caffolds

Update on Pest Management and Crop Development

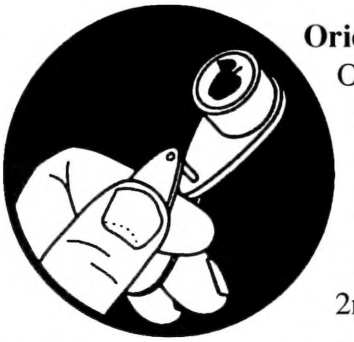
RUIT JOURNAL

27, 2003 VOLUME 12, No. 11 Geneva, NY

INSECTS

HERE COME DA BUGS

ORCHARD RADAR DIGEST



Geneva Predictions:

Roundheaded Appletree Borer

RAB adult emergence begins: June 5; Peak emergence: June 18.

RAB egglaying begins: June 14. Peak egglaying period roughly: July 3 to July 17.

Codling Moth

Codling moth development as of May 27: 1st generation adult emergence at 4% and 1st generation egg hatch at 0%.

1st generation 3% CM egg hatch: June 15. This is first spray date where multiple sprays needed to control 1st generation CM.

Second spray date if using Imidan, Avaunt, or azinphosmethyl is around June 29. If using Bt or other short residual insecticide, 2nd spray date is around June 25, with 3rd spray around July 05 needed to maintain protection through majority of CM egg hatch period.

1st generation 20% CM egg hatch: June 22 (= single spray date where one spray needed to control 1st generation codling moth).

Lesser Appleworm

Peak trap catch: May 27.

Mullein Plant Bug

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 30.

Obliquebanded Leafroller

1st generation OBLR flight, first trap catch expected: June 15.

Oriental Fruit Moth

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

Optimum second treatment date, if needed: June 8.

Redbanded Leafroller

2nd RBLR flight begins: July 7.

San Jose Scale

1st generation SJS crawlers appear: June 24.

Spotted Tentiform Leafminer

1st STLM flight, peak trap catch: May 14

1st generation sapfeeding mines start showing: May 20.

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

White Apple Leafhopper

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

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IN THIS ISSUE...

THE FRASS IS FAMILIAR

WORMS WE HAVE KNOWN
(Harvey Reissig and Dave Combs, Entomology, Geneva)

❖❖ Apple growers in N.Y. have not traditionally applied insecticide sprays specifically targeted against internal Lepidoptera. Early season control sprays directed against the plum curculio have provided adequate control of the first generation of internal Lepidoptera, and later sprays applied during July and August to control apple maggot have controlled later season generations. Most growers have used broad-spectrum organophosphate (OP) insecticides to control all of these pests that directly injure fruit and have usually obtained almost perfect control at a reasonable cost. However, in the future, it appears that changes in pesticide regulations, as well as in pest susceptibility, may affect the availability and effectiveness of organophosphates. Also, as growers attempt to implement more sophisticated IPM programs using more selective "reduced risk" insecticides, which usually have a narrower activity range, for control of plum curculio and apple maggot, it may become necessary to apply specific treatments to control internal Lepidoptera throughout the growing season.

Three species of lepidopteran larvae can infest apple fruit in New York State: codling moth (CM) *Cydia pomonella* (Linnaeus); oriental fruit moth (OFM) *Grapholita molesta* (Busck), and lesser appleworm (LAW) *Grapholita prunivora* (Walsh). This species complex of apple pests is commonly referred to as internal Lepidoptera. Seasonal development differs slightly for all three species. However, since codling moth has traditionally been the most common pest found in fruit in commercial orchards, this entire complex of pests was managed by directing control measures on a schedule designed to control CM. Since these pests can be found commonly infesting apples in unsprayed orchards and wild apple trees, natural enemies, predators and parasites will not provide adequate control in commercial apple orchards. Also, as has been discussed in previous issues of this publication, insecticide resistance may be among the factors responsible for increasing internal worm damage in even well-managed orchards. Therefore, for the foreseeable future, it is likely that specific control tactics will have to be used in order to obtain acceptable control of CM in commercial N.Y. apple orchards.

