http://ipm.osu.edu/fruit/index.html

THE OHIO STATE UNIVERSITY Newsletter Extension

Fruit ICM News

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Calendar

Sept. 17-19: Farm Science Review, Molly Caren Agricultural Center, London, OH. Crops are ready to harvest and exhibitors are waiting in line for Ohio State University's 2002 Farm Science Review. The Review, an agricultural trade show, sold out of exhibitor space far in advance, with 574 commercial exhibitors featuring everything from machinery to seed to work clothes. The Review also showcases education experts and farm and conservation agencies.

Mulch Article Correction

The e-mail version of last week's article about mulches for small fruits "lost some hyphens" in the recommendations for depth of mulching material. For raspberries, the mulch should be applied to a depth of 2 to 4 inches. In blueberries, the mulch should be 3 to 5 inches deep in a width of 3 to 4 feet. Also, the mulch should be replenished every 2 to 3 years. Thanks, Dick Wander, for your astute observations.

Regulatory Status of Diazinon

Source: Scaffolds Fruit Journal, August 19, 2002

Scott Rawlins of Makhteshim Agan sent the following latest information regarding the regulatory status of Diazinon: The EPA has published the Interim Reregistration Eligibility Decision (IRED) for Diazinon on the internet. The entire IRED can be found on the EPA website at http://www.epa.gov/pesticides/op.

A summary of the pertinent proposed changes for tree fruits follows:

- **Apples:** All pests deleted except for woolly apple aphid. Only one application allowed per growing season.
- **Apricots:** May only be used for dormant season applications, only one application per dormant season. It is recommended that diazinon should be applied every other year unless pest infestations can be controlled only with consecutive, annual treatments.
- **Cherries:** Dormant: Apply only once during the dormant season; apply only every other growing season, unless pest infestations can be controlled only with consecutive, annual treatments.

In-season: Only one in-season application per growing season.

- **All tree fruit crops: 4-day REI.**

Clean Up Before Apple Harvest to Minimize Postharvest Decay Problems

Source: Dave Rosenberger, Plant Pathology, Highland, Scaffolds Fruit Journal, August 19,2002

Penicillium expansum, the fungus that causes blue mold decay in stored apples, is generating significant losses both during controlled atmosphere (CA) storage and during shipment of packed apple fruit. Thiabendazole (Mertect 340F) and other benzimidazole fungicides provided excellent control of *P. expansum* for nearly 25 years. However, thiabendazole is no longer effective because the populations of *P. expansum* in most packinghouses have developed resistance to the benzimidazole fungicides. Captan, the only other alternative for postharvest application on apples, has never been very effective for controlling P. expansum.

Research that we conducted over the past six years has led to the following conclusions:

- Inoculum levels for *P. expansum* gradually increased from year to year after postharvest fungicide treatments were no longer effective.
- Inoculum of *P. expansum* survives from one year to the next on field bins and on storage floors and walls. A single badly contaminated wooden bin can carry more than 2 billion spores. Plastic bins may carry fewer spores, but even plastic bins have been shown to carry 480 million spores. These spores are released into postharvest treatment solutions where they can contaminate the new crop each year. Spores can also be spread from bins to fruit by air movement in CA rooms. When inoculum levels are high, *P. expansum* can invade apples through their stems during long-term (>6 months) CA storage.
- Fruits with the early stages of stem-end decay are difficult to detect on packing lines, so some of them end up in retail packages. Airborne spores released during packing contaminate other fruit on the packing lines and cause additional decays in packed fruit.

- As a result, decayed fruits are appearing with unacceptable frequency in retail store displays. We found blue mold decay in 37% of 131 Empire displays and in 21% of 141 McIntosh displays during systematic grocery store surveys of bagged apple displays that were conducted during February, March, and April of 2000 and 2001. The presence of decayed apples in bagged fruit almost certainly contributes to lost sales.
- Improved sanitation measures provide the only option for reducing losses to *P. expansum.*

Following are sanitation measures that should be implemented by apple growers, storage operators, and packinghouses prior to harvest:

- At a minimum, all decayed fruit mummies should be removed from field bins before bins are refilled. Decayed apples do not float, so they remain in bins as bins come out of the water flotation tanks on packing lines. Conscientious packinghouse operators will ensure that workers remove all of the decayed fruit before the empty bins are bundled. These decayed fruits carry vast amounts of inoculum that will contaminate next year's crop if they are left in the bottoms of bins. Apple growers should inspect bins as the bins are unbundled in the field prior to harvest, and any of these unwanted "gifts" that remain in the bins should be removed.
- Sanitize packinghouse and storage walls and floors during summer by treating them with a quaternary ammonium sanitizer. Quaternary ammonium compounds are registered for disinfecting storage rooms and can be purchased from your chemical supply dealer. Follow directions on the product labels. In addition to eliminating inoculum, quaternary ammonium sanitizers will also eliminate foul odors caused by non-pathogenic bacteria and fungi (molds) that sometimes persist on storage walls and floors. Storage odors can be transferred to and persist in fruit, so cleaning storage walls and floors may improve fruit quality at the same time that it reduces the inoculum for post harvest decays.
- If possible, sanitize badly contaminated bins (i.e., bins that came out of storage containing many decayed fruits) with a quaternary ammonium wash. Quaternary ammonium sanitizers can reduce inoculum loads on bins by more than 99% if all of the decayed fruit and fruit residues are removed before the sanitizer is applied. Steam cleaning bins is also effective, but it may be less practical than a drenching system for applying quaternary ammonium sanitizers.
- Whenever possible, avoid wetting fruit after harvest. Postharvest drenching spreads spores of *P. expansum* from bins to wounds and to fruit stems where they can initiate decays. Fruits that are not drenched can still become contaminated by airborne spores in the CA rooms, but the proportion of fruit exposed to inoculum will be significantly reduced if fruits are not drenched.
- When fruit must be drenched to prevent storage scald, drench solutions should be mixed in relatively small quantities and solutions should be changed regularly to avoid accumulating a large number of spores in the drench solutions. Even though most storages contain benzimidazole-resistant populations of *P. expansum*, the fungicide thiabendazole should still be included in drench solutions to control *Botrytis cinerea* and to suppress fungicide-sensitive strains of *P. expansum*.

Postharvest handling procedures for apples will probably become more tightly regulated in the future because of increasing concerns about food safety. The same pathogens that have caused sporadic problems with apple cider can also contaminate fresh apples. To date, I am not aware that anyone has gotten sick from eating fresh apples, but laboratory studies conducted elsewhere have shown that some human pathogens can survive on or in whole apple fruit. As a result, both chain store buyers and government regulators are likely to impose new food safety requirements that will affect apple handling and storage. How those regulations and requirements will evolve is still unclear, but it might be wise to avoid any new investment in postharvest drenching equipment for apples until the industry can determine how food safety issues will be addressed.

Lesser Appleworm

Sources: The Pennsylvania Tree Fruit Production Guide, *and Common Tree Fruit Pests by A.H. Howitt*

Unexplained apple fruit damage has prompted Dr. Celeste Welty and others to hang pheromone traps to monitor lesser appleworm adult populations in several Ohio orchards. Following are brief descriptions of the pest, its life cycle, and feeding habits.

The lesser appleworm, *Grapholitha prunivora* (Walsh), is a minor pest of apple. The adult is small (3/16 inch) and dark-colored. When the moth is at rest, a gold band becomes evident across its back. The white-to-yellowish eggs are laid singly on leaves and fruit. First generation larvae appear in early June and immediately search for food. The larvae are shallow feeders, producing a blotchy mine below the skin that is rarely deeper than ¼ inch. When it matures, the larva bores to the outside of the fruit and drops to the ground. The fully mature larva has a pinkish skin. This is not, however, a distinguishing characteristic, because both codling moth and Oriental fruit moth larvae can be pink.

Most first generation larvae mature by late July, with pupation occurring inside silken cocoons spun in sheltered places on the bark or the fruit. The adults begin emerging the first week in August and second generation larvae are found in fruit from mid-August through early October. When fully grown, these larva seek sites for overwintering as mature larvae in cocoons.

The lesser appleworm larva can be distinguished from that of the codling moth by its feeding habits. The codling moth larva feeds through the fruit skin and burrows toward the core, leaving dark brown castings at the entrance hole. The lesser appleworm does not leave a definite entrance hole.

Though the calyx end is the preferred entry point, entrance through the side is very common. The lesser appleworm can cause twig injury on apples similar to that caused by the Oriental Fruit moth on peaches. This damage occurs early in the season when the terminal parts of rapidly growing apple twigs are succulent. The larvae enter from the terminal and consume the central parts of twigs as they work their way down the shoot for 3 to 6 inches. Twigs infested by larvae will exhibit wilted leaves, which later die and turn a conspicuous brown.

The lesser appleworm is a native pest whose original hosts were crabapple, wild rose, and hawthorn. The presence of these wild hosts in a fruit tree area can be a source of infestations. The larvae have been found feeding on apples, prunes, plums, cherries, apricots, pears, and peaches.

An image of apple fruit damage is available at: http://tfpg.cas.psu.edu/part2/part22br.htm (Click on "shallow mines under the skin").

Pest Phenology

Coming Events	**Degree Day Accum. Base 50F**
Codling moth 2nd flight subsides	1705-2635

Redbanded leafroller 3rd flight begins	1728-2231
Lesser appleworm 2nd flight peak	1844-2359
Apple maggot flight subsides	1904-2573
Redbanded leafroller 3rd flight subsides	2013-2402
Oriental fruit moth 3rd flight subsides	2018-2377
Spotted tentiform 3rd flight subsides	2228-2472

Thanks to *Scaffolds Fruit Journal* (Art Agnello)

SkyBit® Sooty Blotch Prediction for North-Central Ohio

Observed:
Aug 1-21: possible infection & damage

Predictions based on weather forecasts:
Aug 22-31: possible infection & damage

Ohio Drought Watch: August 17, 2002

Source: http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif

State District	Situation
Northwest	Severe drought
North-central	Moderate drought
Northeast	Moderate drought
Central Hills	Moderate drought
Eastern Hills	Severe drought
South	Moderate drought
Southwest	Near normal
Central	Near normal
Southeast	Near normal

The USDA Topsoil Moisture chart indicates that 92% of the state is experiencing short to very short topsoil moisture conditions as of August 18, 2002.

