scaffolds Update on Pest Management and Crop Development
FRUIT JOURNAL
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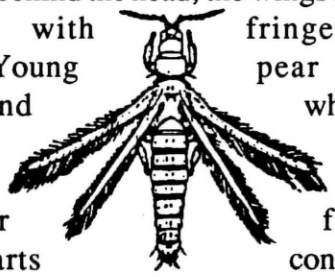
INSECTS

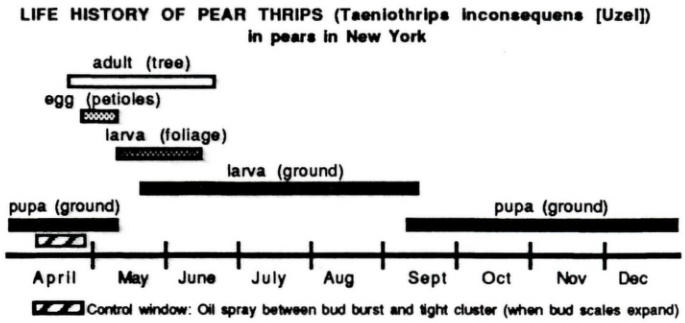
ONE THRIPS, TWO THRIPS


PEAR THRIPS (Art Agnello)

❖❖ A tiny insect that is present in the trees for only a brief period during early spring is occasionally responsible for not only tattered foliage in sugar maple trees, but also large decreases in fruit set of apples in the Northeastern U.S., including parts of New York. The pear thrips (*Taeniothrips inconsequens* [Uzel]) is an unusual insect about 1/20 inch long, with fringed wings and assymetrical mouthparts. The adult pear thrips is slender and brown, with short antennae and a swelling behind the head; the wings are long and narrow, with fringes of long hairs. Young pear thrips are small and white with red eyes. ("thrips" is the term used both for one or for many.) Mouthparts consist of a pair of stylets for puncturing plant tissue, plus a cone with a rasp-like surface, which is used for roughening the wound and then sucking up the juices.



Pear thrips, originally from Europe, were introduced into California at the turn of the century, where they demonstrated a taste for plums, cherry, apple, and pear; other hosts are basswood, birch, beech, ash, and of course, maples. It is the adult thrips that appear on host trees in great numbers and do the most destructive damage. Generally speaking, they arrive just before or during the opening of fruit buds (late April for New York apples and pears). They enter the bud, or start feeding on the bud tip and gradually work themselves in. Eggs are laid under the bud scales, petals and sepals, on stems and in other succulent flower and leaf parts. The larvae feed voraciously for about 3 weeks, adding to the damage already caused by the adults. After the larval feeding period has finished (early June in N.Y.), they drop off the tree and enter the ground, often to depths a foot or more, where they enter a diapause stage until fall. Sometime in September or October, they pupate in their earthen cell, and remain until the adults emerge the next April. Under natural conditions, the duration of a single adult's life probably covers a period of 4-6 weeks.



On fruit trees, feeding is usually concentrated on the tender flower parts, which gives the blossom buds a shriveled, scorched appearance, or causes them to fall off completely. Foliar damage in hosts such as maples is caused by the insects' feeding on the developing leaf tissue; this results in leaves that are dwarfed, mottled yellow to green-brown, and distorted. Small scars resembling blisters show up along the leaf veins and stems. The tree will consequently have a thin crown, possibly suffer some moisture stress, and may even drop its leaves prematurely in the fall.

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Because much of this insect's life is spent underground, control of damaging populations is very difficult. Insecticides have been suggested by some, but their effectiveness is difficult to measure, because most growers are not aware of the damage until after it has already been done, although thrips are sensitive to nearly any prebloom insecticides used in most commercial orchards On fruit trees, an oil spray is advised against the egg-laying adults as they emerge, timed between the bud burst and green cluster stages of pear and plum (usually the 2nd or 3rd week of April). This can be a prudent treatment to apply in any case, as a preventive measure against other pests such as mites or pear psylla. Massachusetts guidelines suggest that it can be useful to examine fruit buds at this time to determine whether thrips are present.❖❖

ACROSS THE RIVER

APPLE PITH MOTH
(Art Agnello)

❖❖ The following information about this insect, which is yet another marginal (but growing?) problem in apples, was adapted from a fact sheet by John Weaver and Alan Eaton in New Hampshire, and the March Message to Massachusetts Growers (Ron Prokopy, Jennifer Mason and Bill Coli):

The Apple Pith Moth (APM), *Blastodacna atra* (Haworth), was collected for the first time in the United States in 1989 in Connecticut; subsequently, APM has been collected from New Hampshire, southern Maine, and Massachusetts. The adult is a small (3/8 inch wingspan) blackish moth with white spots; larvae are yellowish (turning reddish with age) with a dark brown head. In the summer (August), females oviposit eggs separately around the base of leaf axils. The eggs soon hatch and

in September young caterpillars bore into stems without causing much noticeable damage, except for their entrance holes which are surrounded by rust-colored frass. Each caterpillar excavates an overwintering shelter at the base of a bud. In the spring (March-April), the larvae emerge from their chambers, locate new shoots and bore into their stems. When trees are in blossom (15-20th May), the larvae are actively feeding. Pupae occur in June-July and adults in July-August.

