# scaffolds FRUIT JOURNAL

Update on Pest Management and Crop Development

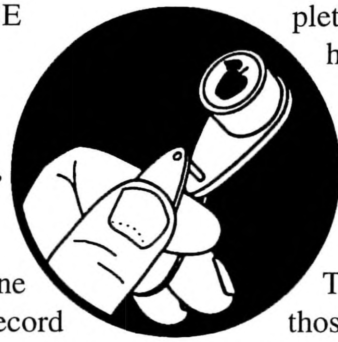
July 29, 1996 VOLUME 5 Geneva, NY


DISEASES

SUMMER SPORES

## FRUIT DISEASE UPDATE

(Dave Rosenberger, Plant Pathology, Highland)



❖❖ July is likely to end up as one of the coolest and wettest Julys on record in the mid-Hudson Valley. At the Hudson Valley Lab, we had 8.7 inches of rain between July 1 and July 29, along with 215 hours of leaf wetting. Following are disease problems of concern in a wet summer.

Apple scab is still active in some orchards where primary scab was not controlled or where adjacent abandoned orchards are supplying inoculum. Orchards with active scab in late summer are at greater risk for developing pinpoint scab at harvest or during storage if preharvest weather stays wet. Maintain captan cover sprays to keep scab under control. Ziram is much less effective than captan against scab and is not recommended for summer sprays in orchards where scab is active.

Flyspeck and sooty blotch: Our cool, wet weather has been very favorable for development of these diseases. Regular fungicide sprays are required to provide protection. Where Benlate is used in combination with ziram or captan, a full cover spray should provide protection for 21 days or 3.5 inches of rain, whichever is shorter. A Benlate cover spray will generally be effective for a minimum of 14 days under even the most adverse conditions, so the recommended summer spray interval in a year like this is 14–21 days. Even the best-timed fungicide program will not protect fruit if spray coverage is incomplete (as in poorly pruned trees, trees with heavily clustered fruit, or where sprays are applied under windy conditions).

Crown rot: Saturated soil conditions are favorable for development of crown rot caused by *Phytophthora*. The most susceptible apple trees are those that are 1–5 years old and growing on M.26 or MM.106 rootstocks. Older trees are less likely to be girdled by *Phytophthora* because an infection on one side of the crown cannot girdle the larger trees as quickly. Older trees that become infected on only one side of the crown frequently recover without any chemical treatment, whereas younger trees may be killed. In the Hudson Valley, Ridomil applications are especially recommended for young trees on M.26 rootstocks. Ridomil cannot be applied to bearing trees until after harvest.

Cherry leaf spot: A postharvest fungicide may be needed on sweet cherries this year to prevent late-season development of cherry leaf spot. If leaf spot is allowed to develop, trees will defoliate prematurely and be more susceptible to winter damage. Some sweet cherry growers have found they can omit the postharvest fungicide most years, but careful monitoring is advised to prevent a leaf spot epidemic in this wet season.

Fabraea leaf spot on pears: Continued fungicide coverage is necessary to prevent this disease in Bosc pears if there is any inoculum present in the orchard. Orchards with no history of Fabraea leaf spot and no symptoms on leaves at the end of July are unlikely to develop the disease during August. However, orchards with any recent

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history of Fabraea are likely to harbor small amounts of inoculum, and these blocks are still at risk. Left uncontrolled, Fabraea can reach epidemic proportions very quickly. Leaves and fruit remain susceptible right up to harvest. Bosc are more susceptible than Bartlett.❖❖

INSECTS

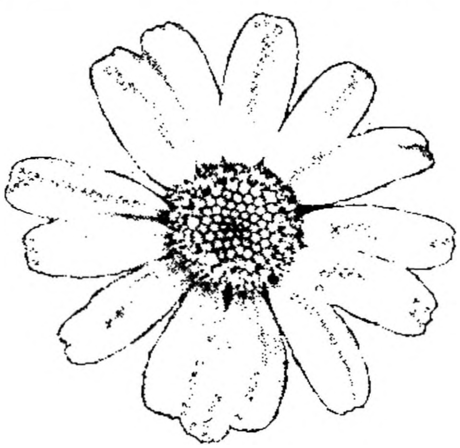
## PLEASE DON'T EAT THE DAISIES

BOTANICAL INSECTICIDES
(Dave Kain, Entomology, Geneva)

❖❖ Naturally occuring 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 becaause 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 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 very expensive.



The four most common botanicals available for use in fruit crops today are rotenone, pyrethrin, sabadilla and ryania. Information on these products appears in the 1996 Tree-Fruit Recommendations (pp. 20–21). A relatively newer, and increasingly more common botanical insecticide that is receiving a lot of attention these days is azadirachtin (or neem).

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ROTENONE 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.

