

scaffolds

Update on Pest Management
and Crop Development

F R U I T J O U R N A L

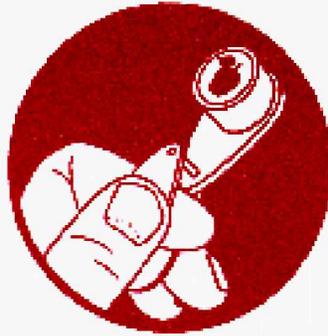
August 15, 2011

VOLUME 20, No. 22

Geneva, NY

WING
BEAT

ORCHARD
RADAR
DIGEST



GOING
FULL
BORE

TRUNK LINES
(Dave Kain &
Art Agnello,
Entomology,
Geneva)

[M = Marlboro, Ulster Co.;
G = Geneva]

Codling Moth

CM development as of August 15: 2nd gen
adult emergence at 100% [M]/93% [G] and
2nd gen egg hatch at 95% [M]/71% [G].

[This update from our annual article
on borer management is being re-
printed because of its timeliness and ap-
plicability to the situation in many commercial
orchards recently.]

❖❖ There is increasing concern throughout
the Northeast about damage done to apple trees
by borers. The species of primary concern is
dogwood borer, but American plum borer can
be prevalent in western New York apple or-
chards that are close to tart cherry and peach
orchards. While we do not yet fully understand

continued...



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UPCOMING PEST EVENTS

the effects these borers have on dwarf trees, we do know that they reduce vigor and can, in time, completely girdle and kill trees.

We tested a number of insecticides against these borers over a number of growing seasons. Lorsban is very effective for this use and we have urged growers to take advantage of it where needed. In 2001–2003 we compared some other materials, including white latex paint, endosulfan, Avaunt, Surround, Intrepid, Danitol, Imidan, spinosad and Esteem with Lorsban, with varying results. To make a long story short, only Avaunt, Danitol and, possibly Esteem, applied two or three times in midsummer, provided control comparable to one application of Lorsban. Assail and Altacor were effective when applied only once in midsummer but, obviously, will control only the summer generation.

Our tests have shown that borers can be controlled season-long by applying Lorsban at various times in the spring and summer. While a postbloom trunk application of Lorsban is still allowed, enabling growers to spray at the peak of the dogwood borer flight, applying this material prebloom as early as half-inch green works well, too, and may be more convenient. Fall also may be a good time to control dogwood borer. Results from 2002 indicated that Lorsban applied postharvest the previous year (sprays went on in October 2001) controlled both the overwintering and the summer generations of dogwood borer. An October 2002 application of Lorsban similarly provided season-long control of dogwood borer in 2003. Lorsban works when applied in the spring or fall because it infiltrates burrknot tissue and kills larvae concealed within. It is also very persistent in wood so it continues to work for a considerable time after it is applied (apparently 9–12 months in our trials). Fall application may offer growers a more convenient alternative for applying borer control sprays. Recall that new Lorsban label restrictions allow only ONE application of any chlorpyrifos product in apples, whether as a foliar or trunk spray, so these recommendations pertain only if no earlier applications have been made.

In a survey we conducted recently, we observed some relationships between borer infestation and various orchard parameters such as the proportion of trees with burrknots, proximity to stone fruit orchards and presence of mouseguards. Conventional wisdom has held that borer problems are worse where mouseguards are in place. Mouseguards can contribute to increased expression of the burrknots that borers invade, and may shield borers from predators and insecticide sprays. This has led some growers to contemplate removing mouseguards under the premise that mice are easier to control than the borers. However, results of our survey indicate that dogwood borer larvae may be found as readily in trees without mouseguards as in those with them. (American plum borer may be a different story in orchards near tart cherry or peach trees.) The orchard in which we have conducted borer control trials has never had mouseguards and there is no shortage of dogwood borers. If mouseguards are deteriorated and no longer protect the tree, there may be some small advantage, in terms of borers, to removing them. But, in orchards where mouseguards still provide protection against rodents, removing them for the sake of borer control is probably not worth the risk. Instead, we would recommend the use of trunk

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sprays to control borers. Even with mouseguards on, insecticides will give adequate control if they are applied carefully (i.e., a coarse, low-pressure, soaking spray with a handgun).

