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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.

Everything Old Is New Again

Source: Dave Kain & Art Agnello, Entomology, Geneva, Scaffolds Fruit Journal No. 21

Naturally occurring pesticides that are derived from plants or plant parts are commonly referred to as "botanicals." Botanicals have been around for quite a while. Along with arsenicals and other inorganic pesticides, they were pretty commonly used before the advent of the synthetic, organic pesticides rendered them "obsolete." From time to time they're re-examined for various reasons and may be familiar. Botanicals are of interest to those concerned with pest management for a variety of reasons. They are generally less toxic to the applicator than many synthetic pesticides. They may be acceptable in

the organic market where synthetic pesticides are not. Because, in general, they break down quickly, they may also be of use near harvest, when control is needed but other materials may not be applied because of PHI restrictions. Rapid degradation also means they are less likely to become environmental problems.

Botanicals, however, are not without concerns. They are usually broad spectrum poisons that can be hard on beneficial insects. And, unlike "biological" pesticides like B.t.'s, insect growth regulators, and pheromones, they are somewhat acutely toxic to humans and other mammals. The fact that they break down rapidly in the environment, while an advantage in some respects, also means that sprays need to be:

- timed precisely to coincide with pest events,
- applied at lower thresholds and, possibly,
- applied more often.

They are also expensive. This regular annual article used to state that the four most common botanicals available for use in fruit crops today were rotenone, pyrethrin, sabadilla and ryania. Unfortunately, for those who found them useful, ryania and sabadilla are no longer on the list due to voluntary cancellation of their registrations. To round out the article, we'll substitute information on a few newer, natural materials that, while not technically botanicals, kind of fit the category.

Rotenone is derived from the root of various plants of the Derris or Lonchocarpus species from Southeast Asia, Central and South America. It is available as at least 118 formulated products from a large number of manufacturers. It is synergized by the addition of piperonyl butoxide (PBO), which is another botanical material. Rotenone is expensive compared with synthetic insecticides, but is moderately priced for a botanical. It is the most commonly mentioned of the botanicals in pre-synthetic literature and is at least somewhat effective against a large number of insect pests. These include: pear psylla, strawberry leafroller, European corn borer, European apple sawfly, cherry fruit fly, apple maggot, cranberry fruitworm, raspberry fruitworm, pea aphid (which is similar to rosy apple aphid), European red mite and two-spotted spider mite, codling moth, plum curculio, Japanese beetle, and tarnished plant bug. Unfortunately, it is also toxic to ladybird beetles and predatory mites. But, it is non-toxic to syrphid flies that feed on aphids, and to honeybees. Rotenone is rapidly degraded by sunlight, lasting a week or less.

Of the botanicals mentioned here, rotenone is the most toxic to humans and other mammals. The acute oral LD50 is from 60-1500 mg/kg. In small doses it may be irritating or numbing to mucous membranes. It is highly toxic to fish, having been commonly used as a fish poison. It is also toxic to birds and pigs.

Pyrethrin (Pyrethrum). This compound is produced in the flowers of Chrysanthemum cinerariaefolium and is the forerunner of the synthetic pyrethroid insecticides. There are not nearly as many commercially available formulations of this chemical as there are for rotenone, but it is available as an emulsifiable concentrate, in combination with rotenone, or alone as a wettable powder, from at least a couple of sources. Pyrethrin is the least expensive of these four materials. Depending on the rate used, it may be less expensive than many synthetic insecticides. It is also synergized by PBO.

Pyrethrin is labeled against a large number of pests. An addendum to the label for one formulation of pyrethrin showed it to be moderately to highly effective (61- 100% control) against the following pests of fruit: grape leafhopper, potato leafhopper, leaf curl plum aphid, blueberry flea beetle, blueberry thrips, and blueberry sawfly. It is also effective against cranberry fruitworm. It is quickly broken down in the environment and may be used up to and including the day of harvest.

Pyrethrin is relatively non-toxic to humans and other mammals, although the dust produces allergy attacks in people who are allergic to ragweed pollen. The acute oral LD50 is 1200- 1500 mg/kg. It is toxic to fish, but "relatively" non-toxic to honey bees.

Azadirachtin (Neem) Azadirachtin is derived from the seeds of the neem tree, Azadirachta indica, which is widely distributed throughout Asia and Africa. The observation that the desert locust did not eat the leaves of the neem tree, and another, closely related species, led to the isolation and identification of azadirachtin in 1967. Since then, azadirachtin has been shown to have repellent, antifeedent, and/or growth regulating insecticidal activity against a large number of insect species and some mites. It has also been reported to act as a repellent to nematodes. Neem extracts have also been used in medicines, soap, toothpaste and cosmetics.