Chemical Control

Technically, it should not be necessary to apply additional special sprays for CM or OFM control in apple orchards that continue to be treated with even minimal schedules (2–3 sprays during the season) of OP or other broad spectrum insecticides for control of the plum curculio and apple maggot. 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 low-level internal worm infestations. In such cases, if it becomes necessary to apply special sprays for control in orchards that are not being treated with standard insecticides, timing

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control sprays by using developmental models based on heat unit accumulation is one component of an effective management strategy.

The Michigan model for predicting CM 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. To control the second generation, the timing is 1260 DD after this same biofix date.

For OFM, we have been following the lead of research done in Pennsylvania and Michigan to identify the prime insecticide application windows according to models of egg hatch and larval development keyed to the biofix (first sustained moth catch) and a developmental base of 45°F. Developmental rates vary somewhat, depending on the host crop, so predictions for both apple and peach tend to get a bit complicated. However, we tend to emphasize both the 1st and 2nd (and succeeding) broods in peaches, while the 2nd (and succeeding) brood is more of concern in apples. According to the PSU model, the periods corresponding with the critical % hatch timings, during which pesticide applications would be advised, are:

From biofix (first sustained moth catch, base 45°F):
Peach
170-195: 10–15% Egg hatch of 1st brood
350-375: 55–60% Egg hatch of 1st brood
1150-1200: 15–20% Egg hatch of 2nd brood
Apple & Peach
1450-1500: 65–72% Egg hatch of 2nd brood

We will again publicize suggested codling moth and oriental fruit moth treatment windows this season, for those growers who have evidence (or suspicion) that these pests are starting to pose a significant threat. We're calling the CM biofix May 22 in Geneva and May 19 in Highland; we will be providing regular updates to identify imminent spray dates. For OFM, the biofix in most western NY sites was May 4–8; by now most peach orchards should be somewhere between their first and second sprays against this pest.

Insecticide trials conducted in N.Y. over a number of years in research apple orchards heavily infested with CM and other species of internal Lepidoptera have shown that most currently available IPM-compatible, "reduced risk" insecticides (Dipel, Confirm, and SpinTor) are slightly less effective in preventing fruit injury than are standard OP insecticides such as Guthion and Imidan. However, it is likely that these selective materials applied on a schedule of 2–3 sprays/generation of CM, based on predictions from the CM developmental model, will provide adequate control in normal commercial apple orchards that are not located adjacent to abandoned orchards or extensive acreages of feral, unsprayed apple trees. However, since some of these materials have limited contact activity against young CM larvae, and are only effective when ingested, they may be more effective if they are applied 5–7 days earlier than the estimated first hatching date predicted by the developmental model for each generation of CM. This type of scheduling ensures that eggs are deposited on residues of the material so that hatching larvae are more likely to ingest a lethal dosage of the compounds before entering the fruit.

Some of the newer selective contact insecticides being developed show promise as potential replacements or rotational complements to the standard OP programs currently used for internal lep management. The results of a recent test in heavily infested research orchards at the NYSAES are shown in Table 1, below. Sprays were applied dilute to runoff with a handgun sprayer at petal fall (22 May) and as cover sprays on 7 Jun, 20 Jun, 8 Jul, 22 Jul, 6 Aug and 19 Aug. Treatments including an untreated check

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were replicated 3 times (two 6-tree plots and one 8-tree plot) and arranged in a RCB design. Treatments, materials and timings are listed in Table 1. Final harvest evaluations were taken on 17 Sep by randomly selecting 100 'McIntosh' and 100 'Cortland' apples and inspecting them for damage. Internal Lepidoptera damage in all treatments was low and significantly less than that found in the untreated check plots. All of these partial seasonal programs of Avaunt also included organophosphate treatments, which historically control internal worms, as well as plum curculio (PC). The Avaunt-Imidan program was the least effective treatment in controlling PC damage (14.7% injury) although damage in all treatments was also significantly lower than that in the untreated check, which was heavily damaged (65.7% injury).

Table 1. 2002 Research trial using Avaunt and broad-spectrum materials in a seasonal program against apple pests, NYSAES, Geneva.

