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Update on Pest Management and Crop Development

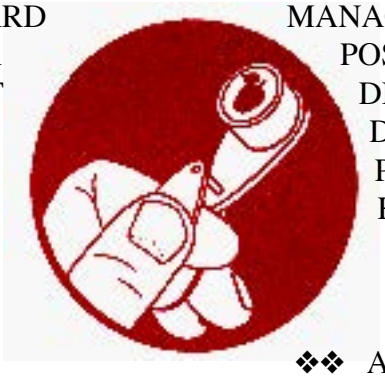
F R U I T J O U R N A L

August 4, 2014 VOLUME 23, No. 20 Geneva, NY

INSECTS

FRUITY RETURNS

ORCHARD RADAR DIGEST



MANAGING POSTHARVEST DISEASES

Dave Rosenberger, Plant Pathology, Highland

AN OZ. OF... YOU KNOW

DISEASES

[H = Highland; G = Geneva]:

Codling Moth

Codling moth development as of August 4: 2nd generation adult emergence at 72% (H)/ 43% (G) and 2nd generation egg hatch at 33% (H)/ 10% (G).

2nd generation 7% CM egg hatch: July 24 (H)/ August 2 (G) = target date for first spray where multiple sprays needed to control 2nd generation CM.

2nd generation 30% CM egg hatch: August 3, (H)/ August 13 = target date where one spray needed to control 2nd generation CM.

White Apple Leafhopper

2nd generation WALH found on apple foliage: August 2 (H)/August 10 (G)

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❖❖ As noted in last week's article on storage sanitation, managing postharvest diseases on apples requires action in at least three different arenas: preharvest disease control in the field, sanitation of bins and storages, and application of postharvest treatments. This article will focus on managing diseases in the field during late summer, with particular emphasis on the last spray that is applied before fruit are harvested.

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IN THIS ISSUE…

Postharvest diseases that must be controlled via field sprays include apple scab (which can appear as pinpoint scab after harvest), sooty blotch and flyspeck (SBFS), and fruit rots caused by *Botryosphaeria* species (black rot, white rot) and *Colletotrichum* species (bitter rot). Pinpoint scab can develop during storage if the orchard has a high incidence of leaf scab, fungicide residues are depleted before harvest, and fruit remain wet for more than 24 hours after the fungicide residues are depleted. Although 24-hr preharvest wetting periods can result in a low incidence of pinpoint scab, severe outbreaks are usually limited to fruit exposed to a 48-hr wetting period shortly before harvest and after fungicide residues were depleted. Fungicide residues are generally depleted after fruit have been exposed to two inches of accumulated rainfall following the application. Fruit infections that occur shortly before harvest will not yet be evident when fruit are harvested, but they will develop into pinpoint scab while fruit are held in cold storage.

Late-season infections by the fungi causing SBFS may also be invisible at harvest and develop during storage if fruit are cooled slowly. Unlike the apple scab fungus which can grow slowly at temperatures below 35 °F., the fungi causing SBFS will not grow after fruit are cooled to below 40 or 45 °F. However, if rooms with limited refrigeration capacity are filled quickly, then it may take 7 to 10 days or more for fruit in the center of stacks to cool to below 40 °F. If fruit in a partially filled room cool down at night and then the temperature rises again the next day as additional fruit are added to the room, the colder fruit may "sweat", thereby providing ideal growing conditions for incubating SBFS infections that needed just a few more hours of wetting to develop visible symptoms.

Effective fungicide coverage during July and August is essential for preventing development of summer fruit rots. If bitter rot becomes established in some fruit, then spores from the infected fruit may spread to other fruit and cause incipient infections that will not be visible at harvest. Those incipient infections can develop into fruit decays during storage. Like the fungi causing SBFS, most of the summer rot fungi stop growing when fruit are cooled to below 40 °F, but the rots can develop rapidly if stored fruit are cooled slowly.

Fungicide options for controlling SBFS and summer fruit rots were discussed in earlier articles (see Scaffolds Fruit Journal for 24 June and 30 June, 2014). A few additional points are relevant for the late-summer sprays. To the best of my knowledge, none of the diseases mentioned above can be reliably eradicated by fungicides applied after harvest. Thus, if fruit are left unprotected during critical infection periods in late summer and become infected with SBFS, scab, or summer rot fungi, those errors of omission during summer cannot be corrected by applying a postharvest fungicide.

