scaffolds Update on Pest Management and Crop Development

FRUIT JOURNAL

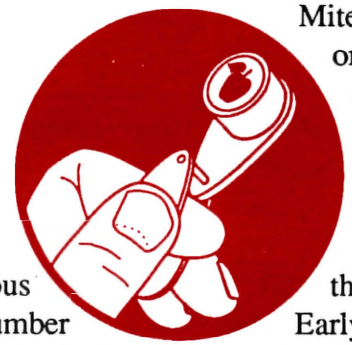
May 2, 1994 VOLUME 3 Geneva, NY

INSECTS

INSECT BITES

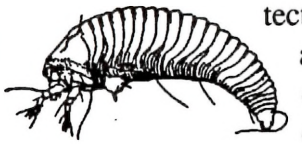
A PAIR FOR PEARS

(Art Agnello)



PEAR RUST MITE

❖❖ This occasionally serious pest of fresh market pears gives a number of growers problems each year. Pear rust mite outbreaks may be worse in areas receiving extensive sprays of materials destructive to predators, and the development of miticide-resistant strains are suspected in some cases. Scouts and growers have difficulty detecting these pests until after they have already damaged the crop because of their minute size. The overwintering stage is a light brown, wedge-shaped adult, which is nearly invisible without a 15X hand lens; these mites settle in any protected area on the trees, such as behind leaf buds, especially on wood 1 or 2 years old.



The mites become active as tree growth starts in the spring, and feed upon the first green tissue at the bud base, later moving to the foliage or fruit. The summer forms are nearly white in color, and even smaller than the overwintered adults. The more tender foliage is preferred, so populations on leaves decrease as the leaves mature and toughen. Damaging populations sometimes develop on the fruit soon after petal fall, sheltered in the hairs around the calyx and remaining active for a few weeks, until sometime in mid-July when they appear to leave the fruit.

Mite feeding causes leaves to turn brown or bronze, which may stunt the growth of young trees; on older trees the damage to fruit is far more significant. Severe russetting of the fruit can leave the entire surface rough and brown, which alters or destroys the desirable varietal skin appearance. Early in the growing season, mite feeding at the calyx or stem ends gives a localized russetting to those areas. If mite growth is unchecked, this feeding and russetting may spread over the fruit entirely, depending on the population numbers and the length of their feeding period.

Monitoring guidelines tend to be pretty complicated, but one rule of thumb is a 2–3% fruit infestation rate for fresh market pears; also, a spray should be applied if any pears contain 30 or more rust mites. If levels on individual fruits do not exceed 10 mites, there is generally a grace period of about 2 weeks within which a spray could be applied. A miticide such as Kelthane or Carzol should be used at petal fall if any of these thresholds are reached, but frankly, a preventive petal fall spray is probably the most advisable course of action in blocks with a history of rust mite infestations. Those growers electing to use Agri-Mek (provided it's been approved) for pear psylla within the recommended 7–14-day post-petal fall time period would probably realize some added rust mite control from that spray. The effectiveness of summer sprays to control rust mite in N.Y. is questionable.❖❖

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PEAR LEAF MIDGE

❖❖ This is an old member of the insect community that had not been noticed for a number of years until recently. Pear leaf midge (*Dasyneura pyri*) is a gnat-like insect that has been responsible for increasing amounts of damage in Eastern New York pear orchards the past few years.

This insect occurs in Europe, the United Kingdom, New Zealand, and New Brunswick; however, its first reported U.S. occurrence was actually in the Hudson Valley in 1932. It has 3–4 generations per year, which are overlapping and variable in their timing. The adult is a dark brown fly, 1.5–2.0 mm in length; this small size, plus the fact that it lives for only 1–3 days, makes it difficult to observe in the orchard. The first generation adults begin to fly in late April, but this date can vary from mid-April to early May; the flight lasts until late May to early June. Eggs, which are reddish in color, are laid within the rolled margins of only undeveloped leaves, as soon as the leaves emerge from the bud. Several eggs, up to as many as 35, may be laid per leaf. The maggots (which are white to yellow-red in color) hatch out in 4–6 days and feed on the leaf surface for 10–12 days; this damage prevents the normal unrolling of the leaf. After the feeding period, some of the maggots drop to the soil and pupate close to the surface, while others pupate inside the rolled leaves. The entire life cycle takes 25–30 days, except that maggots of the last one or two generations of the season remain in the soil over the winter and pupate the following spring. The number of generations per year is probably determined by the length of the period during which there is new shoot growth in the summer.

