scaffolds Update on Pest Management and Crop Development

FRUIT JOURNAL

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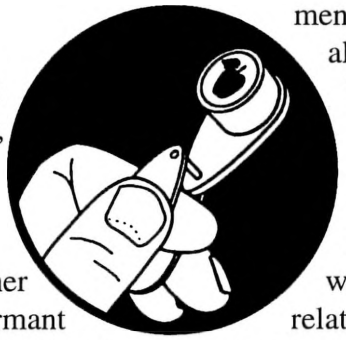
DISEASES

Cu SOON

RISKS AND BENEFITS OF COPPER SPRAYS

(Dave Rosenberger, Plant Pathology, Highland)



❖❖ Copper sprays applied either at leaf fall in autumn and/or as a dormant spray in spring have been very effective for controlling bacterial canker on sweet cherries in the Hudson Valley. However, at least one grower has stopped using the spring application because of concerns that copper residues were reducing fruit set on the treated cherry trees. Copper is toxic to pollen, and the earlier flowering date for cherries as compared with apples increases the likelihood that copper residues from spring applications could interfere with pollination. Thus, cherry growers may wish to use fall copper sprays rather than spring applications to control bacterial canker. For spring applications on cherries, copper should be applied at the lowest labeled rate to minimize possible interference with pollination.

A copper spray applied at the Green Tip bud stage has been recommended for more than 40 years as a part of a fire blight control strategy for apples and pears. As noted in last week's issue of "Scaffolds", copper sprays also have been used to reduce the incidence of a canker problem that is apparently associated with winter injury on the 'Marshall' strain of McIntosh. However, copper sprays can cause fruit russetting on apples and pears, so copper sprays should be used with caution. Researchers generally agree that the Green Tip copper spray reduces the amount of inoculum that is produced by overwintering blight cankers. However, a review of experiments performed by various researchers all over the U.S. reveals that the Green Tip copper spray has performed very inconsistently. In some cases, the Green Tip spray had almost no effect on subsequent development of fire blight, whereas in other cases it was very effective. Variability may be related to specific weather conditions during the tests, the amounts of copper residues remaining in the trees several weeks after application when blight cankers become active, and the sources of inoculum that contributed to the fire blight epidemics in the various tests. In some experiments, the effectiveness of copper sprays in small test plots may have been confounded by bees and other insects that could have carried inoculum from untreated plots into the treated plots during bloom.

Despite variable results in experiments with copper sprays, the tree fruit specialists in New York believe that the Green Tip copper spray is a valuable tool for controlling fire blight. This spray is included in Cornell's "Pest Management Recommendations for Commercial Tree Fruit". The Green Tip copper spray is not a substitute for appropriate applications of streptomycin during bloom, but orchards sprayed with copper are likely to have less blight than comparable orchards where the copper spray is omitted.

When deciding whether or not to apply a Green Tip copper spray, growers must consider the fact that this copper spray has contributed to severe fruit russetting in some years. In 1990, up to 65% of fruit in several Hudson Valley orchards were out of grade because of russet. Where fruit russetting has occurred, one or more

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of the following have been implicated as contributing factors:

• Copper sprays were applied after Green Tip. As trees approach Half-Inch Green, the expanding buds trap and hold more copper. As a result, copper residues remaining in the tree at the Tight Cluster and Pink bud stages can be high enough to cause phytotoxocity.

• Less than 2.5 inches of rain occurred between the copper applications and the time trees reached Tight Cluster. Copper residues were not adequately weathered by Tight Cluster.

• Sprayers were not properly calibrated and application rates were too high.

• Spring frosts occurred just before or after copper applications. As plant cells freeze and thaw during spring frosts, copper ions may get pulled into cells and cause more damage than they would in the absence of frosts.

To minimize the likelihood that copper sprays will cause fruit russetting, the following precautions are recommended:

1. Use copper sprays only on Marshall Macs (to prevent Marshall Mac canker) and on other apple and pear blocks that had fire blight during the previous 2–3 years. Copper helps control fire blight by reducing inoculum from overwintering cankers. There is no reason to use copper where blight has never been a problem (except in the case of newly planted trees as described below).
2. Apply copper sprays no later than Green Tip.
3. Calculate rates carefully using tree-row-volume calculations to determine appropriate rates for small trees.
4. Use the low end of the range of labeled rates, especially in years when spring is late and trees may move very rapidly from Green Tip to Bloom.
5. Avoid applying copper just before predicted frosts or within several days after frosts have occurred.