Source: http://www.cpc.ncep.noaa.gov/products/monitoring_and_data/topsoil.html

Degree Day Accumulations for Ohio Sites August 21, 2002

Location	Degree Day Accumulations Base 50 F	
	Actual	Normal
Akron-Canton	2245	2103
Cincinnati	2749	2743
Cleveland	2302	2066
Columbus	2690	2364
Dayton	2599	2464
Kingsville Grape Branch	2047	1908
Mansfield	2243	2085
Norwalk	2224	2061
Piketon	2674	2662
Toledo	2450	2060
Wooster	2336	1955
Youngstown	2129	1909

Fruit Observations & Trap Reports

Insect Key
AM: apple maggot
CM: codling moth
ESBM: eye-spotted budmoth
LAW: lesser apple worm
LPTB: lesser peachtree borer
OBLR: obliquebanded leafroller
OFM: oriental fruit moth
PTB: peachtree borer
RBLR: redbanded leafroller
SJS: San Jose scale
STLM: spotted tentiform leafminer
TABM: tufted apple budmoth
VLR: variegated leafroller

Site: Waterman Lab, Columbus
Dr. Celeste Welty, OSU Extension Entomologist

Apple: 8/14 to 8/21/02

RBLR: 37 (down from 51)
STLM: 72 (up from 50)
CM (mean of 3 traps): 9.3 (down from 19.0)
TABM: 11 (up from 2)
SJS: 5 (up from 0)
VLR: 8 (up from 3)
OBLR: 0 (down from 3)
AM (sum of 3 traps): 13 (down from 22)
LAW (mean of 3 traps): 1.0 (in first 24 hrs)

Peach: 8/14 to 8/21/02
OFM: 13 (down from 17)
LPTB: 1 (down from 7)
PTB: 8 (down from 10)

Site: Wayne County
Source: Ron Becker, IPM Program Assistant

Apple: 8/14 to 8/21/02
STLM: 217 (down from 620)
CM (mean of 3 traps): 9.9 (down from 12.8)
RBLR: 16.8 (up from 11.7)
AM (sum of 3 traps): 18.1 (up from 11.9)

Peach: 8/14 to 8/21/02
OFM: 0 (down from 0.5)
LPTB: 0.8 (down from 1.3)
PTB: 0.8 (up from 0.3)

Notes: European red mite continues to increase in most blocks, though at a slower pace than last week. Apple maggot counts have made a resurgence in several blocks, with one block having a total of 73 adults on three traps. We are also finding European corn borer causing damage to the apples similar to codling moth.

Site: East District: Erie & Lorain Counties
Source: Jim Mutchler, IPM Scout

Apple: 8/13 to 8/20/02
CM (mean of 3 traps): 6.7 (down from 9.3)
STLM: 840 (up from 825)
SJS: 76 (up from 49)
AM (sum of 3 traps): 10.2 (up from 6.7)
OFM: 0.5 (up from 0)
RBLR: 34.6 (up from 18.1)
OBLR: 4.0 (up from 2.7)
ERM (infested leaves per 25 leaf sample): 1.1 (down from 3.4)

Peach: 8/13 to 8/20/02
OFM: 1.3 (same as last week)
RBLR: 17.7 (up from 15.0)

LPTB: 10.0 (up from 9.3)
PTB: 5.7 (up from 4.3)

Beneficials present - *Stethorus punctum,* native lady beetles, green lacewings, brown lacewings, orange maggots, predatory mites, multi-colored Asian lady beetles

Site: West District: Huron, Ottawa, Sandusky Co.
Source: Gene Horner, IPM Scout

Apple: 8/13 to 8/20/02
CM (mean of 3 traps): 4.6 (down from 13.0)
STLM: 36.0 (down from 37.5)
SJS: 0.6 (down from 213)
AM (sum of 3 traps): 6.8 (down from 8.3)
OFM: 2.0 (down from 11.6)
RBLR: 32.8 (up from 11.0)
OBLR: 3.0 (up from 2.6)
ERM (infested leaves per 25 leaf sample): 0.6 (down from 3.6)

Peach: 8/13 to 8/20/02
OFM: 23.6 (up from 23.0)
RBLR: 43.8 (up from 17.8)
LPTB: 5.5 (down from 5.6)
PTB: 7.8 (up from 1.5)

Beneficials present - lacewings, banded thrips

The Ohio Fruit ICM News is edited by:

Ted W. Gastier
Extension Agent, Agriculture
Tree Fruit Team Coordinator
Ohio State University Extension Huron County
180 Milan Avenue
Norwalk, OH 44857
Phone: (419)668-8210
FAX: (419)663-4233
E-mail: gastier.1@osu.edu

Keith L. Smith, Associate Vice President for Ag. Adm. and Director, OSU Extension.

TDD No. 800-589-8292 (Ohio only) or 614-292-1868

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