A recent regulatory development illustrates the tenuous situation of many minor-use materials and may end up rendering the preceding discussion academic before long. According to a USDA news release and as quoted in the Federal Register (July 20, 1995), the Rotenone Task Force has announced that it plans to delete all the agricultural uses from rotenone labels because of the cost of reregistration; these uses include all tree fruits and small fruits. The registrants plan to maintain rotenone uses for fish control and flea/tick/mite control on dogs and cats. They will reconsider the plans for deletion if someone is willing to develop the necessary data for reregistration. For additional information, contact Mr. Joe Conti, The Rotenone Task Force, AgrEvo Environmental Services, (201) 307-3366.

PYTRETHRIN (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 labelled 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.

SABADILLA The source of sabadilla is the seed of a tropical lily. There are very few commercial formulations of this material. It is available as a dust that may also be added to water and sprayed, but clogging of the nozzles has been noted. It is moderately priced for a botanical (similar to rotenone). It will control potato leafhopper and is somewhat effective against tarnished plant bug. It has little effect on predators/parasitoids, except for the predatory mite *Typholdromus pyri*, to which it was extremely toxic in recent tests by Joe Kovach. Sabadilla may be used up to 24 hours before harvest. Apple is the only deciduous tree fruit crop specifically mentioned on the label of the one product we found registered for N.Y. use. In previous articles about botanical insecticides printed in Scaffolds, it was stated that sabadilla is not toxic to honeybees.

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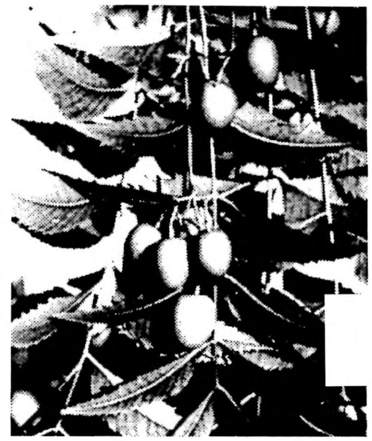
However, the information provided by different sources since then has been ambiguous. Some say that it is relatively non-toxic to honeybees, and others (including the manufacturer) say it is toxic. The confusion may lie in the fact that sabadilla is toxic to honeybees on contact, but without any residual activity. In the interest of playing it safe (especially given the current state of bee health), it would probably be best to consider sabadilla a hazard to honeybees and to follow all necessary precautions to prevent their exposure to the material.

Sabadilla is less toxic to mammals than rotenone or pyrethrin; the acute oral LD50 is greater than 4000 mg/kg.

RYANIA A product of the roots and stems of *Ryania speciosa* of Trinidad, ryania acts as both a stomach and contact poison on target insects. It is the most expensive of the materials covered in this article, and is not as readily available as rotenone or pyrethrin. Ryanodine, the active ingredient, is formulated as a wettable powder and is labelled for use against codling moth in apples. It is also toxic to the European corn borer and may control cranberry fruitworm. In Joe Kovach's tests it provided excellent control of a pest complex comprising codling moth, oriental fruit moth and lesser appleworm. It also controlled aphids, white apple leafhopper and spotted tentiform leafminer. It is more persistent than rotenone or pyrethrin and is more selective. It is generally not very harmful to pest predators and parasites, but is somewhat toxic to the predators *Atractotomus mali* and *Diaphnocoris* spp. It may also be used up to 24 hours before harvest.

The acute oral LD50 of ryania is 750–1200 mg/kg, less toxic than rotenone and slightly more toxic than pyrethrin. It is also toxic to fish.

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, which lists leafminers, mealybugs, aphids, fruit flies, caterpillars and psylla, and Align, 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 last year 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) 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.

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BIBLIOGRAPHY

Allen, T.C. 1945. A compilation of recent insecticidal tests of Sabadilla, *Schoenocaulon* spp. Dept. of Economic Entomology, Univ. of Wisconsin, Madison Wisconsin. NOT RELEASED FOR PUBLICATION

Brown, A.W.A. 1951. Insect Control by Chemicals. Wiley & Sons, Inc. New York.

Garman, P. 1943. Control of the apple maggot with rotenone dusts. Bulletin of the Connecticut Agricultural Experiment Station. Bull. 474 pp. 435–442.

Hardman, J.M., H.J. Herbert, K.H. Sanford and D. Hamilton. 1985. Effect of populations of the European red mite, *Panonychus ulmi*, on the apple variety Red Delicious in Nova Scotia. Can. Entomol. 117: 1257–1265.

Hofstetter, B. 1991. Before you buy botanical pest controls ... The New Farm. Dec. 1991. pp. 36–39.

Kovach, J., H. Reissig and J. Nyrop. 1990. Effect of botanical insecticides on the New York apple pest complex. Reports from the1989 IPM Research, Development and Implementation Projects in Fruit. New York State IPM Program, Cornell Univ. and NYS Dept. of Ag. and Markets. IPM Publication #202. pp. 40–44.

Morse, J.G. and T.S. Bellows, Jr. 1986. Toxicity of major citrus pesticides to *Aphytis melinus* (Hymenoptera: Aphelinidae) and *Cryptolaemus montrouzieri* (Coleoptera: Coccinellidae). J. Econ. Entomol. 79: 311–314.

