scaffolds

Update on Pest Management and Crop Development

FRUIT JOURNAL

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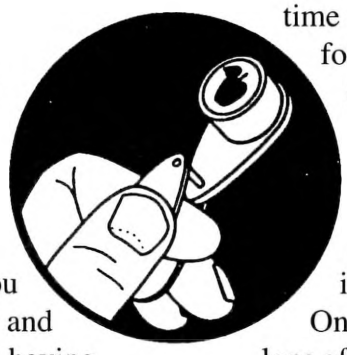
INSECTS

ONE FOR THE AGUES

IN PRAISE OF LIQUID DINOSAURS (Art Agnello, Entomology, Geneva)



❖❖ Depending on how you view these things, the mild winter and early spring weather we've been having should be causing either panic at the imminent approach of April mayhem, or else relief at being able to actually see evidence of some life in your orchard. Regrettably, those life signs also extend to pestiferous organisms, just so you know there's some symmetry in the universe.

As in the past 100 years or so, this would be an appropriate time to consider the uses of horticultural mineral oil against your spring pests, a traditional option that continues to be a wise tactic, despite the fact that a number of newer and capable contact pesticides are available for early season use today.

In the Beginning

It's clear from a reading of early literature that knowledge of petroleum's existence as a substance from the Earth dates back at least to the 1st century AD. The writings of Pliny the Elder *make mention of* petroleum as an 'inflammable mud' from a marsh in Samosata, on the west bank of the Euphrates River in southwestern Turkey. He reported that 'When this touches anything solid it sticks to it.' There is also a passage regarding naphtha as being a similar substance that flows out like 'liquid bitumen'. Although he gives no direct evidence of being aware of its value as a pest control substance, there are indications that Roman citizens of his time were on this track in their early efforts to eliminate pests of the home orchard, vineyard and garden.

Insects reportedly affecting fruit trees and vines included 'worm-disease', 'wood-maggots', horned insects and leaf-rolling caterpillars. One remedy was to boil down two gallons of the lees of olive oil and mix it with a third part of bitumen and a quarter part of sulfur. This, it was cautioned, must be done in the open air because the mixture could catch fire indoors. The preparation was to be smeared around the bases and under the arms of the vines, which would 'prevent the caterpillar'. Ants were kept away from trees by smearing the trunks with a mixture of red earth and tar. From these recommendations, it is apparent that the protective qualities of complex hydrocarbons were already being examined nearly 2000 years ago. (However, it must also be noted that this was an era of certain pest-mitigating tactics that relied

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more on traditional lore than empirical proof. To protect the tops of the trees against caterpillars and pests that produce decay, Pliny advised touching them with the gall of a green lizard. It was also said that caterpillars could be totally exterminated in gardens by fixing up on a stake the skull of a female animal of the horse class, or a river crab hung up in the middle of the garden. But I digress.)

For as many of the blocks as you can find the time and application window to devote to a thorough treatment, oil retains a justifiably preferred position because of its effectiveness, affordability, and relative safety from a biological and pesticide resistance perspective. Exploiting the most acceptable spraying conditions to maximize tree and block coverage can be a challenge in our area, but few pest management efforts have such potentially high returns when everything falls properly into place.

Pear Psylla

After a few teaser days of sunny and warm weather, I know that psylla eggs are already present, as it's nearly impossible to be sure your pear trees are all protected by the time the very first psylla adults start flying and (presumably) ovipositing. However, even a few nice warm days in a row don't awaken more than a small percentage of the total population, so you'll be more than adequately psylla-ready if you prepare a little ahead of time, once the waters recede, of course.

Early oil applications can be useful against pear psylla all throughout the swollen bud stage; although it's capable of killing adults and nymphs that are contacted directly, oil is recommended mainly because the residue has a repellent effect on adult females looking to deposit their eggs, and this *lasts* for an extended period after treatment. The strategy behind the use of oil is to delay the timing of any needed insecticide spray until as late as possible before (or after) bloom. Oil rates depend on when you start: If your buds are at the dormant stage, one spray of 3% oil, or 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.

European Red Mite and the Book of Chapman

The following advice is pretty much unchanged from what I print every spring, which shows the durability of not only the information developed from Paul Chapman's original research, but also of a crop protectant that's still as good as it used to be:

A delayed-dormant spray of petroleum oil from green tip through tight cluster can be a favored approach for early season mite control, both to conserve the efficacy of and to help slow the development of resistance to our contact miticides. Our standard advice has been to try for control of overwintered eggs using 2 gal/100 at the green tip through half-inch green stage, or 1 gal/100 at tight cluster; this assumes ideal spraying conditions and thorough coverage. Naturally, real life doesn't always measure up, mainly because of weather and coverage challenges, coupled with the difficulty of

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getting to a number of blocks during this transient window. It is possible for mites to start hatching when the trees are at solid tight cluster, so the suffocating mode of action tends to be compromised if the nymphs are able to wade through or avoid the droplets. Let practicality determine how best to use the following guidelines.