Bottom line: as we go into fall, consider using Lorsban after harvest to control borers, and consider leaving mouseguards on trees where they still afford protection. ❖❖

NOT SO FAST

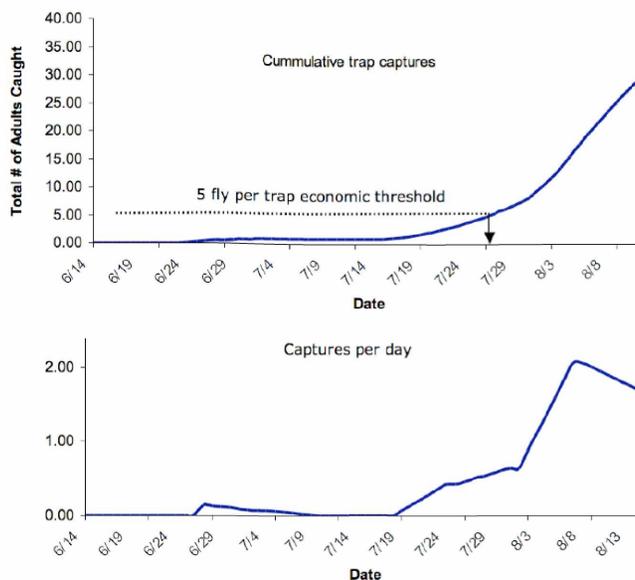
LATE BITE: HUDSON VALLEY INSECTS TO WATCH FOR AT THE END OF THE SEASON
(Peter Jentsch, Entomology, Highland)

❖❖ As we near the end of the season, it's tempting to consider that the last spray in mid-August would represent an end to what has been a relentless spray season. The applications of PGRs for stop-drop control, and a final fungicide, typically put the lid on the sprayer. However, there should be some considerations made for a few insect pests that may come back to take the last bite out of a very successful pest management program. Let's look at these late-comers that should be kept on the radar, especially with regards to late-harvested varieties.

To start with, we've received over 3.3" of rain in Highland as of August 5th, and we've had over 1" of rainfall during the past 24 hours. These recent rains have prompted increased emergence of apple maggot during the past week. Given the recent and heavy rains, significant loss of insecticide residue can be expected. Early varieties such as Ginger Gold are now very susceptible to this new emergence of apple maggot adults looking for oviposition sites.

In recent years, the second brood of oblique-banded leafroller (OBLR) larvae has proven to be a formidable threat in late season insect pest management. Situations that may give rise to damaged fruit

Apple Maggot
Cornell's Hudson Valley Laboratory
Highland, NY 2011



from this insect include infestation of abandoned neighboring orchards, or lack of control in nearby orchards from the summer brood during June and July, producing populations that move into well-managed farms, such as your own. If high numbers of OBLR have been observed in pheromone traps over the past few weeks, scouting evaluations should be conducted to determine the presence of larvae at the end of August. Fruit clusters should be broken open in the upper canopy during scouting to observe potential larval feeding sites. These overwintering larvae will feed on both terminals and fruit, very often infesting varieties such as spur Red Delicious, concealed in tight leaf layers against fruit. They are well hidden in Cortland fruiting doubles, in dense clusters such as are seen in Jonamac and tight-stemmed varieties such as Macoun. Control OBLR early, as once larvae form webbed shelters, it will be very difficult to reduce populations and damage. If management is required, alternating classes of



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insecticides for this generation is critical for resistance management. For instance, if Delegate was used to manage the 1st summer generation, then Altacor 35WDG, Belt 4SC, Intrepid 2F, Proclaim 5SG, the Bts or (perhaps) even one of the pyrethroids should be used to reduce populations prior to harvest before economic damage is observed. Complete coverage is critical.