Damage caused by pear leaf midge infestations can take a number of forms. This insect attacks only the foliage, which causes the edges of leaves to roll tightly upwards and inwards towards the midrib. Heavy infestations may cause shortening of extension shoots, an effect that is probably more important in nursery stock than in mature trees. During the early stages of an infestation, there is a slight, irregular puffiness or "lumpiness" to the rolled portion of the leaf, which may become reddened and brittle. Eventually the leaf curves downward like a sickle, and the red areas turn black; leaf drop may follow. Early in the season, infested leaves occur only at the tips of shoots. As the shoot extends, however, the young leaves at the tip may in turn be attacked by later generations, so that affected leaves may be found at several levels along the shoot.

At the present time, we can give only generalized guidelines for the control of pear leaf midge. Presumably, conventional management practices using insecticides had been controlling this insect, but economically damaging infestations have begun to occur because of either missed or poorly timed sprays, or because of an emerging pesticide tolerance in local populations. Successful control has been reported in New Hampshire using standard organophosphate compounds (i.e., azinphos-methyl, phosmet) to kill maggots rolled inside the leaves. In European orchards, diazinon also has been reported to be successful. In general, the best strategy appears to be spraying a known infestation in the late spring, after the first generation adults have laid eggs, but before pupation begins. Insecticide persistence is important; in problem or-

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scaffolds
is published weekly from March to September by Cornell University—NYS Agricultural Experiment Station (Geneva) and Ithaca—with the assistance of Cornell Cooperative Extension. New York field reports welcomed. Send submissions by 3 pm Monday to:

scaffolds FRUIT JOURNAL
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This newsletter available on CENET, on the Tree Fruit News bulletin board under FRUIT.

chards, 2–3 post-bloom applications are markedly better than 1–2. It may be necessary to examine the leaves regularly to determine the proper timing. To be practical, it is probably best to spray as soon as symptoms of an infestation are found (mid-May to early June).

Very little supplementary information is available about this pest. In New Zealand apple orchards, the use of the synthetic pyrethroid fenvalerate has been correlated with outbreaks of a closely related species (apple leaf midge). Bosc pears are slightly less susceptible than are Bartletts and Clapps. The prospects for natural control are uncertain, although two species of parasitic wasps have been recorded from the apple leaf midge. If insecticide resistance is the root cause of these infestations, and if they start to become more noticeable in commercial orchards, we may ultimately need to re-evaluate our pesticide use patterns in pears and begin looking for different approaches to this problem.❖❖

FIELD NOTES

HUDSON VALLEY

(Dave Rosenberger)

APPLE SCAB ascospore maturity

Highland, NY(4/28):

Immature	Mature	Discharged	Tower shoot
53%	43%	4%	>1000 spores

Peru, NY (Champlain Valley) (4/25):

63%	36%	1%	23 spores

APPLE SCAB UPDATE

❖❖ Apple scab ascospore counts in the Champlain Valley as of April 25 (with Macs at Quarter-Inch Green) were virtually identical to Hudson Valley counts for April 15. Thus, there were large numbers of spores that appeared mature in squash mounts but which were not yet physiologically mature. With warm weather during the mid-part of last week, the scab spores in the Champlain Valley have undoubtedly matured to the point that there will be significant discharge with any rains encountered from here on through the primary scab season.

In the lower Hudson Valley, we had short wetting periods April 25 (0.08 inches of rain) and April 29 (0.01 inches of rain), which were too short to be apple scab infection periods. However, a 14-hr wetting period (mean temp. 59°F, 0.48 inches of rain) began about 10:30 p.m. Sat., April 30. This was a moderate Mills' infection period by conventional standards, but it would not qualify as an infection period if hours of nighttime wetting are disregarded. Considering the quantity of spores likely to be discharged at this time of year and the high risk of infection at this growth stage, most growers opted to protect trees against this infection period. (For a more detailed discussion of the probabilities of spore discharge at night, see last week's "Scaffolds".)