Research at the Hudson Valley Lab over the past 10 years clearly demonstrated that Pristine provided the longest residual control of SBFS, and a combination of Pristine plus Captan has therefore been recommended for the last spray of the season for

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apple cultivars that will be harvested in October. Because that combination was also very effective for controlling bitter rot, it was also recommended for high-value cultivars, such as Honeycrisp and SweeTango, that can sometimes develop summer fruit rots. However, Pristine may be in short supply this year. Fortunately, results from a trial that we conducted a the Hudson Valley Lab in 2013 indicate that Merivon should perform just as well as Pristine for controlling SBFS and summer fruit rots (Rosenberger et al., 2014). When fruit from the 2013 trial were held in cold storage after harvest, the incidence of decay that developed in stored fruit was also similar for the Pristine and Merivon plots (data not yet published), thereby providing evidence that Pristine's ability to suppress storage decays will be matched by the activity of Merivon. Luna Sensation may also perform well in late summer sprays, but it was not included in our 2013 trial, it is not currently labeled in New York, and it has a 14-day preharvest interval whereas Pristine and Merivon both have 0-day PHIs.

Merivon probably should NOT be substituted for Pristine in situations where a fungicide is being applied shortly before or after applications of Harvista (the sprayable form of 1-MCP). Harvista applications require the use of spray oil, and the Merivon label specifically notes that Merivon should NOT be used with oils or other products formulated as emulsifiable concentrates. We don't yet know what degree of separation may be required between applications of Merivon and Harvista, but caution is advised.

Whereas the potential for damaging fruit via sequential applications of Merivon and Harvista is largely unknown, problems everyone should realize by now are that Captan and oil are not compatible, and they should not be applied within 10–14 days (or perhaps even longer) of one another. Normally, we would recommend that Captan should be included in all summer sprays on apples regardless of what other fungicides might be included in the tank mix. However, it appears that an exception may be required in blocks where Harvista will be applied in the next 10 to 14 days (again, we don't know the exact limits). Where Harvista will be applied, the safest bet will be to apply either Pristine or Flint as the sole fungicide in applications prior to or shortly after Harvista has been applied. However, remember that Flint has a 14-day preharvest interval, that Flint must be used at the rate of 3 oz/A for bitter rot suppression, and that the Flint label specifies only four applications per year with a maximum of 11 oz/A/year. An alternative where Harvista will be used might be to apply a combination of Flint-plus-Ziram or Pristine-plus-Ziram, thus substituting Ziram for Captan. However, Ziram can leave a lot of visible residues, and it will match the activity of Captan only if it is applied at nearly full label rates.

In various trials conducted over the years, including the 2014 trial mentioned above, I have found that although preharvest applications of Pristine can help to suppress storage decays, the preharvest sprays never match the effectiveness of postharvest drenching for controlling blue mold caused by *Penicillium expansum*. The level of storage rot control provided by Pristine when it is applied in preharvest sprays is presumably affected both by the quality of spray coverage and by the amount of rain that occurs between the last application and harvest. Thus, sprays applied one day before harvest should be more effective for suppressing storage decays caused by *P. expansum* than are sprays applied three weeks before harvest. However, even if sprays are applied one day before harvest, complete coverage of the fruit surface will be almost impossible on trees that carry a full crop. By comparison, postharvest drenching ensures complete coverage, and postharvest fungicides that are "fogged" into storage rooms may also provide more complete coverage than can be achieved with preharvest sprays.

Despite the fact that preharvest sprays cannot match the efficacy of some postharvest treatments, the slight edge that is provided by preharvest sprays

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may be good enough for situations where there is little disease pressure for postharvest decays. In general, the incidence of fruit decays is very low if fruit are not wetted after harvest, if fungicide protection was maintained throughout the growing season, and if harvest is well managed (i.e., fruit are harvested at the proper maturity with a minimum of bruising). Using a preharvest spray within a week or two of the planned harvest date also increases the likelihood that harvested fruit will still have enough residue to prevent SBFS, bitter rot, and black rot from growing during the cool-down period after harvest. Furthermore, preharvest sprays may provide fungicide coverage that is equivalent to the bin-top treatments that have been used successfully to apply diphenylamine (DPA) after harvest. DPA applied via bin-top treatments protects all fruit surfaces from storage scald because of the volatility of DPA, but postharvest fungicides are less volatile and therefore do not protect all fruit surfaces when applied as bin-top treatments (Rosenberger, 2011). Nevertheless, as with preharvest sprays, field experience has shown that, like preharvest sprays, bin-top treatments can provide control that is "good enough", even if it is less than perfect.