There is a small possibility that fire blight bacteria can be moved in symptomless nursery trees if the nursery trees are grown in regions where fire blight is prevalent in the surrounding orchards. Streptomycin-resistant strains of the fire blight bacteria have been identified in most fruit-growing regions west of New York and Pennsylvania. To minimize the likelihood that streptomycin-resistant fire blight will be introduced into New York on nursery stock, we recommend that all newly planted apple and pear trees receive two applications of copper in the year they are planted and again the following year. The first application should be made at bud-break and the second should be made about the time the trees would be in bloom. (For newly planted trees, this will be somewhat later than the time that established trees are blooming.) The rate of copper applied to newly planted trees should be reduced to avoid stunting them. The label for COCS specifies 1/4 pound per 100 gallons for sprays after Green Tip, and that rate should be adequate for newly planted trees. Copper applications during Bloom can induce severe fruit russetting, but this is of no concern on newly planted trees because the trees should usually be defruited anyway.❖❖

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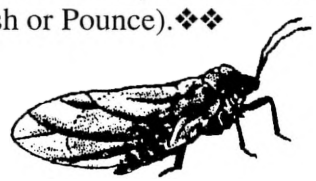
INSECTS

SPRING JACKET

OIL OF NO-LAY
(Art Agnello, Entomology, Geneva)

❖❖ We're quickly approaching the prime period of awakening for pear psylla in the region, which means that the rite of spring dealing with the first oil spray is also quite near. Early oil sprays can be very beneficial against pear psylla until the swollen bud stage, not to kill the adults, but to inhibit their egg-laying activity. This approach is particularly advisable in years when their early activity is drawn out because of persistent cool and wet spring weather, a distinct possibility this year judging from the weather patterns so far. The basic strategy is to buy some time before applying an insecticide spray. Oil rates depend on when you start: If your buds are at the dormant stage, one spray of 3% oil, or (to hedge your bets against uncertain weather trends) two of 2% through green cluster are recommended; if you start at swollen bud, one spray at 2% or two at 1% up to white bud should be adequate for this purpose, especially if applied as soon as the psylla become active (50°F or above). This will also give some red mite control at the same time.

A word regarding contact materials for psylla at white bud: First of all, Mitac can be used nearly anytime during the season, of course, but we still feel it may be advisable to "save" it for postbloom and use something else at white bud, if you so elect. Research and grower experience tells us that resistance to pyrethroids exists, that it is highly localized (your psylla may be resistant, but not your neighbor's), and that cross-resistance may or may not be involved (what happens with Asana may not necessarily happen with Ambush or Pounce).❖❖



WHAT'S THE BUZZ?

SONG OF THE SOUTH: INVASION BY THE PERIODICAL CICADA
(Dick Straub, Entomology, Highland)

❖❖ Brood II of the periodical cicada (a.k.a. 17-yr locust), *Magicicada septendecim*, is scheduled to reappear this spring. Distribution of Brood II is throughout the Northeast, but its occurrence in New York State is limited primarily to the lower Hudson Valley. If you recall the last emergence in 1979, this unique insect was present in astounding numbers and made a lot of noise, reminding us for at least a month or so, that biodiversity was alive and well. We received numerous calls from homeowners who were curious, but some were actually frightened by the sudden appearance of these creatures. Given the size of the cicada (ca. 1.5 inches long), the reaction was perhaps understandable. Beyond that, however, cicada adults wreaked havoc on young peach and apple trees located in heavily infested areas. Although many fruit, forest and ornamental trees are susceptible to damage, commercial apple is especially hard hit because of relatively large blocks with succulent growth that is particularly attractive to resident and immigrating cicadas.