The most common commercial formulations of neem available for N.Y. tree fruit is Neemix (W. R. Grace & Co.), which lists leafminers, mealybugs, aphids, fruit flies, caterpillars, and psylla, and Align (AgriDyne), which includes some minor leafrollers on the label. Azadirachtin has shown good activity against spotted tentiform leafminer in tests in past years, but the formulation that was available at that time was somewhat phytotoxic. In Dick Straub's insecticide trials in 1992 with another azadirachtin product called Margosan-O, the insecticide showed good activity against STLM and leafhopper. Margosan-O is no longer available for fruit crops. In laboratory tests by Jan Nyrop's lab, toxicity to the predatory mite Amblyseius fallacis was very low. Field trials against OBLR by Harvey Reissig in 1998 were not encouraging.

Azadirachtin is relatively short-lived and mammalian toxicity is low (rat oral LD50 >10,000). It can be used up to and including the day of harvest, and reentry is permitted without protective clothing after the spray has dried. It is toxic to fish and aquatic invertebrates.

Piperonyl Butoxide (PBO) is a synergist (in this case, a material that when added to a pesticide increases the activity of its active ingredient) of both rotenone and pyrethrin. It is also a botanical product, being derived from Brazilian sassafras. Acutely, it is very safe, having an acute oral LD50 of greater than 7,500 mg/kg, but it may be chronically toxic in high doses.

Garlic (Guardian) A 10% formulation of garlic is registered on apples, and a number of apple pests are on the label. In 1995, Guardian (supplied by THUMBS-UP Sales Co., Chesterland, OH) was applied in six sprays at two-week intervals, starting at petal fall, and compared with a 3-spray Imidan program. Following the manufacturer's recommendations, each application of Guardian included an adjuvant of Sylgard 309 and Tri-Fol, a buffering agent, to maintain an optimum pH below 5.5- 6.0. Results showed that the garlic spray applied at a rate of 11 oz/A did not provide control of any of the labeled apple arthropod pests in N.Y. and did not affect the population density of two predator species commonly found in apples. The foliar pests - aphids, leafminers, and mites - were unaffected by the garlic sprays. The fruit pests - plum curculio, tarnished plant bug, obliquebanded leafroller, and internal lepidopterans - were also not affected by the biweekly sprays. However, the garlic did not have any effect on the population density of the predators T. pyri or Aphidoletes aphidimyza.

Although not technically botanical insecticides, the following materials are unique, natural products that kind of fit the category:

Abamectin (Agri-Mek) is a natural fermentation product containing a macrocyclic glycoside, used on apples and pears as an acaricide/insecticide. When used as currently recommended, it controls European red mite and pear psylla, and aids in the control of spotted tentiform leafminer. Abamectin is toxic to bees and predator mites on contact, but the foliar residue dissipates quickly, making it essentially non-

toxic to these species after a few hours (low bee-poisoning hazard).

Insecticidal Soaps (M-Pede) are concentrates made from biodegradable fatty acids and are contact insecticides that can be effective against such soft-bodied arthropods as aphids, mealybugs, and psyllids. They can provide suppression of pear psylla when used in a seasonal spray program, but the residual period is short. Uniform drying conditions are required to prevent droplet residues on the fruit surface. They have a low bee-poisoning hazard.

Spinosad (SpinTor) is a mixture of spinosyn A and spinosyn D molecules, a naturally derived group of toxicants from a species of Actinomyces bacteria which are found inhabiting soil. Spinosad, which acts as both a contact and a stomach poison, is available for use in apples, primarily against obliquebanded leafroller, although activity against spotted tentiform leafminer is also exhibited. SpinTor is essentially non-toxic to birds, fish, aquatic invertebrates, and most beneficials. It has a low bee-poisoning hazard.

Kaolin (Surround) is a naturally occurring clay mineral that has many uses as a direct and indirect food, in food contact items, cosmetics and toiletries, and as an inert ingredient in many pesticide formulations. When applied, the 95 WP crop protectant forms a white, mineral-based particle film intended to reduce the damage to plants caused by certain arthropod and disease pests, as well as environmental stress caused by solar effects. In research trials in apples, it has shown some preventative efficacy against plum curculio, internal Lepidoptera such as codling moth and oriental fruit moth, leafrollers, phytophagous mites, leafhoppers, and apple maggot. In pears, it can additionally suppress pear psylla, and in stone fruits it reduces feeding damage from Japanese beetle. Frequent applications (7-10-day intervals) and maximal coverage are advised in New York while there is active foliar growth. Surround has a low bee-poisoning hazard.