Treatment	Timing*/Rate/100 gal	Mean % Fruit Damage PC	Int. Lep.(a)	Clean Fruit at Harvest
Avaunt LI-700 Guthion	pf,1,3,4C/1.6 oz pf, 1,3,4C/16.0 oz 2,5,6C/8.0 oz	9.3ab	1.2a	79.7bc
Avaunt LI-700 Guthion	pf,1,3,4C/2.0 oz pf, 1,3,4C/16.o oz 2,5,6C/8.0 oz	9.3ab	1.7a	84.7c
Avaunt LI-700 Imidan Imidan	pf,1,3,4C/1.6 oz pf, 1,3,4C/16.0 oz pf, 1,3,4C/10.6 oz 2,5,6C/1.0 lb.	14.7b	3.2a	68.2b
Avaunt LI-700 Asana XL Guthion	pf,1,3,4C/1.6 oz pf, 1,3,4C/16.0 oz pf, 1,3,4C/2.6 oz 2,5,6C/8.0 oz	6.2a	1.2a	86.2c
Avaunt LI-700 Spintor Guthion	pf,1,3,4C/1.6 oz pf, 1,3,4C/16.0 oz pf, 1,3,4C/1.0 oz 2,5,6C/8.0 oz	9.7ab	4.0a	66.7b
Guthion	pf thru 6C	5.3a	3.5a	79.5bc
Untreated Check		65.7c	73.2b	1.0a

Means within a column followed by the same letter are not significantly different (Fisher's Protected LSD Test, P£0.05). Data transformed arcsine (sqrt[x]) prior to analysis.

a) complex of internal Lepidoptera consisting of Codling Moth, Oriental Fruit Moth and Lesser Appleworm
* Spray Timing Key
pf – petal fall, pf thru 6C – indicates treatments were sprayed from petal fall through 6th cover spray; numbers represent summer cover sprays

SEE SPOT RUN

MANAGEMENT OF BACTERIAL SPOT OF PEACH, PART II

(Dave Ritchie, NC State Univ. & Phil Brannen, Univ. of Georgia)

[Edited by Bill Turechek – for the complete article w/ pictures see the Southeast Peach Regional Newsletter Vol 3 No 2 at http://newsletters.caes.uga.edu/SRPN/]

❖❖ This is part II of the article written by Dave Ritchie and Phil Brannen on managing bacterial spot; part I was printed in Scaffolds Vol. 11, No. 3. The original article, "Managing Bacterial Spot without Mycoshield", was written in response to an apparent shortage of Mycoshield in the southeast. But according to Syngenta, the manufacturer of Mycoshield, this shortage does not affect NY. Nonetheless, the information on alternative chemical programs for bacterial spot management in this article is informative and interesting. Because the article was split in two, I have edited the article where necessary to maintain flow and made adjustments specifically for New York.

Rainy weather from bloom through shuck split, such as we've been experiencing in western New York, typically favors the development of bacterial spot. However, even though it has been wet, bacterial spot generally requires much warmer weather before it becomes problematic in western New York. Nevertheless, growers should be aware that a few warm and rainy days during this post-shuck split period is all that is needed during this period to initiate an epidemic.

Mycoshield

There currently are no post-shuck split chemical alternatives that are as effective as Mycoshield for controlling bacterial spot on peaches—without causing phytotoxicity. Without question, Mycoshield should be your ***first choice*** when bacterial spot pressure is high or when treating highly susceptible varieties like 'Babygold 5'. Mycoshield was registered for use on peaches in the early 1980's. No other products have shown efficacy comparable to Mycoshield, nor have any been registered for use on peaches since the registration of Mycoshield. Thus, to see what alternatives may be available, we need to look at chemicals that were evaluated prior to Mycoshield and remain available for use on peaches today.

Copper-Containing Materials

There are several copper formulations labeled for bacterial spot. A standard program with copper might begin with the highest labeled rate of Kocide, for example, starting at dormant, followed at 1–5% bud swell using reduced rates, pink to 5% bloom with even lower rates, continued through petal fall to 1% shuck split. At 75% shuck split to 1% shucks off, growers are generally offered a choice between continuing with copper applications at low rates or Mycoshield. Copper is very toxic to the bacterial spot pathogen, but it can be very damaging to peach leaves. Although leaf "shot-hole" can occur from use of copper, the greater damage is associated with excessive defoliation, which can reduce fruit quality (including smaller fruit size and delayed ripening). However, at recommended rates of copper, no direct injury to fruit finish has been observed.