FIRE BLIGHT

❖❖ We are using 'MaryBlyt' to monitor fire blight infection periods. As of Monday morning (5/2), we had not yet reached the epiphytic infection threshold required to initiate blossom blight on either apples or pears. For the MaryBlyt model, we assumed that the very first open blossoms were available April 28 on pears and April 30 on apples. The epiphytic infection potential was 53 on pears and 36 on apples (threshold is considered to be 100). Based on this model, it does not appear that strep sprays were needed for wetting periods that occurred April 29 to May 1.❖❖

GENEVA

APPLE SCAB
(Wayne Wilcox)

ASCOSPORE MATURITY (4/28)

DD 32*	Maturity category (%)** 1	2	3	4	5	Discharge test (Spores/LP field)
228	55	12	10	23	tr	0.6

*Accumulated degree days (base 32°F) between first date of green tip and date of assessment. Ability to discharge ascospores usually begins to increase rapidly at approx. 175–225 DD after green tip.
**Categories: 1–3 = immature; 4 = morphologically (apparently) mature; 5 = discharged. Growth stage on 4/21: McIntosh = Green tip

DISEASES

STONE FRUITS

BROWN ROT CONTROL STRATEGIES
(Wayne Wilcox)

❖❖ This year's annual brown rot reminder:

Periods of host susceptibility. Three important ones: (1) bloom; (2) the last 2–3 weeks before harvest; and (3) shuck split until pit hardening (important for all stone fruits EXCEPT sour cherries). This period is often overlooked by growers, advisors, and those who write fungicide labels, but it can be very important if weather is wet and inoculum is available.

Inoculum availability. The three main sources of brown rot inoculum for BLOSSOM infections are (1) last year's mummified fruit within the orchard (most important); (2) cankers that developed when the brown rot fungus grew from rotten fruit into fruiting wood (most commonly a problem on peaches); and (3) abandoned orchards or wild stone fruit trees within 1/4-mile of the orchard. Obviously, the degree to which these sources are or are not present has a tremendous influence on the risk of blossom infection in any particular orchard or year. Also, remember that wet weather during the prebloom period encourages the production of brown rot spores from mummies and cankers, whereas dry weather significantly suppresses it.

The primary inoculum for FRUIT infections can come from mummies and cankers or the spores produced on infected blossoms. For those who still have peaches, remember the importance of thinned fruitlets lying on the orchard floor. Fruitlets thinned before pit hardening decompose quickly and produce relatively few spores, whereas those thinned later decompose slowly and serve as a major source of inoculum just before harvest.

Environmental requirements. The brown rot fungus requires rain or heavy dew for its spores to germinate and cause infection, and it thrives under relatively warm conditions (77°F is optimum). If inoculum is plentiful and fruit are in a highly susceptible state, infection can occur after only a few hours of wetness at optimum temperatures. However, as temperatures get lower and/or inoculum gets scarcer, progressively longer periods of wetness are required.

This same principle also holds true for infections of blossoms and young fruitlets. The current "best guess" (based upon controlled-environment experiments) is that about 12–24 hr of wetness are required to produce infections of sour cherry blossom at 60°F under typical field conditions, and this figure should be adjusted down or up according to temperature and relative inoculum availability . Also, sweet cherry and apricot blossoms appear to be more susceptible than those of sour cherry.

One last factor determining blossom blight development is the temperature/humidity con-

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dition following a possible infection period. Under experimental conditions, 'Montmorency' trees subjected to a standard infection period (high inoculum, 8 hr wetness, 68°F) developed anywhere from 5–90% blight, depending almost entirely on relative humidity during the next few days AFTER the infection period. In other words, rains during bloom followed the next day by wind and low humidity are fundamentally less dangerous than those followed by still air and mugginess.

