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Update on Pest Management and Crop Development

FRUIT JOURNAL

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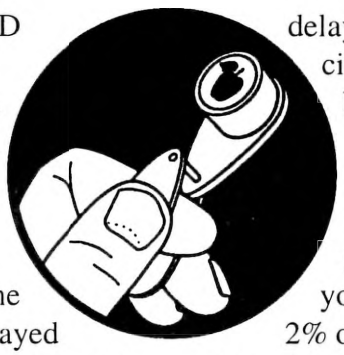
INSECTS

AIN'T THAT SLICK?

SATURATED BONDS
(Art Agnello, Entomology, Geneva)



❖❖ We used to think that the popularity of petroleum oil as a delayed dormant application for mite and insect control was in decline in recent years, mainly because of the flush of effective early season miticides currently being developed and marketed for apples. However, horticultural mineral oils have been in use as crop protectants for over 100 years, and some traditions hold on for good reasons — for instance, oil is still relatively inexpensive, highly effective when applied properly, and virtually resistance-proof among the various tools we use against mites and psylla in N.Y. For these reasons, there is still justifiably wide use of oil during the early season in many growers' orchards, and the advice behind its use is still applicable, if familiar to many.

Pear Psylla

We weren't out there personally to witness it, but it's a pretty good bet that psylla adults have been active since the warm temperatures of early March, and have already started to lay eggs on those pear buds not yet covered by a protective oil spray.

Early oil applications can be very useful against pear psylla all through the swollen bud stage; although it's capable of killing adults and nymphs that are contacted directly, oil is used chiefly because the residue causes a reduction in egg-laying 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

Despite the newly acquired prebloom miticides that are now available for apples, a delayed-dormant spray of petroleum oil from green tip through tight cluster can be a preferred approach for early season mite control, both to

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conserve the efficacy of and to help slow the development of resistance to our contact miticides. Technically, we have always advised that it is possible to get good 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 advice assumes ideal spraying conditions and thorough coverage. As we all know, oil applications don't always live up to our expectations, not only because of weather and coverage problems, but also because proper timing is difficult, especially if there are a number of blocks to cover during this transient window. That is, we have seen mites start to hatch when the trees are at solid tight cluster, so naturally the oil loses its ability to smother mites that are able to avoid (or trudge through) the droplets. For practicality's sake, there are a couple of guidelines to follow.

First, to ensure 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. Fortunately, the low amount of snow and rain this winter has resulted in firmer orchard floors this spring, so although we may have to deal with droughty conditions later this season, you might as well take advantage of the positive side effects now by getting in some early sprays where possible. 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. A compromise that might be worth making is to use 1.5 gal/100 if the buds linger somewhere between half-inch green and full tight cluster during your chosen spray period.

Good coverage of the trees is naturally 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 the problems this can cause usually aren't worth the tradeoff.

Rosy & Jose

It was a common belief that San Jose Scale might actually be retired as a regular pest of N.Y. apples, but a small and determined group of populations scattered here and there refuses to be written off, and it's clear that they aren't gone yet (see following article). In this case, a 2% oil treatment at half-inch green will control the nymphs, and this is a preferred treatment if no other problem insects need to be controlled. Combining the oil with an insecticide has not been shown to be more effective than using the oil or insecticide alone. If you choose not to use oil against the scale nymphs, or if you have Rosy Apple Aphid or other early season insects to be controlled, an insecticide would be more appropriate. For both of these pests, Lorsban 4EC or Supracide (2EC or 25WP) have proven very effective during the green tip to tight cluster stage. Check the opening buds for infestations of Rosy Apple Aphid; treatment would be advisable upon finding one colony per 100 clusters.❖❖

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Dept. of Entomology
NYSAES, Barton Laboratory
Geneva, NY 14456-0462
Phone: 315-787-2341 FAX: 315-787-2326
E-mail: ama4@nysaes.cornell.edu

Editors: A. Agnello, D. Kain

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THEY'RE BAAACK!

