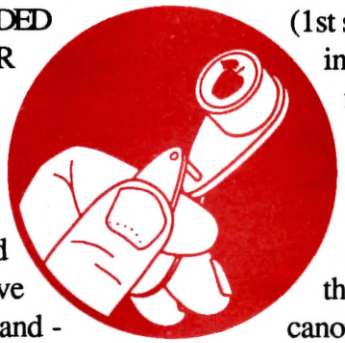
INSECTS

SUMMER INSECT CONTROL

OBLIQUEBANDED LEAFROLLER

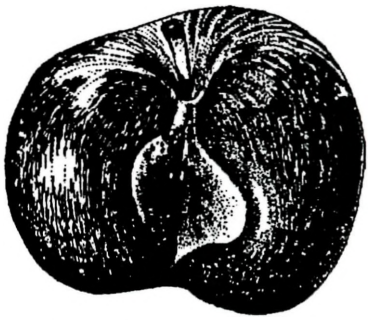
(Art Agnello & Harvey Reissig)



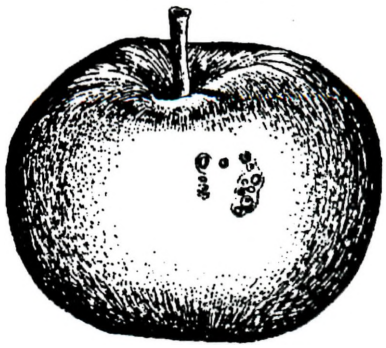
❖❖ The first summer brood obliquebanded leafroller moths have been caught so far as follows: Highland - 6/1; Geneva, Albion and Somerset - 6/13. Recall that we recommend sampling at 600 DD (base 43°F) after the first adult catch. As of today, 6/14, 178 DD have accumulated already in the Hudson Valley, and temperatures in the 70's are forecast for this week, so it would be a good idea to note high and low temperatures in your area to better time your sampling and treatment forays.

This insect, a native of this continent and widely distributed, feeds on a large range of plants, particularly members of the rose family. Outbreaks of OBLR can cause severe damage to the fruit of apple, peach, pear, and even blueberry. Depending on the locality, there can be 1–2 generations a year, but these are biologically ill-timed for convenient control measures in N.Y. orchards. Prebloom sprays at pink bud are not completely effective, because the insects are usually concealed in rolled leaf terminals or bud clusters, which makes adequate spray contact difficult. Also, not all of the population is fully active at this time, so any applications made then will simply not contact all the insects that will eventually emerge by bloom (and which would need to be controlled at petal fall anyway.) During the next normal spray at petal fall, the larvae are extremely large and not susceptible to most commonly used organophosphate insecticides, and so must be treated with "unconventional" OP's such as Lorsban, or else a carbamate or synthetic pyrethroid. At the time of the next (1st summer generation) larval emergence in mid- to late June, growers were formerly in the habit of postponing a specific spray until the apple maggot treatments in July, but by this time the OBLR larvae are again quite large, and still not susceptible to OP's. Also, thorough coverage is difficult in the canopy's thick foliage.

The most serious injury caused by the overwintered generation is damage to the developing fruit before and shortly after petal fall. Many of these damaged fruits drop prematurely, but a small per-



centage remain on the tree, developing deep corky scars and indentations at maturity. The two summer broods feed on the surface of developing fruit in July and August, causing injury that is virtually