After the unusually long developmental period on roots, larvae emerge from the soil, attach to tree trunks or other supports, and shed their last larval skin to become pre-reproductive adults. There are reports of 20,000 or more larvae emerging from the roots of a single large tree. Occurrence begins around the Petal Fall period of McIntosh (15 May) and persists until the end of June, with peak emergence during the first two weeks of June. Adult cicadas do not feed on trees; damage is a result of the gross tearing or ripping of bark by their ovipositor during the egg-laying process. Tissue above these sites usually dies or grows abnormally and must be

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removed by pruning. Adult longevity is from 4–10 weeks, of which only 1–2 weeks is spent ovipositing. A single female may lay 400–600 eggs, usually not more than 15 per ovipositional site, so they have the potential to affect a lot of new growth.

Newly planted trees in particular are at risk from cicada because they can ill afford the loss of potential scaffold limbs. Mature trees, having numerous shoots that serve as ovipositional sites, are less at risk because they can better tolerate the damage and any pruning that may result. Although not discussed in the historical literature, we have reason to believe that the long-term establishment on roots by large numbers of cicada larvae have chronic effects on tree performance. Apple roots we excavated from a number of infested sites during 1993–95 displayed long channels and scarring resulting from the feeding of numerous larvae. We suspect that "seedling" rootstocks with vigorous and extensive root systems can tolerate such damage, but that the performance of varieties on dwarfing rootstocks may be affected.

Although birds are efficient predators of cicada adults, in most instances they are not numerous enough to significantly reduce high cicada populations below damaging levels. At sites where non-bearing trees or high-density systems are located, treatment with insecticides may be advisable. Field and laboratory trials performed by Rick Weires and myself in 1979 highlighted a number of facts concerning the management of cicada by insecticides:

• In laboratory bioassays, the pyrethroid fenvalerate demonstrated quick knockdown and immobilization of adults, but when the cicada was isolated from the residue, it usually recovered within 4 hours.

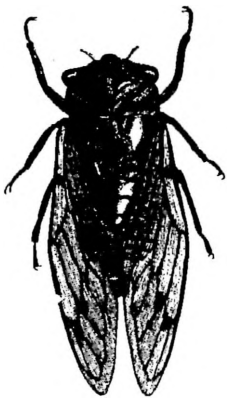
• None of the numerous insecticides tested provided adequate protection of apple trees within reasonable application intervals. Under severe pressure from mobile female cicadas, residual activity of even the best materials persisted no longer than 3–4 days.

• Behavioral reactions to fenvalerate resulted in the avoidance of residues and prevented oviposition. These non-lethal residues can contribute to the total effect of crop protection.

Fenvalerate (Pydrin), as you recall, was the forerunner of esfenvalerate (Asana). We have every reason to believe that esfenvalerate will perform as well as or better than did fenvalerate. Presented below is a three-spray treatment scenario designed to blanket the ovipositional period and to minimize damage by cicadas. Although I am convinced that esfenvalerate is the most effective material, we all know of its propensity to flare mites. The alternatives proposed will lessen this phenomenon, but they likewise may have some deleterious effects on mite predators and bio-based mite management efforts.

- 20 May: esfenvalerate
- 30 May: esfenvalerate or carbaryl
- 10 June: esfenvalerate or oxamyl or methomyl

I again emphasize that this protocol may only minimize damage, not eliminate it. In making treatment decisions, growers will have to consider the extent of cicada infestations or damage, the age and size of trees, the rootstock and the potential effects on mite management programs. Damaged wood should be eliminated by pruning before eggs begin to hatch ca. 20 July. Because eggs within excised wood may still hatch and ultimately infest roots, prunings should be removed from the orchard.❖❖



PEST FOCUS

Highland: Pear psylla adults active, laying eggs

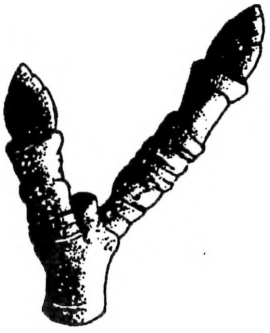
PHENOLOGIES

Geneva, Highland:
Apple - **Dormant**
Pear, cherry - **Dormant**
Peach, plum: **Dormant**

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1 - 3/25):	32	6
(Highland 1/1 - 3/25):	91	24

Coming Events:	**Ranges:**	
Green fruitworm 1st catch	41–143	9–69
Pear psylla adults active	2–121	0–49
Pear psylla 1st oviposition	25–147	1–72
McIntosh at silver tip	56–137	17–58



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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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