Market Loss Assistance Update

Source: James R. Cranney, Jr., USApple via Tom Sachs, Executive Director, Ohio Fruit Growers Society

The U.S. Department of Agriculture (USDA) formally announced the provisions of the $75 million market loss assistance program in a July 19 Federal Register notice, which requires USDA to accept public comments on the program for 30 days. USDA has informed the U.S. Apple Association (USApple) that it expects to close the sign up period on this program shortly after the end of the 30-day comment period, which expires on August 19. Payments to apple growers under this program are expected to begin shortly after this sign up has closed.

Additionally, USDA has indicated that it plans to open the sign up period for the $94 million market loss program shortly after closing its comment period for the $75 million program. USDA is not required to accept public comments on the $94 million program, and therefore, expects a shorter sign up period under this program. These features should result in more timely disbursements to growers once the sign up is announced. USApple plans to notify the industry when more specific information is available.

Please contact J. C. Ranney by telephone at 703-442-8850 or via e-mail at jcranney@usapple.org should you have any questions or require additional information.

Plum Pox Virus Update July 31, 2002

Report prepared by Nancy Richwine, PA Department of Agriculture Survey Coordinator, Nrichwine@state.pa.us

Field Activities (Pennsylvania): Cumulative number of orchard blocks surveyed this season is 1,495 of 1,564 total number of susceptible Prunus blocks statewide. The slight increase in the number of orchard blocks statewide reflects recent new plantings. Surveys are completed in 47 counties where susceptible host material is grown commercially. The only counties with remaining blocks to be surveyed include: Adams, Dauphin, Franklin, Lancaster, and York. Franklin was previously thought to be completed, but 4 new growers were uncovered recently. The field operations of the statewide survey will be completed by August 2.

Laboratory Activities*: The lab processed 5,656 field samples during this week (July 22-July 26). Cumulative number of field samples processed for this year is 51,111 including samples from commercial orchards, homeowner properties, retail nurseries, production nurseries, budwood source trees, sentinel trees, and miscellaneous samples. No new positives were detected this week. As reported previously, PPV has been detected from three commercial orchard blocks and one homeowner property this season. The homeowner property was in Franklin Township, York County, and the commercial blocks belonged to three different growers in Dickinson Township, Cumberland County, and Monaghan and Conewago Townships, York County.

Regulatory Activities**: The PA quarantine has been amended to include Monaghan and Conewago townships, York County, effective July 23, 2002. A new quarantine map has been posted to the PA Department of Agriculture web page at <www.pda.state.pa.us/> or is available via email from PDA's survey coordinator noted below.

Homeowner Activities: PDA & USDA homeowner survey personnel are currently working in the quarantine area in Adams, Cumberland, Franklin, and York counties in buffer zones which are within 500 meters of locations where PPV was detected and removed. Thus far this season 15,334 properties have been visited. Some 4,283 of the properties visited (29%) had Prunus which were sampled.

* Laboratory testing always lags behind field sample collection. Samples are processed in the order in which they are received in the laboratory. Since crews are working in many blocks at several grower locations on any given day, individual block results are processed over a period of several days. Growers are notified of positive detections immediately and of negative survey results at the end of the growing season. NOTE: It is Department policy not to release grower/property owner names and exact location in order to preserve confidentiality.

** PA PPV Quarantine area includes Latimore, Huntington, and portions of Menallen and Tyrone Townships, and Borough of York Springs, Adams County; Dickinson, South Middleton, and Southampton Townships, and Borough of Mt. Holly Springs, Cumberland County; Quincy Township and Borough of Mont Alto, Franklin County; Conewago, Franklin, Monaghan and Washington Townships, and Borough of Franklintown, York County.

Predicting Third Generation Codling Moth Activity

Source: Carlos Garcia-Salazar, Extension Small Fruit Agent, David Epstein, IPM, MSUE Fruit CAT, August 6

Will Michigan fruit growers see a large third generation of codling moth at the end of August this year? The onset of a third generation of codling moth can be very disconcerting. Not only can fruit injury begin to appear just when many growers are ready to put their spray equipment away for the season, but codling moth eggs oviposited at the end of August may also hatch in storage facilities after harvest, presenting further difficult control challenges.