Apple Pith Moth has been recorded as a pest of economic importance in Europe. Damage can be severe enough to cause complete defoliation; however, attacks of APM in Europe are severe but not common. Damage is most noticeable in the spring, either just before or after bloom, when the larvae are actively feeding in the woody

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scaffolds
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tissues at the bases of new shoots of apple trees, causing leaf wilt and die-back of blossoms and terminal shoots. The larvae usually attack spurs and the stems of apical shoots, which stimulates the growth of laterals. It has been observed that APM tend to frequent blocks with terminal bearing trees, such as Cortland, Paula Red and Liberty. Fruit boring is not a common behavior of APM larvae, but it is occasionally observed and can be quite destructive. Larval tunnels the thickness of a paper clip wire may go straight toward the core of the apple. In one Massachusetts orchard last summer, 30% of the fruit was affected; larvae could be found in the apples until late summer, although they were gone by harvest. APM probably will not become a problem to most commercial apple growers who use chemical controls. However, unless new biological controls are introduced to the United States soon, APM will probably become a serious pest in organic apple orchards and nurseries. In commercial orchards it probably will become necessary to modify current practices and spray young nonfruit-bearing trees. Effective control probably occurs in most commercial settings whenever pesticides are being used during two critical time periods: 1) in the summer, when adults are active, and 2) in the early spring, when overwintering caterpillars emerge from their shelters. ❖❖

PESTICIDES AND pH

THE ACID/BASE TEST
(Art Agnello)

❖❖ A number of people find it helpful for us to repeat past articles that address some of the more fundamental considerations of pest control practices, such as the effect of spray water pH on pesticide activity. There may be times when you don't get the expected results from a pesticide application, even though you used the correct concentration of the recommended material and applied it in the same way that has given acceptable control at other times. Although you may suspect a bad batch of chemical or a buildup of pesticide resistance, the poor results may in fact be due to alkalinity — that is, a solution with a pH higher than 7.0. A close inspection of the pesticide label will often reveal a caution against mixing the chemical with alkaline materials such as lime or lime sulfur. The reason is that many pesticides, particularly insecticides, undergo a chemical reaction under alkaline conditions that destroys their effectiveness. This reaction is called alkaline hydrolysis, and can occur when the pesticide is mixed with alkaline water or other materials that cause a rise in the pH.

Hydrolysis is the splitting of a compound by water in the presence of ions. Water that is alkaline has a larger concentration of hydroxide (OH-) ions than water that is neutral; therefore, alkaline hydrolysis increases as the pH increases. Insecticides are generally more susceptible to alkaline hydrolysis than are fungicides and herbicides, and of these, organophosphates and carbamates are more susceptible than pyrethroids. A survey of fruit-growing areas in N.Y. showed that water from as many as half of the sites in western N.Y. had pH values above 8.0. Water at this pH could cause problems for compounds that will break down in only slightly alkaline water, such as ethephon (Ethrel). Compounds that break down at a moderate rate at this pH, such as Carzol and Imidan, should be applied soon after mixing to minimize this process in the spray tank. A

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smaller number of sites (less than a quarter of them) had pH levels greater than 8.5. Above this level, the rate of hydrolysis is rapid enough to cause breakdown of compounds such as Carzol and Imidan if there is any delay in spraying the tank once it is mixed. In a few sites having a pH above 9.0, compounds such as Guthion and malathion, which would not break down in most situations, may have problems. It is also important to note that in any one site, ground water pH can vary substantially (by nearly 2 pH units) during the season.

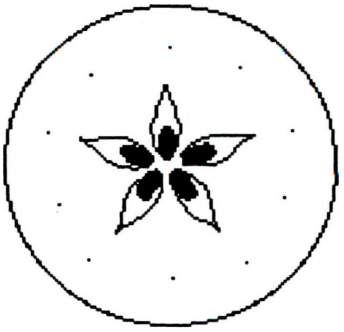
In order to prevent alkaline hydrolysis, you should:

• 1 - Determine the pH of your spray solution; because of seasonal variability, this should be done more than once during the growing season. Measuring your spray water pH before mixing can be misleading, because the chemicals you use can raise or lower the pH of the overall spray solution. It makes more sense to take the time to run some bottle tests of your most-used spray materials after they have been mixed with your spray water. The most accurate method is by using an electronic pH meter; however, these are expensive and not very practical. Another, less accurate method uses dyes that change color in response to pH. These are available in the form of paper strips, or in solution for use in soil pH test kits. In general, the indicator is mixed with or dipped into the water, and the resulting color is compared against a standard color chart.