A second lepidopteran pest to keep an eye on is the larva of the 3rd generation of oriental fruit moth. OFM flight in the lower Hudson Valley began last week, with larvae expected to emerge through August and into September. NEWA-based predictions estimate that "about 10% of the eggs laid by the third generation of OFM have hatched. Observations have shown that late sprays, during September or October, may be necessary to protect fruit of late-maturing cultivars if damage from OFM is noted during fruit inspections in the summer."

A third complex of insects to keep on the radar include the green aphids (GAA) and a primary predator, the Asian multicolored ladybird beetle (MALB). Late in the season, rains and cooler weather often promote new terminal growth, giving rise to very high aphid populations that feed, causing increased sooty

mold growth on fruit (image).

GAA fruit feeding damage can also occur in the form of dimpling and surface discoloration. When high populations of GAA occur, adult

MALB are drawn into orchards to feed and reproduce. The larvae of MALB feed heavily on GAA and may pupate on fruit, "gluing" their mouth parts onto the fruit), which makes a hole in the surface of the apple and downgrades fruit quality. Low rates of the

neonicotinoids Assail, Calypso or Provado will reduce GAA populations without promoting the loss of MALB as a biological control agent.

Comstock mealybug and woolly apple aphid (WAA image) are two insects that often become late season pests at harvest. Control of mealybug can be achieved using Movento 240SC (6–9 fl oz/A; 7 DTH), Centaur 0.7WDG (34.5 oz/A.; 14 DTH), Portal 0.4EC (1–2 pts/A; 14 DTH) or Assail 30SG (4–8 fl oz/A; 7 DTH). Movento and Assail are also options for WAA.

The leafhopper complex, comprising the rose and white apple leafhoppers, can give rise to very high adult populations that reduce picking efficiency and downgrade fruit quality, requiring a brushed washing to remove excrement. Reduced rates of Provado and carbaryl have been shown to significantly reduce the adults within ten days of harvest.



Stink bugs have become a late season player over the past few years. The two native species causing damage to apple are the brown stink bug, *Euschistus* sp. and the green stink bug, *Acrosternum hilare*. Their presence and feeding injury is often associated with drought conditions, such as those experienced earlier this season. However, recent rains may have increased tree fruit attractiveness and the likelihood of late season stink bug feeding. The brown marmorated stink bug, *Halyomorpha halys* (Stål), has also been observed for the first time recently (last week) on peach and vegetables in the mid-Hudson Valley. Insecticides for BMSB management include Asana, Baythroid, Danitol, Endigo, Lannate, Leverage, Proaxis, Surround, Voliam Xpress, Vydate, and Warrior. Follow label restrictions carefully, especially note formulation active ingredient allowances, particularly in the case of pre-mixes.❖❖



BREAK
THE
MOLDFUNGICIDE OPTIONS
FOR CONTROLLING
STORAGE DECAYS OF
APPLES(Dave Rosenberger, Plant
Pathology, Hudson Valley
Lab, Highland)

❖❖ Blue mold decay caused by *Penicillium expansum* can result in significant losses in stored apples, especially if apples received a postharvest treatment of diphenylamine (DPA) applied via a high-volume recycling drencher. DPA treatment is needed to prevent storage scald and carbon dioxide injury for some cultivars and storage regimes. The recycling drench solutions collect spores from bin surfaces and transport them to wounds in fruit. If apples are moved into storage without a recycling drench and without any postharvest fungicide treatment, then the risks from blue mold decay are lessened, but gray mold decay caused by *Botrytis cinerea* sometimes develops in 3 to 5% of fruit that are held for more than six months. Decays caused by *Penicillium* are soft, watery, and may have blue sporulation, although sporulation is suppressed under low oxygen or controlled atmosphere (CA) conditions. Most infections occur when spores are transported into stem punctures and other wounds created during harvesting.