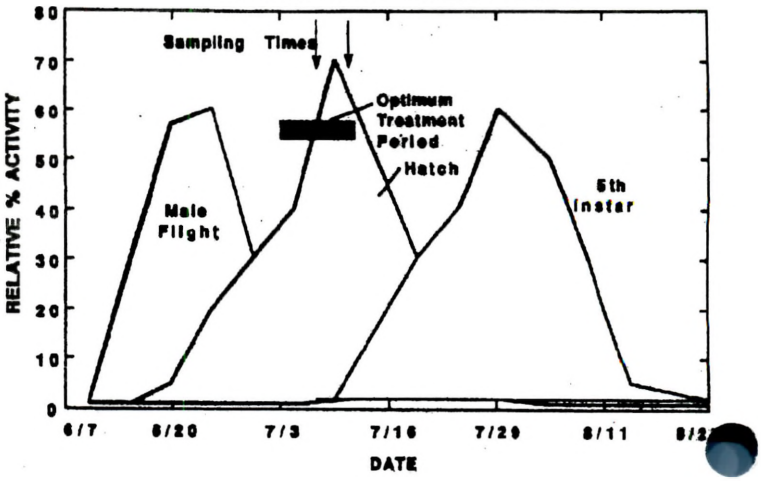
identical to that of several other leafroller species. Fruit damage caused by these broods is usually more serious than the feeding by larvae of the

overwintered generation, because more of this later-injured fruit tends to remain on the tree until harvest. Also, biological studies have shown that populations of the summer generation of OBLR are generally higher in commercial orchards than are those of the overwintering larvae.

Various summer management options are used against this pest, with variable success. One approach is to apply sprays starting around mid-June to kill adults and newly emerging 1st-generation larvae. However, extremely complete coverage is required to justify this strategy, and of course this also adds 1–2 extra sprays to the cover spray schedule. Unfortunately, the effectiveness of most materials has been decreasing in recent years, so again it is important for your application to be thorough. Recent field trials indicate that Lannate and Lorsban are probably the most consistently effective materials to use. Generally, the synthetic pyrethroids are almost as effective as Lannate and Lorsban, but Asana has not been recommended for use as frequently against the summer brood of OBLR because of its ability to cause mite outbreaks. Phosdrin is still very effective, but its high mammalian toxicity makes it too hazardous for most growers to choose. *Bacillus thuringiensis* materials (Biobit, Dipel, MVP, etc.) are effective if they are used in multiple applications and timed properly, but these products tend to be a little more expensive, and their control efficacy is generally no better than that obtained using the broader spectrum materials mentioned above. Nevertheless, their selectivity makes them more desirable from the standpoint of preservation of natural enemies.

To control the summer larvae, most growers have traditionally applied a spray 12–16 days after the first adult catch in their area. This timing generally coincides with peak egg hatch, and does in fact kill some larvae, but usually a second spray still ends up being necessary 10–14 days later. Another approach is to time a single application in mid- to late July, after most 1st-generation larvae have emerged, but before they begin to severely damage fruit, which occurs primarily during the fifth and sixth instars. This strategy used to give control as effective as the 2-spray option, especially if timed to reduce larval densities as much as possible—at 600 degree-days (43°F base) after the catch of the first adult, which coincides with a cumulative egg hatch of approximately 40%. However, our OBLR populations are getting tougher to control this way, and this timing is probably better regarded as the preferred time for a first application, with a repeat spray 10–14 days later.

Optimum Timing of Sampling and Control of Summer OBLR



Different treatment strategies to control the 1st summer OBLR brood were tested last season, using some or all of the following sprays timed according to certain test criteria:

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• 1st spray timed to coincide with 1st hatch of eggs (12 days after the first moth catch)

• 2nd spray one week later for some treatments to maintain weekly treatment intervals

• 3rd spray timed at approximately 600 DD (base 43°F) after the first moth catch, timed to coincide with cumulative egg hatch of 40%

• a 4th or 5th spray timing, if so indicated by test guidelines, at 10-14-day intervals thereafter to maintain weekly intervals.

Some generalized results of these trials were:

• A 4-spray Lorsban program was essentially no more effective in reducing fruit damage at harvest than was a 2-spray program (at 600 DD and 2 weeks later).

• Addition of the wetter/spreader/penetrant Kinetic did not affect the degree of fruit damage in the different Lorsban programs.