One final note: When the QoI fungicides (FRAC group 11) were first labeled, all products in this group (including Flint, Sovran, Pristine) had a label restriction dictating a maximum of four sprays per season for any combination of products that contained a QoI active ingredient. That restriction remains on the current labels for Sovran and Flint. However, the labels for Pristine, Merivon, and Luna Sensation have been changed. Those products still have label limitations indicating that no more than two sprays can be applied in succession with a maximum of four applications per year for each product, but they no longer limit users to a maximum of four applications per year for all QoI fungicides combined. Thus, for example, current labels would allow two applications of Merivon prebloom, two applications of Merivon, post-bloom, and two applications of Pristine in preharvest sprays. However, any use of Flint or Sovran during the season would appear to limit apple growers to a maximum of four sprays per year for any and all products that include a QoI fungicide. Limiting total QoI usage to four sprays per year may help to delay resistance development, but options for using five or six sprays per year (e.g., three or four for early-season scab, plus one or two preharvest) could be helpful in some situations and would be feasible if the Sovran and Flint labels were updated to include the same wording currently used for Pristine, Merivon, and Luna Sensation. ❖❖

Literature cited

Rosenberger, D.A., Meyer, F.W., Rugh, A.L., Feldman, P.M., and Kostina, J. 2014. Post-infection efficacy of fungicides for controlling summer diseases on apples, 2013. Plant Disease Management Reports 8:PF013. Online publication. DOI:10.1094/PDMR08.

Rosenberger, D.A. 2011. Controlling postharvest diseases and disorders of apples with non-recycling drenches. N.Y. Fruit Quarterly 19(2):21-24. On-line at http://www.nyshs.org/fq.php.

GENERAL INFO

FRUIT TOUR EVENT ANNOUNCEMENTS

WAYNE COUNTY FRUITGROWER TOUR
Wednesday, August 6, from 9:00 am
Registration and 1st stop at Wafler Nursery & Orchards, 10748 Slaght Rd, Wolcott, NY

Sponsored by agr.assistance, this large, informative and entertaining tour is in its 16th year, and will feature presentations on new club varieties, advances in automated fruit harvest systems, fire blight and apple scab management, PGR use, dealing with biennial bearing, orchard weed control, and internal worm management options, plus much more. Door prizes, lunch, some levity, a BBQ/clambake dinner with a live band, growers and industry representatives from NY and surrounding states — tough to beat on a midsummer day. Free attendance. Contact Lindsay LaMora (585-734-8904; lindsaylamora@agrassistance.com) for RSVP pre-registration and tour information.

CORNELL FRUIT PEST CONTROL FIELD DAY

The Geneva Fruit Pest Control Field Day will take place during Labor Day week on Sept. 3 this year. Activities will commence 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. Because of the recent retirements and personnel changes at the Hudson Valley Lab, there will be no corresponding Highland component this year. However, cooperators desiring one-on-one tours of their individual research plots can contact Peter Jentsch to make arrangements. No pre-registration is required for the Geneva tour.

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INSECT TRAP CATCHES (Number/Trap/Day)

Geneva, NY

	7/24	7/31	8/4
Redbanded leafroller	0.7	0.2	0.0
Spotted tentiform leafminer	12.0	5.4	6.6
Oriental fruit moth	0.3	0.1	0.0
Codling moth	0.0	0.6	1.1
Lesser appleworm	0.1	0.1	0.0
San Jose scale	563	436	603
American plum borer	0.0	0.3	0.0
Lesser peachtree borer	0.0	0.1	0.1
Obliquebanded leafroller	0.0	0.0	0.1
Dogwood borer	0.5	0.2	0.3
Peachtree borer	0.5	0.1	0.1
Apple maggot	4.8	6.3	12.9

* first catch

Highland, NY

	7/28	8/4
Redbanded leafroller	2.1	0.0
Spotted tentiform leafminer	26.9	52.5
Oriental fruit moth	2.6	1.6
Codling moth	10.4	5.6
Lesser appleworm	0.8	0.0
Variegated leafroller	0.4	0.1
Tufted apple budmoth	0.1	0.0
Sparganothis fruitworm	0.0	0.0
Obliquebanded leafroller	2.1*	0.0
Apple maggot	0.5	0.0

PEST FOCUS

Highland: **Oriental fruit moth** 3rd flight beginning.

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–8/4/14):	2266	1536
(Geneva 1/1–8/4/2013):	2357	1630
(Geneva "Normal"):	2421	1584
(Geneva 1/1–8/11/14, predicted):	2449	1670
(Highland 1/1–8/4/2014):	2601	1793

Coming Events:	Ranges (Normal ±StDev):	
American plum borer 2nd flight peak	2005–2575	1351–1777
Comstock mealybug 2nd gen. crawlers emerging	2234–2624	1505–1781
Codling moth 2nd flight peak	1943–2727	1288–1888
Spotted tentiform leafminer 3rd flight begins	2261–2651	1516–1842
Oriental fruit moth 2nd flight subsides	2062–2556	1375–1785
Oriental fruit moth 3rd flight begins	2281–2849	1545–1981
San Jose scale 2nd flight peak	2135–2499	1440–1748
Apple maggot flight peak	2115–2665	1417–1845
Obliquebanded leafroller 2nd flight begins	2256–2648	1517–1833
Redbanded leafroller 2nd flight subsides	2182–2742	1471–1891

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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