To successfully predict third generation codling moth activity, we need to evaluate the environmental factors that trigger diapause induction in the codling moth, and to calculate GDD50 for the present season before the onset of diapause conditions.

Diapause is a strategy by which insects survive harsh winter conditions by undergoing a period of suspended or diminished growth, development, and physiological activity. In insects, diapause is genetically controlled, and is induced by environmental factors. The two major environmental factors controlling diapause in the codling moth are daily temperature and photoperiod. Photoperiod refers to the daily cycle of light and dark periods.

From research conducted at MSU and elsewhere, we know that the critical photoperiod for diapause induction (the photoperiod at which 50 percent of a codling moth larval population is induced into diapause) is 14 hours, 12 minutes of light, and occurs in Michigan between July 27 and August 4. We also know that codling moth development depends on the accumulation of degree-days above a critical temperature of 50°F and that 950 GDD are required to complete a generation. From this information, it is easy to deduce that all larvae hatching and reaching larval maturity before July 27 have a chance to develop into adult moths before apple harvest. This is what we observe in a "normal" year.

However, there is another factor that must be considered. Prevailing temperatures around the time of critical photoperiod directly impacts diapause induction. Our research indicates that the critical photoperiod is moved forward or backward, depending on the daily temperature occurring between July 27 & August 4. We observed that the critical photoperiod for diapause induction increases or decreases by 7.2 minutes with any 1°C increase or decrease in the average daily temperature. The algorithm to estimate the effect of daily temperature on the critical photoperiod is: CPhP50= 17.02-0.12 (X); where CPhP50 = critical photoperiod to induce diapause in 50 percent of a larval population, and X = Average daily temperature occurring between July 27 and August 12.

The fruit season 2002 has been one of the most difficult to follow. We had a long cool spring, followed by high summertime temperatures. The high summertime temperatures led many to speculate that we would see more than the usual third generation codling moth activity. Based on the model calculations, though, this should not be the case.

The accumulation of GDD50 through August 4, 2002 at the Trevor Nichols Research Center (TNRC) in Fennville, Michigan was approximately 1688 GDD and the average daily temperature for July 24 through August 4 at TNRC was 19.83°C. These conditions put the critical photoperiod at approximately 14 hours, 40 minutes of light, which corresponds to July 24 July 27, 2002. Under these photoperiod and temperature conditions, 69 to 70 percent of all larvae from the second codling moth generation in 2002 will enter diapause, leaving only a small portion of the population to produce a partial third codling moth generation at the end of August. This is a relatively high percentage of codling moth larvae entering diapause (see accompanying chart for comparison with other years), indicating that we should not see high levels of third generation codling moth activity in southwest Michigan in 2002.

Estimated Percentage of Diapause Induction in SW Michigan as a Function of Temperature and Photoperiod

Year	DD base 50 8/4	Avg temp C, 7/27 to 8/12	Modified CPhP 50, Aug 4 = 14 hrs. 12 min	Equivalent Date	Diapause Induction %
1983	1,798	24.7	14 hrs., 4 min.	Aug 15	44.0
1984	1,738	23.9	14 hrs., 10 min.	Aug 12	49.0
1985	1,652	19.8	14 hrs., 40 min.	July 30	69.0
1997	1,439	19.12	14 hrs., 44 min.	July 26	72.0
1999	1,811	21.8	14 hrs., 28 min.	July 30	59.0
2002	1,688	19.83*	14 hrs., 40 min.	July 24-27	69.0

Reducing Fruit Damage

Source: Fruit Times Newsletter, Volume 19, No. 13, August 8, 2002

As we continue to harvest Ohio's quality tree fruit, it is good to remember to take steps to maintain that quality. An article in California Agriculture by I. T. Agar and E.J. Mitcham on handling and ripening Bartlett pears has reinforced the basics of reducing the damage to any fruit crop. Listed below are the 8 points brought out in the research.

Use gentler picking containers (padded buckets) to reduce bruising and scuffing.

1. Keep plastic bins clean to reduce fruit scuffing.

2. Line wooden bins with plastic to significantly reduce fruit scuffing.

3. Consider providing incentives to harvest crews to minimize fruit damage.

4. Use air-ride suspension when transporting fruit from orchards to packinghouse, especially when travel is over rough roads.

5. Use immersion dumps with flotation salts to minimize postharvest damage to pears.

6. Reduce damage from nonimmersion water dumps by allowing fruit to move onto conveyors before additional fruit is dumped.