• A mixture of half-rates of Lannate + Imidan was not as effective in preventing fruit damage as the comparable two-spray Lorsban program (600 DD and 2 weeks later).

• Fruit damage was very similar in all of the rates and timing programs of Dipel (2-spray at 2 lb/A vs. 3-spray at 2 lb/A vs. 3-spray at 12 oz/A vs. 5-spray at 9 oz/A), and this damage was slightly higher than in the comparable Lorsban standard treatments.

• The efficacy of MVP was similar to that of Dipel, and there were very few differences in fruit damage among the different treatments of this material.

• The actual level of fruit damage in the different treatments varied between the two orchard sites where the plots were located, but in both orchards, the most effective treatments reduced fruit damage by about 80% compared with the unsprayed check plots. These results suggest that it is virtually impossible to completely eliminate fruit damage from OBLR feeding during the summer, regardless of the amount of insecticide applied. Treatments should therefore be optimized based on the costs of the insecticide treatment and economics of fruit losses at harvest.

As of today, 6/14, it's still too early to predict when the best sampling and spraying period will be, other than to rely on historical records, which indicate sometime during the first week of July. At the designated time, use the OBLR sampling chart in the 1993 Recommends with a 3% infestation threshold for fresh fruit (pp. 61–62 or 179), or the 10% threshold for processing fruit (pp. 61–62 or 184). If a below-threshold decision is reached, wait for 100 additional degree-days (3–5 days) and repeat the sample. A second below-threshold result indicates a population low enough to ignore. As always, if spraying is necessary, good coverage is more than half the battle.

During the past few years, there has been a growing incidence of fruit damage in some orchards caused by young larvae of the 2nd summer generation, just prior to harvest. Particularly susceptible are spur-bearing cultivars with late season foliar growth, which provide suitable habitat as well as adequate sites for larval feeding; we have often seen problems in blocks of Ida Red and Cortland. Although the specifics of this brood's biology are not as well known, the adults responsible start to fly in late July, and peak in late August. We presume that sampling and spray measures, if necessary, would need to take place sometime around the third week in August. Currently, we are not recommending control of this second summer generation of OBLR for several reasons. Research trials have shown that 2nd brood damage is not a serious problem in orchards where the 1st summer brood was adequately controlled. Also, spraying in late August and early September can cause potential problems with harvest intervals and it is inconvenient for growers to apply sprays in late summer because they are preparing to harvest apples by then.❖❖

SPOTTED TENTIFORM LEAFMINER

You will note from the pheromone trap counts that the 1st brood spotted tentiform leafminer is at its low ebb in Geneva, and the 2nd brood should be starting any day. By the second or third week of July, this flight should have peaked and eggs will have hatched, at which time we recommend sampling leaves for the young (sap-feeding) mines of the second generation, to determine the need for a spray. Sampling should be conducted when the first of the mines reach the tissue-feeding stage. This is the time when most of the population is in the sap-feeding stage, and it usually occurs about 500–700 degree-days (base 43°F) after the start of the second moth flight. The larvae can be found easily at this stage, but they have not yet caused much damage to the leaf. You may wish to make a note of the 2nd flight's start date in your region, or use the Geneva date (we'll let you know) for accumulating degree-days in your locality if you don't happen to document this event in local traps.❖❖

FIELD NOTES

HUDSON VALLEY

(Dave Rosenberger)

APPLE SCAB ASCOSPORE MATURITY

Date leaves collected	Imm.	Mature	Empty asci	Number of spores (tower shoot)
Clermont, NY (Columbia County)				
June 2	14%	29%	57%	474 spores
Peru, NY (Champlain Valley):				
June 4	9%	26%	65%	816 spores

❖❖ **Primary scab:** Significant numbers of ascospores were still present in leaves from Columbia County and the Champlain Valley at the beginning of last week. (Counts for Ulster County were already lower on May 25 than the counts noted above.) Some of the ascospores remaining undoubtedly discharged in rains during the week of June 6–12. However, I would expect to find about 15% of the spores remaining if another squash mount assessment was made today using leaves from Columbia County or the Champlain Valley.