In CA storages, decays caused by *Botrytis* are usually firm, light tan in color, and (at least in eastern United States) originate from the calyx ends of the affected apples. In cold air storage, *Botrytis* can progress from one apple to the next and cause "nests" of decay, but fruit-to-fruit spread does not seem to occur under CA conditions. We suspect that most of the gray mold decay that develops in stored apples in eastern United States results from infections of senescent blossom petals that sometimes occur as trees approach petal fall in spring. Once established in the petals, the fungus can sub-

sequently invade flower sepals, which eventually become part of the calyx of the apple fruit. The infections on the sepals remain quiescent during summer, but the fungus can become active and invade fruit during long-term storage.

Gray mold is often more prevalent following seasons that had a lot of rain during late bloom and petal fall. Postharvest treatments with thiabendazole (Mertect, Deccosalt 19, Deccozole A), pyrimethanil (Penbotec, ecoFOG-160), or fludioxonil (Scholar) can provide effective control of gray mold. Theoretically, fruit treated with Inspire Super at bloom and petal fall should harbor fewer quiescent gray mold infections at harvest because Inspire Super contains cyprodinil (Vangard), which is very active against *Botrytis*. However, we do not have any research results to show that Inspire Super applied near petal fall will affect the incidence of gray mold that develops during long-term storage.

Preharvest sprays of Pristine and some other fungicides have been evaluated for their ability to suppress postharvest development of blue mold and gray mold. Pristine applied within 7 days of harvest may have some benefit if there is little or no rain between the application date and the final harvest date. However, most apple growers in rainy eastern U.S. climates will choose other options for controlling postharvest decays because of the logistics, expense, and rain-related uncertainties inherent in using preharvest sprays to control postharvest diseases on apples

Reports from Hudson Valley pear growers suggest that a preharvest spray of Pristine may reduce storage losses in Bosc pears that are held for 3-4 months after harvest. This application for Bosc pears makes sense because eastern pears almost never receive any postharvest treatments.

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Postharvest fungicide options for apples can be summarized as follows:

1. Omit fungicide treatments completely where no DPA treatment is needed. This option has been adopted for most fruit that will be stored less than 90 days. A postharvest fungicide treatment might still be warranted for high-value, decay-prone cultivars such as Honeycrisp that will be stored for more than a few weeks.

2. Where DPA is applied via a traditional high-volume recycling drench, a fungicide should always be included in the drench solution. Options include thiabendazole (Mertect 340F or Deccosalt 19), Penbotec, or Scholar. Captan can also be included with any of the previous three, but I would not suggest using Captan alone in a recycling drench. Captan is not very effective for preventing decays after spores enter wounds, but it may reduce viability of the spores that collect in the recycling drench water. Including Captan with one of the other fungicides may help to reduce the inoculum load in the drencher solution and thereby reduce selection pressure for development of pathogens that are resistant to thiabendazole, Penbotec, or Scholar.

3. Where DPA is applied via thermofogging or aerosol injection, many storage operators have omitted fungicide treatments without encountering major decay problems, especially for fruit that will be packed by the end of March. Where no postharvest fungicide will be applied, decay risks from blue mold can be reduced by sanitizing storage rooms as outlined in last week's article in Scaffolds.

4. Both blue mold and gray mold sometimes reach unacceptable levels in CA rooms that are not opened until after March or April. In long-term CA rooms where DPA is applied via fogging or aerosol injection, storage sanitation (i.e., treating storage room floors with a sanitizer during summer) is absolutely essential. Risks can be further reduced by treating filled rooms with ecoFOG-160 (the ther-

mofog version of Penbotec) or Deccozole A (the aerosol formulation of thiabendazole). The Deccozole treatment will not control benzimidazole-resistant strains of *Penicillium* that are abundant in some storages. There is no published research on the effectiveness of ecoFOG-160 or Deccozole A, and these treatments are relatively expensive. However, these products may provide a cost-effective way of minimizing decay risks in long-term storage rooms where DPA will be applied via fogging or aerosol injection.