First, to be sure that mites are in the egg stage, start on your blocks as soon as the weather and ground conditions permit, even if this means using a higher rate. Depending on how heavy snowfalls have been in certain locations, local conditions will be a prime determinant of how easily you can get through the rows early on. Also, tend toward the high end of the dosage range, especially if there's been no frost during the 48-hour period before your intended spray, and no danger of one for 24–48 hours afterwards. For example, use 1.5 gal/100 if the buds linger somewhere between half-inch green and full tight cluster during your chosen spray period.

Naturally, good coverage of the trees is critical if you're to take advantage of oil's potential efficiency; this in turn requires adequate spray volume delivered at an appropriate speed. Experience and research have shown that a 1X concentration (300 gal/A) in larger trees is clearly preferable; however, if all other conditions are optimal (weather, speed, calibration), then 3X, or 100 gal/A, is the highest concentration that should be expected to give acceptable control at any given time. Growers like to concentrate more than this to save time and the hauling of extra water, but reducing coverage too much can wipe out your efforts if you end up getting only a *small fraction* of the egg population under the residue.

Don't limit this mite-control tactic just to apples and pears. Talks with stone fruit growers recently have reminded us that many cherry, peach and plum plantings can suffer equally serious European red mite infestations that weren't given the early season attention they might have needed. We don't have hard and fast threshold guidelines for these crops, but stone fruit plantings with a history of past ERM problems should be examined for presence of the red overwintered eggs, and if they're numerous enough to see without a hand lens, then a prebloom application of 2% oil would be a prudent measure to help stave off this damage, particularly if your fungicide program at this time doesn't present any compatibility problems.❖❖

ONE STEP AHEAD

UREA FOR SCAB INOCULUM REDUCTION IN PROBLEM ORCHARDS?

Dave Rosenberger, Plant Pathology, Highland

DISEASES

❖❖ A year ago I suggested that growers who experienced apple scab control failures in 2004 should consider inoculum reduction strategies prior to the 2005 spray season. (See Scaffolds 14(1):3–5 or http://www.nysaes.cornell.edu/ent/scaffolds/2005/050321.html#disease). Many fruit growers from within New York State as well as from other states told me during winter meetings that they had applied urea sprays prior to the 2005 season. Most felt that it really helped them to regain control of apple scab, but it is always difficult to determine if improved control resulted from their inoculum reduction practices or from other changes in weather and/or spray programs in 2005.

Some growers who successfully utilized urea sprays in spring of 2005 have asked if they should repeat the urea applications again in spring of 2006. The answer is that inoculum reduction practices are of no value in orchards that were scab-free the previous season. Thus, inoculum reduction treatments for apple scab are somewhat similar to getting medical care at an emergency room: They are last resort options that are chosen only under dire circumstances and when immediate correction/attention is needed.

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Where scab was severe in 2004 but was controlled in 2005, growers should be able to resume spray programs typically used in low-inoculum orchards. If the scab failure in 2004 was triggered by SI-resistant scab, then control programs for 2006 and beyond will always need to be more conservative than in orchards where SI fungicides are still working. Nevertheless, the biggest hurdle following a scab control failure is reestablishment of low-inoculum conditions. Once that task has been accomplished, maintaining scab control is much easier than in high-inoculum orchards.

For orchards with SI-resistant apple scab, the most critical factor in achieving good scab control is ensuring that the first fungicide is applied BEFORE the first scab infection period. Copper applied for fire blight control will suffice as the first fungicide, or a mancozeb spray at 1 lb/100 gal will provide good protection against green tip sprays. So long as early-season scab infections are prevented, major economic losses are unlikely in low-inoculum orchards.

For orchards where scab was noticeable at harvest in 2005, growers may wish to consider the options for scab inoculum reduction that we outlined in the Scaffolds article last year: Overwintering scab inoculum can be significantly reduced either by applying a urea spray sometime before greentip or by shredding leaf litter with a flail mower. Urea works by stimulating microbial breakdown of overwintering leaves and by softening leaves so that they can be removed more quickly by earthworms that feed on the leaf litter. Urea may also directly suppress ascospore formation in the surviving leaf litter. Shredding leaf litter with a flail mower causes leaves to decay more quickly and also reorients much of the leaf litter so that ascospores released from those reoriented leaf pieces will discharge into the ground rather than into the air. In a study in New Hampshire, either of these sanitation measures (spring urea sprays or flail chopping leaves in spring) could reduce ascospore production by 70–80%.

When using urea for inoculum reduction, treat each acre of orchard with 40 lb of urea fertilizer dissolved in 100 gallons of water. Applications can be made either with air blast sprayers that have the upper nozzles turned off or with boom sprayers rigged to spray both the sodded row middles and the areas beneath the trees. The portion of the urea spray that falls within the herbicide strip beneath the tree canopy (or inside the drip-line) will ultimately contribute to nitrogen fertilization of the trees whereas the portion of the spray that is applied to the sodded row middles will be utilized primarily by the ground cover. Nitrogen fertilizer rates should be adjusted accordingly for orchards where urea applications are used for scab control.