• 2 - To minimize loss of chemical effectiveness from hydrolytic breakdown in the tank, it is a good practice to apply right after it is mixed (as much as is allowed by the weather and other factors). If a delay occurs, a buffering agent may be added to the tank if the pH is high and the chemical you are using is susceptible to alkaline hydrolysis; these agents work by lowering the pH and resisting pH change outside of a certain range. A pH in the range of 4-6 is recommended for most pesticide sprays. Buffering agents are available from many distributors; some examples are: Buffer-X (Kalo Lab), Nutrient Buffer Sprays (Plant Health Technologies/ Monterey), Spray-Aide (Miller), Sorba-Sprays (Uniroyal/Leffingwell), and LI 700 (Loveland/ AgChem Service, Agway). Some sources for pH testing materials are (pH Indicator Paper): Ward's Natural Science Est., PO Box 1712, Rochester, NY 14603; VWR, PO Box 1050 Rochester, NY 14603; Fisher Scientific, PO Box 8740, Rochester, NY 14642; (Soil pH Test Kits): Agronomy Soil Test Lab, 804 Bradfield Hall, Cornell Univ., Ithaca, NY 14853.

Growers often add technical flake calcium chloride to the tank when spraying cultivars such as McIntosh, which is susceptible to storage disorders related to inadequate levels of fruit calcium. However, research done in Massachusetts indicates that, although calcium chloride does not itself affect pH, a contaminant present as a result of the manufacturing process does increase the pH of the solution; this could in turn encourage alkaline hydrolysis. There are a few pesticide materials that should not be acidified under any circumstances, owing to their phytotoxic nature at low pH. Sprays containing fixed copper fungicides (including Bordeaux mixture, copper oxide, basic copper sulfate, copper hydroxide, etc.) and lime or lime sulfur should not be acidified. But if the product label tells you to avoid alkaline materials, chances are that the spray mixture will benefit by adjusting the pH to 6.0 or lower.

For further information on water pH and pesticide effectiveness, refer to N.Y. Food & Life Sci. Bull. No. 118, "Preventing decomposition of agricultural chemicals by alkaline hydrolysis in the spray tank", by A. J. Seaman and H. Riedl, from which much of this information was adapted.❖❖



CHEM NEWS

UPDATE

MORE CHEMICAL ERRATA
(Art Agnello)

❖❖ Thanks to a phone call from Mary Concklin in Hudson, I was alerted to a couple of important errors in print I've already committed this season, both having to do with label changes.

1) The EPA registration numbers for Lorsban given on p. 17 of the 1994 Recommends are no longer correct; apparently, either the re-registration process or DowElanco's reorganization resulted in the following new numbers: Lorsban 50WP, 6219-39; Lorsban 4EC, 62719-23.

2) The March 28 issue of Scaffolds referred to the Mitac label change restricting its use to 2 applications per season. However, it has since undergone another label change this year that does not restrict the number of sprays you may apply, but limits total per-acre use to 2 gallons of the EC formulation, or 3 lb of the WP formulation (or any combination of the two totalling 3 lb A.I.) per season. By the way, Nor-Am has recently merged with Hoechst-Roussel and will now be known as AgrEvo.

Keep those cards and letters coming, folks.❖❖

FIELD NOTES

HUDSON VALLEY

(Dave Rosenberger)

APPLE SCAB ascospore maturity
Highland, NY:

	Imm	Mature	Discharged	Tower shoot
3/31	94%	6%	0%	0 spores
4/4	81%	9%	1%	2 spores

APPLE SCAB UPDATE

❖❖ Snow cover through most of the winter and spring has allowed ascospores to mature without disruption from extended periods of freeze drying, which can occur during open winters. With the counting method we have traditionally used in eastern N.Y., we have found that economically important ascospore discharges usually occur only after we have reached 17% mature spores. Since April 4, we have had several warm sunny days. Thus, I suspect that we have reached the 17% maturity threshold as of this writing. Rainfall predicted for tomorrow afternoon should produce the first economically significant infection period, but that will occur only in orchards with large amounts of carryover inoculum.

Ascospore maturity is only one factor affecting the risk of scab infection. Another factor (and often the most important factor early in the season) is the amount of overwintering inoculum present in orchards. In 1992, we had a very wet summer. As a result, we had high levels of overwintering inoculum and significant infections occurred at Green Tip. In 1993, we had a very dry summer and I therefore doubt that most orchards are carrying very much inoculum. Thus, although ascospores are mature and ready to shoot, I doubt that there is enough inoculum in most orchards to justify applying sprays prior to Half-Inch Green. Where Nova or Rubigan are used, growers should be able to delay the first application until tight cluster.