5. Where DPA will be applied via a non-recycling bin-top spray, we are still uncertain whether or not a fungicide needs to be included with the DPA solution. (For details of the bin-top spray method for applying postharvest treatments, see either the recent article in *New York Fruit Quarterly* [2011, Vol. 19, issue] or the preliminary article published in *Scaffolds* last year and available at <http://www.scaffolds.entomology.cornell.edu/2010/100809.pdf>.) Some packinghouse operators using the bin-top spray method have omitted fungicides without noting any significant increase in decay, but I believe that these storage operators are carefully sanitizing their storage rooms during summer. The argument for including a fungicide in the bin-top DPA applications is that the DPA solution that is applied to the top of the bin could still redistribute spores into wounds on the 40–60% of fruit surfaces that are actually contacted by the bin-top spray solution. Including a fungicide with the DPA would also provide protection against quiescent gray mold for at least those fruit that are contacted by the solution. (DPA will be effective throughout the bins because of its vapor action, but fungicides lack similar vapor action and will be effective only on the fruit surfaces that are contacted, which our research indicated will be only about 40% of the total fruit surface.) Finally, including a fungicide in bin-top spray applications will provide excellent protection from blue mold spores that are deposited on the upper layers of fruit in each bin as bins are

continued...

being positioned in CA rooms. Although sanitizing CA rooms prior to refilling will eliminate most of the spore load in CA rooms, some spores will be dislodged from the sides of bins as they are stacked into rooms. Including a fungicide with the DPA solution used for bin-top sprays will minimize risks from the airborne blue-mold spores that are brought into the room on bin surfaces. Ultimately, each storage operator will need to assess the risks, costs, and benefits of including a fungicide with DPA in bin-top spray applications.

Fungicide resistance management strategies should be employed regardless of which fungicide application method is used. The best strategy is to rotate fungicides annually, using Penbotec (or ecoFog-160) one year and then rotating to Scholar the next year. Where thiabendazole is still working, Mertect or Deccozone A could be included in a three-year rotation, or one of the thiabendazole products could be rotated with one of the other products in a two-year rotation.

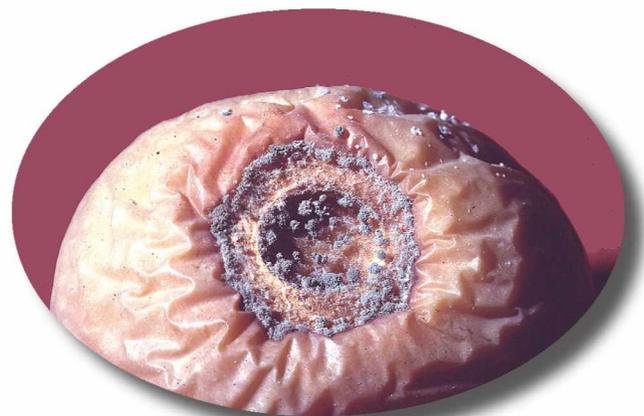
The objective of the rotation is to avoid exposing the bins themselves to the same treatment two years in a row because the bins carry most of the *Penicillium* spores. Thus, using the same fungicide for the entire season increases the probability that bins will be exposed to different fungicides each season as compared with what would occur if fungicides were rotated within a single harvest season. As noted above, including Captan with Mertect, Penbotec, or Scholar may also help to reduce selection pressure for resistant strains of *Penicillium*.