SAN JOSE SCALE
(Dick Straub, Entomology, Highland)

❖❖ A number of growers throughout the state are experiencing a rebirth of problems with San Jose scale (SJS). This shouldn't be surprising because the current luxury of having three efficacious postbloom miticides has resulted in the virtual abandonment of dormant oil sprays that formerly controlled or suppressed overwintered SJS populations in eastern N.Y. Although SJS may have three generations per season in warmer climes, N.Y. growers contend with only two generations. SJS overwinters on bark as 1st instar nymphs ("black-caps") and development resumes as temperatures exceed 10°C (50°F). Females do not deposit eggs, but rather produce live crawlers within 4–6 wk following mating — usually about 3 weeks after petal fall.

Infestation of the fruit induces local red to purple circular lesions around the sites of feeding. Growers who have an SJS problem will have noticed it sometime during late summer, or certainly at the packing line. Hopefully, the blocks from which the infested fruit originated were noted and the records kept for reference. Infestations tend to occur from a focus of a single tree, spreading to neighboring trees within the row. Spot treatments within and surrounding an infested area are often adequate to check this pest. If prebloom treatments (oil, Lorsban or Supracide) were not accomplished, three treatment scenarios utilizing either Lorsban or Provado may be used:

- Sprays against 2nd generation crawlers ~3 weeks after petal fall (500 DD [base 50°F] accumulation starting 1 March), followed by another spray 7–10 d later. In heavily infested blocks, additional sprays may be necessary against 2nd generation crawlers at 1450 DD [base 50°F] and 7–10 d later.
- If pheromone-baited traps are used, the double spray scenario above should be used against each generation (310 DD after first male catch of 1st generation; and 400 DD after first male catch of 2nd generation).
- Crawlers may be monitored by affixing sticky tape around a number of randomly selected limbs throughout the block (suggested action threshold: 1–2 crawlers/trap).

Obviously, each scenario has windows within which SJS will be impacted by treatments for other pests – Provado and Lorsban are often applied for other insects such as leahoppers, aphids, leafminers or leafrollers. In such cases, specific sprays for SJS may not be necessary during each generation of this pest.❖❖

PEST FOCUS

Geneva:
1st catch of **green fruitworm**.

Highland:
1st catch of **spotted tentiform leafminer**. **Aphids** observed on apple buds.

PHENOLOGIES

Geneva,
Apple (McIntosh): green tip
Apple (Red Delicious): early green tip
Pear (Bartlett): swollen bud
Tart cherry (Montmorency): swollen bud
Sweet cherry: swollen bud
Peach: green tip
Plum: swollen bud

Highland:
Apple (McIntosh): 1/2 inch green
Pear (Bartlett): swollen bud
Peach: green tip

DISEASES

BLACK & WHITE

BLACK ROT CANKERS AND WHITE ROT CANKERS

Dave Rosenberger (Plant Pathology, Highland)

❖❖ Some apple growers in eastern New York are noting more than the usual number of canker problems in their orchards this spring. The only "cure" for large cankers is to prune them out. However, early season spray programs may reduce the potential for at least one kind of canker disease. Growers and consultants should be aware of early indications that orchards may be at risk for white rot canker. Some adjustments in prebloom spray programs may be appropriate for blocks where white rot lesions have become established.

The two most common apple cankers in New York are black rot canker caused by *Botryosphaeria obtusa* and white rot canker caused by *Botryosphaeria dothidea*. Both of these fungal pathogens can also cause fruit rots during summer. However, in northern growing regions (e.g., New York, New England, Michigan) there is no apparent linkage between incidence of the canker diseases and incidence of the fruit rot diseases. Orchard conditions that favor canker development do not necessarily favor development of fruit rot diseases, nor is there evidence that fruit rots contribute to canker development.

During the first three-quarters of the 1900's, the problem of black rot cankers was addressed by numerous researchers in the northeast, whereas white rot canker was considered a "southern" problem. In the 1980's, Dr. Jim Travis and co-workers at Penn State showed that white rot canker was causing tree decline in parts of Pennsylvania. White rot cankers were subsequently found in some Hudson Valley orchards as well.