Effective leaf shredding can be accomplished only with a flail mower that is set low enough to contact leaf litter on the orchard floor. If the flail mower cannot be offset to reach most of area beneath trees, then leaf litter beneath trees should be blown or raked into the sodded row middles where it can be accessed with the flail mower. Mechanical brush rakes can remove leaf litter from beneath trees if the orchard has a relatively clean herbicide strip. Flail mowers used to chop prunings should shred leaf litter at the same time if the flails are adjusted to cut low enough. However, low mowing in early spring can remove most of the overwintering sod cover, thereby increasing potential problems with mud and equipment traction at the time when early sprays will need to be applied.

Sanitation measures applied to high-inoculum orchards will provide the following benefits:

1. Reducing inoculum reduces risks of getting green tip infections. These early infections begin sporulating as trees approach bloom, just at the time that terminal leaves and fruitlets are approaching peak susceptibility to scab. Only a small proportion of ascospores are usually mature enough for release at green tip, but that small proportion can still be a huge number in high-inoculum orchards.

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High-inoculum orchards subjected to urea sprays or leaf shredding will behave more like "normal" orchards vis-à-vis risks of green-tip scab infections.

2. Protectant fungicides such as mancozeb and captan work better in low-inoculum than in high-inoculum orchards, especially if foul weather prevents perfect spray timing.

3. Reducing inoculum reduces selection pressure for resistance to the strobilurin fungicides (Sovran, Flint) and the anilinopyrimidine fungicides (Vangard, Scala) if those fungicides are used during the prebloom period.

Using a urea spray or leaf shredding prior to bud break will not eliminate the need for protectant sprays beginning at green tip. Sanitation measures that reduce overwintering inoculum levels are therefore a supplement to, not a replacement for, effective spray programs during the prebloom period.❖❖

PHENOLOGIES

Geneva:
Apple (McIntosh): Silver tip
Apple (Red Delicious): Silver tip
Apple (Empire): Silver tip
Pear (Bartlett): Swollen bud
Plum: Dormant
Peach: Swollen bud
Sweet cherry: Swollen bud
Tart cherry: Swollen bud

Highland:
Apple (Ginger Gold): 1/4" green
Apple (McIntosh): Green tip
Apple (Red Delicious): Green tip
Pear (Bartlett, Bosc): Late swollen bud
Peach: 1/4" green
Plum: Swollen bud
Apricot: Bud burst

FIELD NOTES

HUDSON VALLEY

APPLE SCAB
ASCOSPORE
MATURITY
SQUASH MOUNT
ASSESSMENT

Highland, NY March 30 Macs 10% green tip: 99% immature spores, 1% mature spores, no discharge in spore tower.
Highland, NY April 3 Macs Quarter-inch green: 92% immature spores, 8% mature spores, 76 spores discharged in spore tower.

❖❖ Three days of warm weather (upper 60's °F) between March 30 and April 3 along with warm rain on 1 April contributed to rapid spore development. Spore maturity of 8% is still slightly below the 12–15% that I use as an action threshold for "clean" orchards, but scab is definitely "on the move." Cold rains are predicted for the next several days in the Hudson Valley. Because the predicted wetting period will involve temperatures in the low 40's (°F) and because ascospore maturity is still below threshold, I do not believe that significant scab infections are likely for orchards that had no visible scab last fall. However, the first fungicide should have already been applied to orchards that were not "scab-free" last fall and to orchards next to abandoned blocks that can provide scab inoculum. ❖❖

PEST FOCUS

Geneva:
Green fruitworm and **redbanded leafroller** flights began today.

Highland:
Green fruitworm trap catch increasing. **Pear psylla** egg laying increasing.

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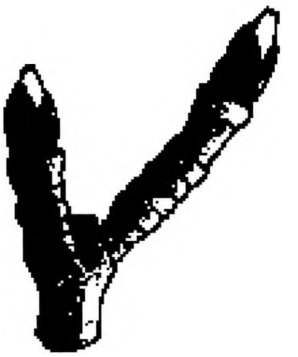

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–4/3/06):	120	40
(Geneva 1/1–4/3/2005):	41	10
(Geneva "Normal"):	86	37
(Geneva 1/1–4/10 Predicted):	137	44
(Highland 3/1-4/3/06):	102	47

Coming Events:	Ranges(Normal±StDev):	
Green apple aphids present	111–265	38–134
Rosy apple aphid nymphs present	134–244	56–116
Pear thrips in pear buds	118–214	50–98
Spotted tentiform leafminer 1st catch	112–236	39–113
McIntosh at green tip	93–145	36–62

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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