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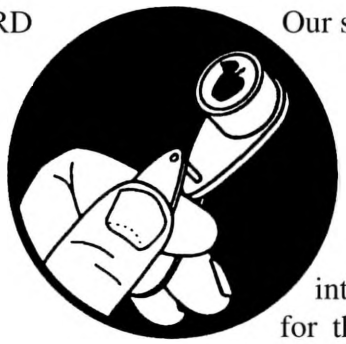
Update on Pest Management and Crop Development

August 16, 2004 VOLUME 13, No. 22 Geneva, NY

INSECTS

LOOKING FORWARD (TO THE END)

ORCHARD RADAR DIGEST



Our sample numbers as of today:
Geneva (biofix 5/7) - 1882
Albion (biofix 5/4) - 1822
Appleton (biofix 4/30) - 1860
Williamson (biofix 5/3) - 1892

Codling Moth. We are currently into the second brood control window for this pest, and considerably further along in the Hudson Valley. With 1260 DD (base 50°F) from the 1st catch of the season as a first spray date for the second brood, we currently have:
Geneva (biofix May 17) - 1275
Albion (biofix May 17) - 1232
Williamson (biofix May 18) - 1204

Geneva Predictions:

Codling Moth
Codling moth development as of August 16: 2nd generation adult emergence at 56% and 2nd generation egg hatch at 18%. 2nd generation 30% CM egg hatch: August 20 (= single spray date where one spray needed to control 2nd generation codling moth).

❖❖

Highland Predictions:

Codling Moth
Codling moth development as of August 16: 2nd generation adult emergence at 93% and 2nd generation egg hatch at 71%.

❖❖

MODEL BUILDING

Oriental Fruit Moth. This pest's development is tracked using a 45°F DD model from biofix, defined as the first sustained moth catch of the first brood. We are currently between the second and third broods in western NY. Pesticides to control the last brood should be applied in apple or peach blocks with a history of OFM infestation at 2450–2500 DD after biofix, taking into account PHI's and harvest date.

IN THIS ISSUE...

DISEASES

BIN BETTER

CONTROLLING POSTHARVEST APPLE DECAYS VIA PREHARVEST CLEAN-UP AND HARVEST LABOR TRAINING

(Dave Rosenberger, Plant Pathology, Highland)

❖❖ *Penicillium expansum*, the fungus that causes blue mold decay in stored apples, continues to cause 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.*

Preharvest sanitation measures:

In the absence of effective fungicides, sanitation measures implemented by apple growers, storage operators, and packinghouses prior to harvest are essential for reducing losses to postharvest decays:

1. 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 all of the decayed fruit is removed before the empty bins are bundled. These decayed fruits carry huge numbers of spores (sometimes more than a billion spores/bin) 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 fruit mummies and decayed fruit debris that remain in the bins should be removed.

2. Sanitize packinghouse and storage walls and floors during summer by treating them with a quaternary ammonium sanitizer or another approved sanitizer. Quaternary ammonium compounds are registered for disinfesting 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. Alternatives to quaternary ammonia sanitizers include chlorine dioxide foam and a new product, Stor-Ox (hydrogen dioxide). Both chlorine dioxide and Stor-Ox require specialized application equipment whereas quaternary ammonium compounds can simply be sprayed on the walls and floors. Hypochlorite (bleach) solutions are not very effective for sanitizing storage floors and walls because solutions dry too quickly to allow effective sanitizing.

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3. 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.

4. Cleaning bins and storages will be wasted effort if soil is brought into storage and drenchers via soil embedded in bin runners; Forklift operators must be trained to handle bins without pushing soil into the bin runners, or the bottoms of bins must be prewashed before the bins are run through drenchers. Putting one batch of dirty bins (or bins clogged with soil) through the drencher will compromise the value of cleaning bins. Thus, for maximum effectiveness, sanitation must be integrated throughout the entire operation including all cooperating growers.

Factors affecting sanitizer activity:

Most biocides are oxidizers that kill spores via oxidative reactions. Bacteria are generally easier to kill with biocides than are spores of *P. expansum*. Effectiveness of biocides is dependent on the following factors and their interactions:

- Biocide concentration: Higher concentrations are better, but excessively high concentrations can injure fruit in the water flumes or leave excessive residues on bins and other treated surfaces. (**Read and follow product labels!**).
- Solution pH: For hypochlorite solutions, pH should be maintained between 6 and 7.5. With pH > 7.5, the effectiveness of the biocide is decreased and with pH< 6 chlorine off-gassing can create a disagreeable and potentially hazardous work environment. Hypochlorite solutions with pH < 6 are also more corrosive to equipment and nails in wooden bins.
- Duration of exposure: Many fungal spores can survive brief exposure to biocides, especially at lower temperatures. Spores in water flumes generally receive long exposures (days) in the recirculating water whereas exposure for bins passing through a water dump is often a matter of minutes.
- Solution temperature: Activity increases with temperature. At low temperatures, longer exposure times are needed to achieve effective sanitation.
- Organic matter introduced into the biocide solutions can quickly deplete the oxidizing potential of the solution. Sanitizers cannot kill spores that are contained within organic debris (e.g., rotten apples) left in bins or on storage room floors. If water flumes contain organic matter, the solution will need regular recharging with a biocide.
- Surfactants can affect biocide activity when biocides are intended to control pathogens like *P. expansum* that have very hydrophobic spore masses. However, using surfactants in flume water may also enhance penetration of *P. expansum* spores into fruit wounds, stems, and calices and therefore could conceivably enhance decay, especially if the concentration of biocide drops below critical levels.