It is not always easy to tell the difference between black rot and white rot cankers, but there are some characteristic differences. Black rot cankers are usually initiated at pruning cuts, *whereas* white rot cankers may be initiated in unwounded bark on trunks and scaffold limbs. Black rot cankers have distinct margins, and the bark and cambium within the canker margins are completely killed (Fig. 1).

Fig 1. Typical black rot canker developing around a bench cut.

White rot cankers frequently begin as depressed areas in the bark with less clearly defined margins. Green cambium is often evident beneath superficial white rot lesions (Fig. 2). Bark areas affected for

Fig. 2a. Sunken bark typical of a superficial white rot lesion.

Fig. 2b. Necrosis and necrotic flecking develops beneath lesions.

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several years may develop large wart-like structures surrounding lenticels (Fig. 3). The superficial white-rot lesions do not seem to cause economic damage until the trees become drought stressed. Under drought stress conditions, the white rot fungus penetrates through the cambium and the resulting cankers suddenly become obvious. In some cases, white rot cankers that develop during summer may ooze, almost like active fire blight cankers.

Fig. 3: Large "warts" may develop in bark areas affected by the white rot fungus.

Field observations in New York suggest that black rot cankers develop primarily on trees where xylem tissue has been sequentially damaged by cold injury and by basidiomycete wood-invading fungi such as *Schizophyllum commune* and *Trametes versicolor*. The wood-invading fungi follow saprophytic yeasts and bacteria into pruning cuts where they colonize, discolor, and soften the old wood in the center of trunks and limbs. Healthy trees create chemical and physical "barrier zones" that keep these weak pathogens from invading undamaged xylem, but stressed trees cannot maintain effective barrier zones. The wood-invading fungi advance from the center, damaged wood outward toward the bark until the perimeter of living tissue can barely support life functions of the limb. It is at this stage that *B. obtusa* moves into the surface tissue and completes the killing of the bark to form a visible black rot canker. Incidence of black rot cankers often increases dramatically three to five years after a severe winter-injury event because it takes three to five years for wood-invading fungi to weaken limbs enough to allow development of a black rot canker.

Development of white rot cankers in New York seems more closely correlated with drought stress than with winter injury. (Drought conditions also allow more rapid extension of black rot cankers, but drought seems less important in the epidemiology of black rot cankers.) White rot cankers are more abundant following drought conditions because superficial white rot lesions on the bark surface are able to completely penetrate the bark only when the tree is under drought stress. Most fruit growers fail to notice superficial white rot lesions on trunks and older limbs because the superficial lesions can be mistaken for a natural part of the "aging process" that occurs as trunks transition from smooth to scaly bark. Nevertheless, I have seen at least three orchards where failure to control superficial white rot lesions over a period of years allowed development of severe canker problems in a drought year.

There is no evidence that spray programs can slow development of black rot cankers under New York conditions. However, spray programs definitely can affect the incidence of the superficial white rot lesions that contribute to development of visible white rot cankers in drought stressed trees. Observations I have made over the past 15 years suggest that superficial white rot lesions gradually increase in abundance in orchards where early-season scab sprays consist of either SI/EBDC combinations or low rates of EBDCs (mancozeb, Polyram) used alone. Neither the EBDCs nor the SI fungicides (Nova, Procure, Rubigan) have much activity against *Botryosphaeria* species. EBDCs may have been somewhat effective when they were applied at rates of 6–8 lb/A, but they no longer suppress white rot when applied at 3 lb/A. The benzimidazoles (Benlate, Topsin M) controlled this

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disease when they were used for scab control, but these fungicides are rarely used in prebloom sprays today because the scab fungus is resistant to benzimidazoles in many orchards.

No research has been done to determine when superficial white rot lesions are initiated or the best method for controlling them. Therefore, we have no scientific basis for making control recommendations. However, I suspect that copper sprays applied at green tip to half-inch green may be the most cost-effective approach for suppressing white rot lesions because the copper residues remain on the bark for an extended period of time. Including Topsin M or Benlate in a tight cluster or pink spray might also help reduce the incidence of superficial white rot lesions. The new strobilurin fungicides (Sovran, Flint) are effective against *Botryosphaeria* species and may help to suppress white rot lesions if they are applied prebloom.