Captan Tank-Mixed with Dodine (Syllit 65W)

This is a combination that was evaluated in the 1960's and 1970's, and the recommendation remains on the Syllit 65W label. It is recommended for use when bacterial spot pressure is light to moderate. This hopefully is the situation in orchards where the early season copper spray program was followed. Data from the average of seven experiments (1961–1971) using this chemical combination showed about 50% of the bacterial spot incidence of the non-sprayed check. In these experiments, the Captan-plus-Syllit sprays were started at petal fall or shuck split, without any earlier sprays

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for bacterial spot. In years with frequent rainfall, newly emerged leaves can be infected earlier than petal fall, thus providing an abundant source of bacteria for fruit infection starting at shuck split. Therefore, this spray combination may be even more effective if earlier copper sprays have been applied. The rate listed on the Syllit 65W label is 0.5 lb-plus-1.0 lb Captan 50WP per 100 gal. Some leaf "shot-hole" has been observed with this combination, but this has not resulted in significant defoliation. This combination also provides peach scab control (if sprays are applied at the proper time for scab control and at least 4.0 lb of Captan 50WP is used).

Zinc-Containing Materials

Different forms of the metal zinc have been evaluated, often formulated as zinc sulfate. Disease control obtained has been less than that using copper products, and there remains the risk of phytotoxicity from zinc, which also responds to pH (similar to that described for copper). The fungicide Ziram contains metallic zinc, sold under the brand names Ziram 76DF and Ziram Granuflo. Each of these products contains 16.25% metallic zinc. This is approximately 2.6 oz of zinc per pound of material. The use rate is 4–8 lb per acre, and one should not exceed 72 lb per acre per year. Both of these formulations are labeled for use on peaches up to 14 days before harvest, BUT neither has bacterial spot listed on the label. Ziram has been occasionally evaluated during the last 20–30 years, with some indication of bacterial spot suppression. No foliar or fruit injury has been observed with the use of Ziram. However, Ziram should not be relied upon for adequate peach scab control.

GENERAL RECOMMENDATIONS:

1. The focus should be on preventing bacterial spot from starting. The optimal time to use Mycoshield is at late shuck split to the start of shucks off and then for the following 3–4 weeks on a 7–10-day schedule if weather conditions remain wet. Wet can be defined as having at least one measurable rainfall per week or heavy dews that result in several hours of leaf wetness. Do not use less than 0.75 lb of material per acre in an attempt to "stretch" the use of Mycoshield by using low rates.

2. Disease control is most effective when chemicals are applied within a 24-hr period prior to anticipated rainfall but with a sufficient time period for the pesticide to dry. In wet or rainy seasons, additional applications of Mycoshield may be needed on a 10–14-day schedule and can be applied up to 3 weeks before harvest. If wet weather continues for the few weeks after shuck fall, continue Mycoshield applications on a 7–10-day interval.

3. If at all possible, insecticide and fungicide application should be conducted only when foliage is dry. Spraying when the foliage is wet can further distribute the bacteria.

4. Once pit hardening occurs, at which time fruits apparently become less susceptible, evaluate the bacterial spot situation on fruit as well as the foliage. If few or no lesions are observed, but weather conditions remain favorable for disease, consider alternating a low rate of copper or a Syllit 65W-plus-Captan application with Mycoshield. Also, focus the use of Mycoshield on the most susceptible varieties.

5. If you do not have or choose not to use Mycoshield, continue to apply the reduced rates of copper sprays, carefully monitoring for injury before each application until a point is reached that injury is considered too great to continue the use of copper. Switch to Syllit 65W-plus-Captan sprays at this time.❖❖

PEST FOCUS

Highland:
High numbers of **rosy apple aphid** observed in Golden Delicious. **Plum curculio** damage moderate in Ginger Gold with less damage in later varieties. **Pear psylla** eggs and nymphs increasing.

CAPTAN CAUTION

WEATHER AND POTENTIAL FOR CAPTAN PHYTOTOXICITY (Dave Rosenberger, Plant Pathology, Highland)

❖❖ Fruit growers should be very cautious about using captan during the next 7–10 days because weather conditions over much of the state have left apples, peaches, plums, and cherries unusually susceptible to captan injury. Captan is an effective, broad-spectrum fungicide that is labeled for many fruit crops. However, when absorbed into plant tissue, captan causes phytotoxicity that appears as leaf spotting, shot-holing, and leaf yellowing. When combined with other products that enhance uptake into leaves, captan applied at this time of year can cause complete defoliation of peach and nectarine trees. To be safe, growers should avoid applying captan until trees have had several days of sunny, dry weather.