Biocide Options:

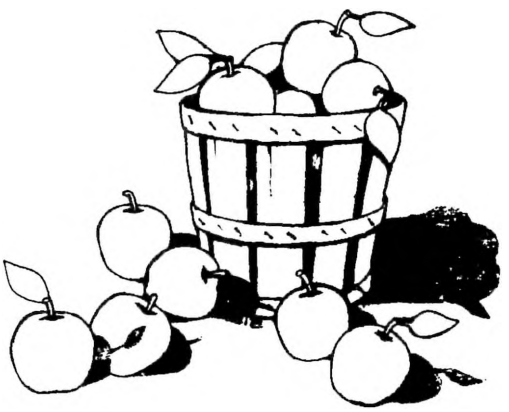
The most common biocides available for use in apple packinghouses include the following:

- Sodium hypochlorite is most commonly used for chlorinating water flumes.
- Calcium hypochlorite is available in a system where water flowing through a dispenser unit releases a constant supply of hypochlorite. Calcium hypochlorite is less corrosive than sodium hypochlorite.
- Hydrogen dioxide (Stor-Ox) was recently registered as an alternative for hypochlorite in water flumes, but we have no data to suggest that it is more cost-effective than hypochlorite solutions. According to company literature, hydrogen dioxide is very effective for disinfesting storage rooms when the product is introduced via cold-fogging. The advantage of cold-fogging is that exposure time can be extended by running the fogging equipment continuously for several hours.
- Ozone introduced into water with an ozone generator can substitute for hypochlorite solutions, but ozonation is used primarily in states where packinghouse operators have difficulty disposing of chlorinated water.

continued...

• Chlorine dioxide mixed into a foam is very *effective* for sanitizing bins, storage walls, and floors. However, as with ozone generation, equipment for generating chlorine dioxide can be relatively expensive and worker safety issues must be carefully addressed.
• Quaternary ammonia compounds, or "quats" (e.g., Deccosan) are not labeled for use in water flumes but are very effective for killing spores and microorganisms on bin surfaces and storage walls and floors.❖❖

Next week: Options for postharvest fungicide treatments on apples.



GENERAL INFO

TOURIST SEASON

2nd NOTICE - TREE FRUIT PEST CONTROL FIELD DAY

❖❖ Please remember to make plans to attend the annual N.Y. Fruit Pest Control Field Day, which will take place during Labor Day week on Sept. 9 and 10. This year, as we did last year in order to accommodate participants who may wish to attend other area tours earlier in the week, the dates have been shifted to the Thursday and Friday of the week, **AND** the Geneva installment will again take place first (Thursday Sept. 9), with the Hudson Valley installment on the second day (Friday Sept. 10). Activities will commence in Geneva on the 9th, 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, miticides, and insecticides on tree fruits and grapes. It is anticipated that the tour of field plots will be completed by noon. On the 10th, participants will register at the Hudson Valley Laboratory starting at 8:30, after which we will view and discuss results from field trials on apples.❖❖

PEST FOCUS

Highland:
Apple maggot pressure high in some blocks with oviposition observed in late varieties. **Stink bug** present and feeding on apples.

INSECT TRAP CATCHES (Number/Trap/Day)

Geneva, NY

	8/5	8/9	8/16
Redbanded leafroller	0.3	0.4	0.0
Spotted tentiform leafminer	11.8	7.5	16.7
Oriental fruit moth	0.0	0.4	0.1
Lesser appleworm	0.2	0.0	0.2
Codling moth	0.0	0.0	0.0
San Jose scale	0.0	0.0	0.0
Obliquebanded leafroller	0.0	0.4	0.3
American plum borer	2.7	1.8	1.1
Lesser peachtree borer	3.3	0.1	0.1
Peachtree borer	3.7	1.3	1.7
Apple maggot	0.7	0.3	0.5

* first catch

Highland, NY

	8/9	8/16
Redbanded leafroller	0.2	0.6
Spotted tentiform leafminer	16.6	15.9
Oriental fruit moth	0.2	0.4
Codling moth	0.2	0.1
Lesser appleworm	1.2	1.9
Obliquebanded leafroller	0.1	0.0
Sparganothis fruitworm	0.2	0.4
Tufted apple bud moth	0.0	0.0
Variegated leafroller	0.2	0.1
Apple maggot	0.3	0.7

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–8/16):	2566	1677
(Geneva 1/1–8/16/2003):	2528	1688
(Geneva "Normal"):	2630	1835
(Geneva 8/23 Predicted):	2750	1813
(Highland 1/1–8/16):	3101	2174

Coming Events:	**Ranges:**	
Comstock mealybug 2nd gen. crawlers peak	2380–2624	1505–1781
Apple maggot flight peak	2139–2587	1458–1770
Oriental fruit moth 3rd flight begins	2342–2756	1613–1901
San Jose scale 2nd flight peak	2136–2560	1459–1805
Spotted tentiform leafminer 3rd flight begins	2288–2644	1532–1872
Spotted tentiform leafminer 3rd flight peak	2599–3055	1776–2134
Codling moth 2nd flight peak	2005–2835	1337–1977
Lesser appleworm 2nd flight peak	2315–3295	1554–2292
Obliquebanded leafroller 2nd flight peak	2615–3023	1779–2117
Redbanded leafroller 3rd flight begins	2634–2960	1812–2092

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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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