BLACK KNOT ON PLUMS

Following is a summary from a 1992-93 fungicide trial conducted at the Hudson Valley lab in Highland:

Black knot on plums can be controlled only by using a combination of sanitation (removing knots from trees annually) and effective fungicides applied from the popcorn flower stage through second cover. In 1992, several fungicides for black knot were evaluated at the Hudson Valley Lab. Infections occurring in 1992 developed during and after

bloom in 1993. (Black knot usually requires two years to develop before knots become full grown and black.) As shown in the table below, Bravo is the most effective fungicide for controlling black knot. Note that in our trial we used Bravo at the highest label rate in five applications, including two applications after petal fall, so as to avoid confounding our test results by using two different fungicides within the same season. However, Bravo must not be applied to plums after petal fall in commercial orchards because applications after petal fall may cause fruit injury and are therefore prohibited on the label.

The best strategy for controlling black knot involves the following:

1. During winter or early spring, prune out and burn all knots found in the orchard and in wild plum and cherry trees in adjacent hedgerows.
2. Use Bravo as labeled to control brown rot blossom blight at popcorn, full bloom, and petal fall, or at approximately 7-10 day intervals starting at popcorn.
3. Use Captan or a Captan/Topsin M combination in sprays at shuck split and first cover.

Other researchers have shown that none of the other fungicides labeled for brown rot on plums will control black knot. Thus, neither Funginex nor Rovral is effective against black knot, nor are any of the SI fungicides that might eventually be labeled for controlling brown rot on plums.❖❖

Table 1. Effectiveness of labeled fungicides for controlling black knot on two plum cultivars in a trial conducted at the Hudson Valley Lab during 1992-93.

Material	Rate/100 gal[1]	Mean No. black knots/tree Oullins	NY-56.713.1[2]
Control	-	112.0 a	231.7 a
Topsin M 85WDG plus Captan 75 WDG	1.33 lb	34.5 b	62.3 b
Bravo 720	22 fl oz[3]	4.0 c	5.8 c

Means followed by the same letter are not significantly different (P = 0.05, Fisher's Protected LSD).

[1] Treatments were applied with a handgun 28 April; 6,13,21 and 29 May 1992. Incidence of black knots was determined 2 December 1993.

[2] NY-56.713.1 is a Stanley-type plum ripening the second week of August. Trees were produced and sold by New York State Fruit Testing during the 1980's.

[3] Bravo was used at the highest label rate in five applications, including two applications after petal fall, to evaluate efficacy.

BRAVO SHOULD NOT BE APPLIED TO PLUMS AFTER PETAL FALL, HOWEVER, BECAUSE APPLICATIONS AFTER PETAL FALL ARE NOT LABELED AND MAY CAUSE FRUIT INJURY.

INSECT TRAP CATCHES (Number/Trap/Day)

Geneva NY

	4/4	4/7	4/11
Green fruitworm	0	0.2*	0.1
Pear psylla adults	0.03*	–	–
Pear psylla eggs (per terminal bud)	0.01*	–	–
Redbanded Leafroller	0	0	0
Spotted Tentiform Leafminer	0	0	0

HVL, Highland NY

	4/4	4/8	4/11
Green fruitworm	0.5	0.5	1.0
Pear psylla adults	0.2*	1.0	0.5
Pear psylla eggs (per terminal bud)	0.01*	0.06	0.6
Redbanded Leafroller	0	0	0
Spotted Tentiform Leafminer	0	0	0

* = 1st catch

(Dick Straub, Peter Jentsch)

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations		
(Geneva 1/1- 4/11):	68	23
(Highland 1/1- 4/11):	125	44

Coming Events:	**Ranges:**	
Redbanded leafroller 1st adult catch	32-480	17-251
Spotted tentiform leafminer 1st adult catch	73-433	17-251
Green fruitworm peak flight	64-221	19-108
Pear psylla 1st egg hatch	111-278	55-92
Rosy apple aphid nymphs present	91-291	45-148
Tarnished plant bug adults active	71-536	34-299
McIntosh at green tip	24-161	4-74
Peach/Pear at swollen bud	67-184	17-82
Plum at swollen bud	97-184	53-83

PHENOLOGIES

Geneva: Apple(McIntosh) - **Silver tip**
Cherry - **Swollen bud**
Pear, Peach, plum: **Dormant**
Highland: Apple (McIntosh): **Green tip**

PEST FOCUS

Pear psylla adults active, laying eggs
Green fruitworm adults flying

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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