The risk of captan injury is greatest when the annual spring growth flush of fruit trees coincides with an extended period of cloudy, cool, damp weather. The growth flush on fruit trees begins when terminal shoots start growing during or shortly after bloom. The cuticle (the waxy layer on the leaf and fruit surfaces) develops in response to heat and water stress. During cloudy and damp weather, there is little danger from heat or water loss and trees therefore produce only a thin cuticle to protect the newly formed leaves and enlarging fruitlets.

The same waxy cuticle that serves to prevent water loss also prevents captan from entering and injuring living cells beneath the plant cuticle. Some varieties of plums and cherries almost always develop a leaf spot or shot-hole after captan is applied because, even under the best conditions, some captan enters and kills leaf cells of these varieties. For most other fruit crops, captan causes little or no injury except during unusual seasons when weather conditions inhibit cuticle development.

Even when plant tissue has only a thin cuticle, captan by itself will rarely cause phytotoxicity (except to those plum and cherry varieties that are especially susceptible to captan injury). Problems often arise, however, when captan is mixed with other agrichemical products. Spray adjuvants that enhance the transport of captan through the plant cuticle can greatly increase the phytotoxicity of captan, especially when the plant cuticle is thin at the time spray is applied. Adjuvants that enhance uptake of captan include spray oils, some spreader-stickers, and other petroleum-based carriers commonly found in products that are formulated as liquids or emulsifiable concentrates.

Where apple scab symptoms are appearing in orchards, the best option for stopping further spread of apple scab is to apply a combination of an SI fungicide along with the maximum label rate of captan. To avoid phytotoxicity problems, however, growers may need to use an SI-plus-mancozeb combination for the next week to avoid the potential phytotoxicity that could result if captan is applied at this time. This is especially true if Sevin XLR Plus will be applied for thinning or if spray oil will be applied with a miticide during the next week. Those who opt to apply captan despite the risks are advised not to use spray adjuvants that might enhance transcuticular movement of captan.❖❖

PHENOLOGIES

Geneva:

	5/27
Apple(McIntosh):	fruit set
Apple(Red Delicious):	50% petal fall
Peach	shuck split

Highland:
Apple(Red Delicious/Golden Delicious): petal fall

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UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–5/27):	544	280
(Geneva 1/1-5/27/2002):	553	286
(Geneva "Normal"):	610	322
(Geneva 6/2 Predicted):	646	340
(Highland 5/27):	727	393

Coming Events:	**Ranges:**	
Lesser appleworm 1st flight peak	372–851	181–483
Lesser peachtree borer 1st catch	224–946	110–553
Mullein bug 90% hatch	464–668	236–352
Oriental fruit moth 1st flight peak	259–606	96–298
Spotted tentiform leafminer sap-feeders present	295–628	130–325
Plum curculio oviposition scars present	448–670	232–348
Pear psylla hardshells present	463–651	259–377
San Jose scale 1st catch	189–704	69–385
San Jose scale 1st flight peak	457–761	229–449
Red Delicious at petal fall	474–760	251–339

INSECT TRAP CATCHES (Number/Trap/Day)

Geneva, NY

	5/19	5/22	5/27
Green fruitworm	0.0	0.0	0.0
Redbanded leafroller	2.3	1.7	1.3
Spotted tentiform leafminer	338	189	43
Oriental fruit moth	4.4	1.5	1.2
Lesser appleworm	1.4	0.8	1.7
San Jose scale	0.0	0.0	0.0
Codling moth`	0.0	0.7*	0.1
American plum borer	0.1	0.3	0.1

* first catch

Highland, NY

	5/19	5/27
Green fruitworm	0.0	0.0
Redbanded leafroller	3.2	1.4
Spotted tentiform leafminer	12.6	8.2
Oriental fruit moth	2.5	4.5
Codling moth	0.8*	1.1
Obliquebanded leafroller	0.0	0.0

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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