Does that mean growers in Columbia County and the Champlain Valley must still be concerned about primary scab? That depends ...! Use the following items to draw your own conclusions:

• Ascospore counts at the end of the season almost always over-estimate the proportion of the year's total inoculum remaining. Many leaves have decayed and therefore are not available for counting. Some pseudothecia in the remaining leaves have also completely disappeared and therefore cannot be counted as "empty asci". Thus, late season counts reflect the proportions of spores remaining in an increasingly limited and skewed portion of the total population.

• Many remaining ascospores fail to become airborne. Spore trapping has consistently shown that relatively few apple scab ascospores get airborne after petal fall as compared with the period prior to petal fall.

• The importance of the remaining inoculum is directly related to the total amount of inoculum in the orchard. As Wilcox has pointed out in several earlier notes on apple scab, inoculum levels in orchards are much more important that spore maturity levels. Thus, orchards with high inoculum levels are almost certainly still at risk for primary scab.

• In most orchards, secondary scab is a much greater concern now than is primary scab. Conidia produced by just one or two lesions of leaf scab per acre will have a much greater impact than remaining ascospores in the leaf litter.

Secondary scab: In orchards where primary scab is present, secondary spread of apple scab to new leaves and to fruit is a continuing threat. Fruit gradually become more resistant as they increase in size. (This means longer infection periods are required before fruit become infected.) However, the two most important factors in limiting secondary spread of apple scab are fungicide protection and hot weather. Hot weather decreases viability of apple scab conidia produced in existing lesions.

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I'm not certain that anyone has defined an exact relationship between hot weather and spore viability, but I consider 3–5 consecutive days with maximum temperatures >85°F to be pretty effective in arresting scab epidemics. Regional folk wisdom (and I have no observations to the contrary) suggests that captan sprays plus hot weather is an especially potent combination for arresting scab epidemics. (This does not mean that captan should be applied in hot weather, only that activity of captan applied in a normal manner has increased effectiveness when the application is followed by hot weather.)

In the Hudson Valley, we can no longer depend on dodine (Syllit), Benlate, or Topsin M for assistance in arresting scab epidemics because resistance to these compounds is widespread. Earlier in the season, I would have recommended back-to-back applications of an SI fungicide plus captan in situations where primary scab was appearing in orchards. At this point, captan plus hot weather may prove just as effective and considerably cheaper.

Unknown marking on pear fruit: Over the past two weeks, I have received several samples of pear fruitlets (mostly Bosc) showing injury on one side. At first glance, the injury appears to be chemical burn, but no common denominator has been found to suggest pesticide applications were the culprit. The injury appears as black lesions and small pustules, the latter usually centered on lenticels in the fruit. The lesions are dry and scabby, and there is no water-soaking beneath the lenticel pustules. Samples were sent to Dr. Tom Burr at Geneva to determine if the bacteria *Pseudomonas syringae* might be involved, but Dr. Burr found no evidence of bacterial infection. The jury is still out on this problem, but my best guess is that the very windy conditions this spring were involved. Wind may have caused direct abrasion damage or it may have caused less-visible abrasions that were subsequently damaged by pesticides that normally are not phytotoxic.

Marshall Mac die-back: "Marshall Mac canker" was a problem that appeared several years ago and then disappeared. The problem reappeared in a number of orchards this year. Terminals on affected trees fail to develop leaves, or the buds on affected terminals may collapse before bloom. Affected terminals may die back into two- or three-year-old wood. Often these terminals have retained petioles from last year's leaves. Irregular cankers may develop on the trunks.

Both Tom Burr and I made isolations from samples collected in mid-May from one severely affected orchard in Columbia County. Tom reported finding no pathogenic bacteria. I found a mixture of weakly pathogenic fungi: *Cytospora* species, *Phomopsis* species, and *Botryosphaeria obtusa*..