Fungicide considerations. Three general fungicide categories for brown rot control: (1) Protectants (Captan, ferbam, Bravo, sulfur). Must be present before a wetting period occurs and need to be reapplied fairly regularly (depending on the material) if they are washed off by rain. (2) Dicarboximides (Rovral and Ronilan). Provide both protectant and limited systemic activity. They can stop blossom infections if applied within 24–48 hr after the start of an infection period and have some after-infection activity against fruit rot as well. Significantly, they also interfere with the production of brown rot spores from infected blossoms and fruit, so they are useful in slowing down the spread of an epidemic. However, because resistance to Rovral and Ronilan can develop after intensive use, we recommend using them only during the preharvest period unless an emergency or very high pressure situation occurs during bloom. No Ronilan on plums. (3) Sterol inhibitors (Funginex, Nova, and Orbit). Some of the same advantages (don't wash off, good post-infection activity) and disadvantages (limited residual protectant activity) as we've seen with SI's on apple scab. Orbit's the most active of the three, but isn't labeled on cherries; also, east of the Rockies it's labeled on plums but not on "prunes" (residues are legal, but there's some concern over plant growth regulator effects). Nova is labeled ONLY on cherries and peaches (including nectarines). NOTE THAT THE INCLUSION OF NOVA ON PLUMS/PRUNES AND APRICOTS IN THE CORNELL RECOMMENDS IS AN ERROR. Also note that Nova does a good job against blossom blight, but has provided relatively poor control of brown rot on sour cherry fruit in several trials that we have conducted.

Bottom line. Sanitation is important—orchards with plenty of mummies in the trees or lying on the ground will need more fungicides than those that have been cleaned up. If thinning peaches, do so before pit hardening. Determine the need for bloom sprays according to crop, the availability of inoculum, and weather. If you actually need a blossom spray, you probably need something more effective than sulfur; captan's decent under moderate pressure; the SI's are quite effective and provide kickback plus antisporulant activity; dicarboximides are recommended only in an emergency.

After bloom, provide protection through pit hardening if weather is wet. Sulfur, captan, and Bravo are the only choices during this period (no Bravo after bloom on plums or after shuck split on other stone fruits); Benlate and Topsin also are labeled, but don't count on 'em. Bravo is expensive but has relatively long residual activity, so a good shot at shuck split might carry you through to pit hardening, depending on subsequent rain intensity. Minimize injuries and treat as necessary during the last few weeks before harvest, using disease pressure and fungicide characteristics to guide specific decisions.❖❖

BLACK KNOT

❖❖ Black knot infections caused during the wet 1992 season are showing up now as ugly black knots (a disease name that makes sense!), both on plums and sour cherries. The fungus within these knots is now producing inoculum capable of causing further disease spread, so control measures are necessary to keep things from getting out of hand.

Remember that infections are caused by ascospores, which are ejected from fruiting structures embedded in the black knots on limbs. Ascospores are potentially available from green tip until early summer, although the peak period of spore discharge is in the petal fall to shuck split period. As with the apple scab fungus, spore release occurs only during rainy periods. The spores are then

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moved by wind currents, and require a period of free moisture to cause infection. There is no Mills Table for black knot, but the little data available indicate that very long wetting periods are required at temperatures below 50–55°F. On the other hand, infections can occur with only 6 hr of wetting at a temperature of 70°F.

Infections occur almost entirely on the young green twigs, but usually remain undetected during the first year. Typical swollen knots start becoming obvious the following season, then turn ugly and begin producing new inoculum 2 yr after infection.

The single most important procedure for black knot control is sanitation; i.e., prune out and destroy all visible knotted tissue in the early spring. Ideally, this should already be completed by now. Again, the ideal recommendation is to burn these prunings, but a realistic alternative is to chop them with a flail mower that strips the bark from the wood (the earlier that this is done, the better, so bark has a chance to decompose before there's too much new shoot tissue). All infected branches and limbs should be cut 6–8" below any visible swelling, since the fungus spreads out beyond the knot itself. There's no need to sterilize shears between cuts.