Resistance to pyrimethanil (Penbotec) has already been detected in Washington State where Penbotec has been used continuously for four years or more. These valuable postharvest fungicides must be managed carefully via annual fungicide rotation if we hope to maintain their usefulness for more than just a few years. ❖❖

EVENT REMINDERS

CORNELL FRUIT PEST CONTROL FIELD DAYS

The N.Y. Fruit Pest Control Field Days will take place during Labor Day week on Sept. 7 and 8 this year, with the Geneva portion taking place first (Wednesday Sept. 7), and the Hudson Valley installment on the second day (Thursday Sept. 8). Activities will commence in Geneva on the 7th, with registration, coffee, etc., in the lobby of Barton Lab at 8:30 am. The tour will proceed to the orchards to view plots and preliminary data from field trials involving new fungicides, bactericides, miticides, and insecticides on tree fruits and grapes. It is anticipated that the tour of field plots will be completed by noon. On the 8th, participants will register at the Hudson Valley Laboratory starting at 8:30, after which they will view and discuss results from field trials on apples and other fruit crops. No pre-registration is required for either event.



| INSECT TRAP CATCHES (Number/Trap/Day) | | | | | | |
|--|------------|-------------|-------------|-----------------------------|------------|-------------|
| Geneva, NY | | | | Highland, NY | | |
| | <u>8/8</u> | <u>8/11</u> | <u>8/15</u> | | <u>8/8</u> | <u>8/15</u> |
| Redbanded leafroller | 0.0 | 0.2 | 0.0 | Redbanded leafroller | 0.9 | 1.3 |
| Spotted tentiform leafminer | 3.9 | 11.2 | 11.6 | Spotted tentiform leafminer | 30.1 | 25.2 |
| San Jose scale | 4.3 | 10.2 | 6.1 | Oriental fruit moth | 1.1 | 2.5 |
| Oriental fruit moth | 0.0 | 0.5 | 0.1 | Lesser appleworm | 3.2 | 0.6 |
| American plum borer | 0.0 | 0.0 | 0.0 | Codling moth | 2.7 | 2.3 |
| Obliquebanded leafroller | 0.0 | 0.0 | 0.0 | Obliquebanded leafroller | 0.2 | 0.2 |
| Apple maggot | 4.5 | 5.7 | 2.5 | Apple maggot | 2.1 | 1.7 |
| Sodus Center trap catches | <u>8/2</u> | <u>8/4</u> | <u>8/11</u> | | | |
| Oriental Fruit Moth | 1.0 | 0.5 | 2.5 | | | |
| Lesser Appleworm | 0.0 | 3.0 | 17.0 | | | |
| Codling Moth | 1.5 | 0.0 | 3.0 | | | |

| UPCOMING PEST EVENTS | | |
|--|--------------------------------|-------------|
| | <u>43°F</u> | <u>50°F</u> |
| Current DD accumulations (Geneva 1/1–8/15/11): | 2840 | 2007 |
| (Geneva 1/1–8/15/2010): | 3007 | 2125 |
| (Geneva "Normal"): | 2635 | 1792 |
| (Geneva 1/1–8/22 Predicted): | 3039 | 2157 |
| (Highland 1/1–8/15/11): | 3044 | 2142 |
| <u>Coming Events:</u> | <u>Ranges (Normal ±StDev):</u> | |
| Redbanded leafroller 3rd flight begins | 2594–2976 | 1768–2070 |
| Redbanded leafroller 3rd flight peak | 2717–3207 | 1881–2225 |
| Spotted tentiform leafminer 3rd flight peak | 2552–3010 | 1732–2094 |
| Lesser appleworm 2nd flight peak | 2131–3105 | 1422–2156 |
| Obliquebanded leafroller 2nd flight peak | 2593–3011 | 1758–2098 |
| Apple maggot flight subsides | 2772–3258 | 1907–2283 |
| American plum borer flight subsides | 2929–3365 | 2015–2381 |
| Codling moth 2nd flight subsides | 2845–3493 | 1922–2472 |
| Oriental fruit moth 3rd flight peak | 2662–3236 | 1831–2243 |
| San Jose scale 2nd flight subsides | 2639–3349 | 1785–2371 |

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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