Morse, J.G., H.S. Elmer, O.L. Brawner. 1986. Resistant thrips: The 1986 control recommendations for California. Citrograph, the magazine of the citrus industry. Riverside, CA 71(6): 118–120.

Morse, J.G., J.A. Immaraju, O.L. Brawner. 1988. Citrus thrips: Looking to the future. Citrograph, the magazine of the citrus industry. Riverside, CA 73(6): 112–115.

Strickler, K. and B.A. Croft. 1985. Comparative rotenone toxicity in the predator, *Amblyseius fallacis* (Acari: Phytoseidae), and the herbivore, *Tetranychus urticae* (Acari: Tetranychidae), grown on lima beans and cucumbers. Environ. Entomol. 14: 243–246.
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## ROUND TWO, CONT.'

❖❖ The model for 2nd generation codling moth larvae predicts that a control spray should be applied in problem orchards 1260 DD (base 50 F) after the start of the FIRST flight (5/28 in Geneva, 5/20 in the Hudson Valley). As of today, 7/29, 1081 DD have accumulated in Geneva and 1450 at Highland. Keep your eye on the thermometer so that you will be timely with any OP applications you should decide to make.❖❖

## IT'S THAT TIME AGAIN

N.Y. FRUIT PEST CONTROL FIELD DAY

❖❖ This annual (in Geneva at least) event, sponsored by the Departments of Plant Pathology and Entomology, has been scheduled for September 4 this year. All those interested are invited to attend this preliminary presentation of results of field trials on the control of diseases and insects attacking N.Y. fruit crops. Results will be discussed from experiments on tree fruits and grapes. Please note that this represents a change from most years, as the Geneva tour is traditionally held on the Thursday after Labor Day, and this year it will be on **Wednesday**.

In the Hudson Valley, the fall fruit tour is being held only on alternate years, and since there was a fall tour here last year, another is not scheduled until 1997. Registration begins at 8:30 at Barton Laboratory, NYSAES, Geneva (that's **Wednesday**, September 4).❖❖

## PEST FOCUS

Highland: **Apple blotch leafminer** damaging terminals.

## UPCOMING PEST EVENTS

| | 43°F | 50°F |
|---|---|---|
| Current DD accumulations (Geneva 1/1– 7/29): | 2018 | 1354 |
| (Highland 1/1–7/29): | 2452 | 1790 |

| **Coming Events:** | **Ranges:** | |
|---|---|---|
| OBLR 2nd flight starts | 2199–3040 | 1490–2076 |
| Oriental fruit moth 2nd flight subsides | 1806–2783 | 1164–1963 |
| American plum borer 2nd flight peaks | 1648–2612 | 1407–1840 |
| Apple maggot peak | 2033–2688 | 1387–1778 |
| Redbanded leafroller 2nd flight subsides | 2037–3045 | 1342–2160 |
| STLM 2nd flight subsides | 1773–2514 | 1148–1818 |
| Comstock mealybug 2nd gen. crawlers emerging | 2106–2768 | 1447–1924 |

## INSECT TRAP CATCHES (Number/Trap/Day)

### Geneva NY

| | 7/22 | 7/25 | 7/29 |
|---|---|---|---|
| Redbanded leafroller | 0.4 | 0 | 0 |
| Spotted tentiform leafminer | 316 | 409 | 167 |
| Oriental fruit moth | 5.3 | 12.7 | 13.1 |
| Lesser appleworm | 2.5 | 1.8 | 1.8 |
| Codling moth | 3.1 | 6.3 | 1.8 |
| San Jose scale | 0.1 | 3.0 | 0.9 |
| American plum borer | 2.4 | 2.3 | 3.9 |
| Lesser peachtree borer (cherry) | 0 | 1.3 | 0 |
| Lesser peachtree borer (peach) | 1.0 | 0.3 | 0.1 |
| Peachtree borer | 1.4 | 3.7 | 1.1 |
| Obliquebanded leafroller | 0.3 | 0 | 0.1 |
| Apple maggot | 0 | 0 | 0.4 |

### HVL, Highland NY

| | 7/15 | 7/22 | 7/29 |
|---|---|---|---|
| Redbanded leafroller | 3.8 | 0.1 | 0.3 |
| Spotted tentiform leafminer | 38.3 | 27.9 | 19.1 |
| Oriental fruit moth | 0.5 | 0.9 | 0.2 |
| Lesser appleworm | 0.1 | 0.4 | 1.9 |
| Codling moth | 0.2 | 1.4 | 6.2 |
| Fruittree leafroller | 0 | 0 | 0 |
| Tufted apple budmoth | 0.9 | 0.4 | 0 |
| Obliquebanded leafroller | 0.4 | 0.2 | 0 |
| Sparganothis fruitworm | 0.3 | 0 | 0 |
| Variegated leafroller | 0.1* | 0.1 | 0.2 |
| Apple maggot | 0.3 | 0.8 | 0.9 |

*=1st catch

(Dick Straub, Peter Jentsch)

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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