Fungicide sprays are effective in reducing the number of new black knot infections, but their effectiveness is strongly influenced by the inoculum load they've got to fight. Fungicide programs should concentrate on the peak danger period between white bud and shuck split, integrating these sprays with those for brown rot, which is generally favored by the same weather conditions. Captan, Benlate, Topsin, and Bravo have all been shown to provide some protection against black knot and are all labeled on plums. Dave Rosenberger has shown that Bravo is particularly effective, probably because it is retained on the tree so well, but it cannot be used on plums after petal fall.❖❖

DON'T MISS OUT

LAST CALL
(Art Agnello)

❖❖ The registration deadline for the Cornell In-Depth Fruit School on High Density Apple Planting Systems on August 2–4 technically expired yesterday, 5/1. However, because we didn't completely fill all the available spaces and would like to see as many people as possible attend, we have decided to extend the registration process for another 2 weeks, until Monday, May 16. If a sufficient number of people have not enrolled by this date to justify the effort, the Organizing Committee has decided to cancel this school until another year, and return all registration fees collected thus far. We are reprinting the following information on this function for those who may have missed it:

The Cornell Cooperative Extension Fruit Industry Workgroup is holding a 3-day In-Depth Fruit School on the Geneva campus from August 2–4, on "Apple Planting Systems: How Fast and How Far?" The goal of this course is to provide horticultural and economic information to improve growers' horticultural skills and enable them to choose a profitable planting system suited to their situation. This is one in a continuing series of Cornell Fruit Schools, and is being offered in response to requests from New York apple growers who have a need for an intensive course on the fundamentals of contemporary high-density apple planting systems. Topics will be presented in the form of lectures and panel discussions, supplemented by daily field labs and demonstrations in nearby orchards. Registration is $150 for N.Y. residents, $200 for all others; enrollment deadline May 16. For more information or to register, contact Art Agnello (addresses & numbers given at the end of this letter).❖❖

INSECT TRAP CATCHES (Number/Trap/Day)

Geneva NY

	4/25	4/28	5/2
Green fruitworm	0.2	0	0
Pear psylla adults	0	0	0.05
Pear paylla eggs	4.3	4.0	1.9
Pear psylla nymphs	0	0	0.1*
Redbanded Leafroller	0	0	0
Spotted Tentiform Leafminer	277	542	274

HVL, Highland NY

	4/25	4/29	5/2
Green fruitworm	0.4	0	0
Pear psylla adults	2.8	–	–
Pear psylla eggs	–	–	–
Redbanded Leafroller	0.5	4.4	1.7
Spotted Tentiform Leafminer	2.8	10.4	19.2
Oriental Fruit Moth	–	1.0*	6.5
Fruitree Leafroller	–	0.1*	0

* = 1st catch

(Dick Straub, Peter Jentsch)

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations		
(Geneva 1/1 – 5/2):	257	130
(Highland 1/1 – 5/2):	402	208

Coming Events:	**Ranges:**	
Comstock mealybug 1st crawlers	220–425	82–242
Lesser peachtree borer 1st catch	224–946	110–553
Oriental fruit moth 1st catch	208–587	79–338
Redbanded leafroller 1st flight peak	180–455	65–221
Spotted tentiform leafminer 1st oviposition	141–319	48–154
Spotted tentiform leafminer 1st flight peak	180–375	65–192
Rosy apple aphid nymphs present	91–291	45–148
Green apple aphid nymphs present	127–297	54–156
Tarnished plant bug adults active	71–536	34–299
Lesser appleworm 1st catch	135–651	49–377
Pear thrips in pear buds	137–221	54–101
Obliquebanded leafroller larve active	149–369	54–196
European red mite egg hatch	157–358	74–208
Predator mites observed	218–396	92–212
McIntosh at pink	258–319	113–154
Pear at white bud	217–423	99–217
Peach at shuck split	362–518	174–287
Plum at green cluster	170–282	75–138
Sweet cherry at petal fall	257–448	131–251
Tart cherry at bloom	257–448	131–251

PHENOLOGIES

Geneva:
Apple(McIntosh) - **Early pink**
Pear - **Green cluster** ; Tart cherry - **White bud** ; Sweet cherry - **Bloom** Peach - **Bloom** ; Plum - **Bud burst**
Highland:
Apple (McIntosh): **King bloom (4/30)**
Pear (Bartlett): **Full bloom (5/1)**
Plum (Stanley): **Full bloom (4/30)**

PEST FOCUS

Geneva:
Pear psylla eggs hatching
Spotted tentiform leafminer adults flying

Highland:
Pear psylla eggs hatching
Flea beetles in apple

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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