7. Avoid dropping pears onto hard surfaces such as hard plastic, wood, or supported belts that can be damaging, especially at heights of 6 inches (about 15 cm) or greater. Minor modifications, such as adding padding curtains to slow fruit, and suspended belts at fruit transfer points can minimize damage due to drops and its effect on fruit quality.

8. The Pennsylvania Tree Fruit Production Guide has information on reducing damage to fruit during harvesting and handling. This information may also be seen on the web at: http://tfpg.cas.psu.edu/part6/part62a.htm

Pest Phenology

Coming Events	Degree Day Accum. Base 50F
Codling moth 2nd flight peak	931-2212
San Jose scale 2nd flight peak	1271-1874
Obliquebanded leafroller 2nd flight begins	1412-2076
Oriental fruit moth 3rd flight begins	1448-2013
Spotted tentiform leafminer 3rd flight begins	1537-2123
Codling moth 2nd flight subsides	1705-2635
Redbanded leafroller 3rd flight begins	1728-2231
Apple maggot flight subsides	1904-2573

Thanks to *Scaffolds Fruit Journal* (Art Agnello)

Ohio Drought Watch: August 3, 2002

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

State District	Situation
Northwest	Moderate drought
North-central	Moderate drought
Northeast	Moderate drought
Central Hills	Moderate drought
Northeast Hills	Moderate drought
Rest of State	Near normal

Degree Day Accumulations for Ohio Sites August 7, 2002

Location	Degree Day Accumulations Base 50F	
	Actual	Normal
Akron-Canton	1916	1832
Cincinnati	2375	2413
Cleveland	1962	1793
Columbus	2328	2059
Dayton	2244	2136
Kingsville Grape	1731	1740
Mansfield	1923	1815
Norwalk	1897	1794
Piketon	2328	2345
Toledo	2117	1792
Wooster	2004	1702
Youngstown	1810	1658

SkyBit® Sooty Blotch Prediction for North-Central Ohio

Observed:
Aug 1-7: possible infection & damage

Predictions based on weather forecasts:
Aug 8-16:: possible infection & damage

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: 7/31 to 8/7/02

RBLR: 36 (up from 29)
STLM: 48 (up from 37)
CM (mean of 3 traps): 14.7 (down from 17.0)
TABM: 2 (same as last week)
SJS: 10 (same as last week)
VLR: 4 (up from 0)
OBLR: 1 (down from 4)
AM (sum of 3 traps): 13 (up from 9)

Peach: 7/31 to 8/7/02

OFM: 17 (down from 25)
LPTB: 4 (same as last week
PTB: 4 (down form 8)

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

Apple: 8/1 to 8/08/02

STLM: 1634 (up from 892)
CM (mean of 3 traps): 14.9 (up from 12.1)
RBLR: 6.9 (up from 1.8)
AM (sum of 3 traps): 11.6 (down from 16.1)

Peach: 8/1 to 8/08/02

OFM: 0.8 (up from 0.3)
LPTB: 0.3 (up from 0)
PTB: 0.3 (down from 1.8)

Red mites are starting to flare up in more blocks of apples. We are also seeing an increase in aphids and leaf mines. Black rot is being found on some fruit.

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

Apple: 7/30 to 8/06/02
CM (mean of 3 traps): 10.5 (up from 6.1)
STLM: 950 (up from 388)
SJS: 92 (down from 245)
AM (sum of 3 traps): 4.1 (up from 1.1)
OFM: 1.5 (up from 1.0)
RBLR: 17.5 (up from 4.1)
ERM (infested leaves per 25 leaf sample): 0.8 (down from 2.4)
OBLR: 3.9 (down from 4.0)

Peach: 7/30 to 8/06/02
OFM: 2.7 (down from 4.0)
RBLR: 5.7 (up from 3.0)
LPTB: 5.7 (up from 1.3)
PTB: 8.3 (up from 6.7)

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: 7/30 to 8/06/02
CM (mean of 3 traps): 7.6 (up from 4.1)
STLM: 79 (up from 33.0)
SJS: 3.0 (down from 5.4)
AM (sum of 3 traps): 4.8 (up from 0.8)
OFM: 4.6 (up from 2.2)
RBLR: 10.8 (up from 3.4)
OBLR: 1.6 (down from 2.0)
ERM (infested leaves per 25 leaf sample): 0.4 (down from 4.6)

Peach: 7/30 to 8/06/02
OFM: 10.4 (up from 4.2)
RBLR: 16.4 (up from 5.4)
LPTB: 3.2 (up from 1.6)
PTB: 4.0 (up from 2.8)

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

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