Our observations and results of our isolations are consistent with the hypothesis that winter damage is the primary cause of this problem. I suspect that, compared with other McIntosh strains, Marshall McIntosh does not harden off as early in the fall. Because it apparently grows late into the fall, Marshall Mac trees are susceptible to damage by quick temperature drops in early winter. Retained petioles are usually considered evidence for late hardening followed by freeze damage. I suspect the cold-damaged tissue is then invaded by weak pathogens such as those we isolated.

Avoiding Marshall Mac die-back will probably require a combination of methods that contribute to better hardening-off of trees in the fall. The following may prove helpful in avoiding the problem:

- Maintain low nitrogen levels in Marshall Mac plantings.
- Narrow herbicide strips and allowing more grass competition in late summer.
- Avoid planting this cultivar in low swales where soil moisture promotes late growth.
- Avoid planting Marshall Mac on late-hardening rootstocks such as MM.106.
- Delayed-dormant copper sprays may help protect damaged tissue from invasion by weak pathogens such as *Cytospora, Phomopsis,* and *Botryosphaeria.* In the past, problems have disappeared after copper sprays were applied, but that may have been coincidence. The severely affected orchard we found in Columbia County this spring had received a copper spray, so we know copper sprays alone will not prevent the problem.
- Where damage becomes evident before bloom, a prebloom foliar application of zinc chelate and boron may help to strengthen damaged buds and limit the extent of the die-back❖❖.

INSECT TRAP CATCHES (Number/Trap/Day)

Geneva NY

	6/3	6/7	6/10	6/14
Redbanded Leafroller	0.5	0.1	0.2	0
Spotted Tentiform Leafminer	14.0	6.4	6.2	1.8
Oriental fruit moth (apple)	2.5	0.8	2.0	1.1
Oriental fruit moth (peach)	0	0	0.2	0
Lesser appleworm	2.5	0.6	1.3	1.0
Codling moth	17.0	12.6	15.5	14.3
Obliquebanded leafroller	0	0	0	4.2*
Lesser peachtree borer (cherry)	0.5	0.5	3.8	2.3
Lesser peachtree borer (peach)	0	0	1.2	1.3
American plum borer (plum)	0	0.6	1.7	0
American plum borer (cherry)	1.0	0.9	0.8	0.4
Peachtree borer	0	0	0.8*	0.5

HVL, Highland NY

	6/1	6/7	6/13
Redbanded Leafroller	0	0	0
Spotted Tentiform Leafminer	3.8	0.4	7.4
Sparganothis Fruitworm	0.9	0.8	0.5
Oriental fruit moth	0.8	0.8	0.9
Fruittree leafroller	0	0	0.3*
Lesser appleworm	0.3	0	0.4
Codling moth	1.2	0.8	0.6
Variegated leafroller	0.4*	0.6	1.6
Obliquebanded leafroller	0.1*	0.2	1.9
Tufted apple bud moth	0.1*	0	0
Green fruitworm	-	0	0

* 1st catch

(Dick Straub, Peter Jentsch)

PEST FOCUS

Geneva:
European red mite summer eggs hatching
Obliquebanded leafroller 1st catch 6/13. Sampling for larvae should commence 600 DD (base 43° F) from this date
Highland:
178 degree days (base 43° F) have accumulated since the 1st catch of **obliquebanded leafroller**
Rose leafhopper adults have migrated from multiflora rose to apple

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1 - 6/14):	837	562
(Highland 1/1 - 6/13):	1150	699

Coming Events:	Ranges:	
Codling moth 1st flight peak	547–1326	307–824
Obliquebanded leafroller 1st flight peak	948–1294	548–807
Oriental fruit moth 1st flight subsides	781–1066	442–672
Pear psylla 2nd brood hatch	992–1200	609–763
Spotted tentiform leafminer 2nd flight start	795–1197	449–746

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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