White rot canker does NOT pose a significant threat for most New York apple growers. No changes in fungicide programs should be needed in orchards with trickle irrigation or orchards where there is no evidence of superficial white rot lesions. However, fungicide adjustments may be warranted in non-irrigated orchards where superficial lesions are abundant, especially considering that the long-term weather forecast is calling for another dry summer.❖❖

FIELD NOTES

HUDSON VALLEY

Dave Rosenberger
(Plant Pathology, Highland)

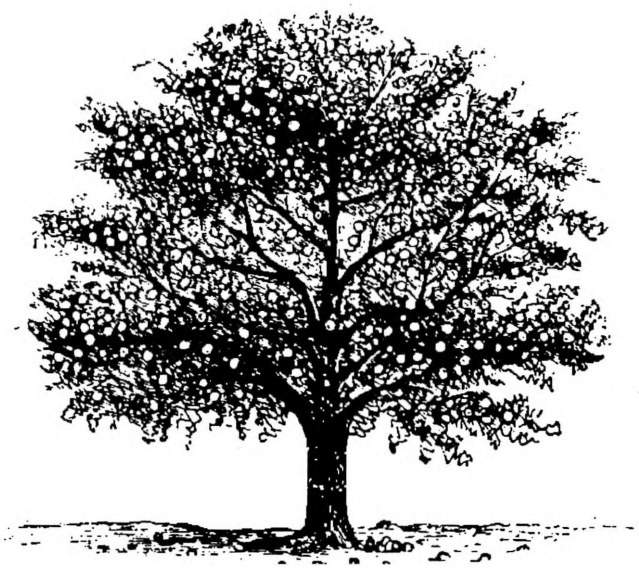
Apple scab ascospore maturity:

March 28, Highland (Ulster Co.): 0% mature spores, no spore discharge

March 30, Livingston (Columbia Co.): 0% mature spores, no spore discharge

April 3, Highland (Ulster Co.): 2% mature spores, 215 spores is tower discharge

❖❖ Ascospore maturity in eastern NY progressed rapidly with warm temperatures over the past weekend. Leaves collected this morning (April 3) provided the first discharge in our shooting tower test. The first commercially important ascospore release generally does not occur until we have at least 15% mature spores as determined with our squash-mount assessments. Thus, the risk of scab infection in commercial orchards remains low throughout the early part of this week and growers in the Hudson Valley can delay fungicide applications at least until mid-week. Spore maturity is likely to reach the 15% threshold by the end of the week if the weather predictions for warm temperatures prove accurate.❖❖



INSECT TRAP CATCHES (Number/Trap/Day)

Geneva, NY

	3/30	4/3
Green fruitworm	–	0.1*
Redbanded leafroller	–	0
Spotted tentiform leafminer	–	0

Highland, NY

	3/27	4/3
Green fruitworm	1.4*	0.4
Redbanded leafroller	0.5*	3.8
Spotted tentiform leafminer	0	0.1*
Pear psylla (eggs/100 buds)	42.0	13.0

* first catch

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–4/3):	163	64
(Geneva 1999 1/1–4/3):	78	26
(Geneva "Normal" 1/1–4/3):	79	34
(Highland 1/1–4/3):	197	77

Coming Events:	**Ranges:**	
Green fruitworm flight peak	64–255	19–108
Rebanded leafroller 1st catch	32–480	5–251
STLM 1st catch	73–433	17–251
Pear thrips in pear buds	137–221	54–101
Pear psylla 1st egg hatch	111–402	55–208
Rosy apple aphid nymphs present	91–291	45–148
McIntosh at half-inch green	112–221	54–102
Peach at half-inch green	154–230	61–107
Pear at bud burst	68–245	33–117
Plum at bud burst	68–234	33–108
Sweet cherry at bud burst	135–235	53–101
Tart cherry at bud burst	135–279	53–138

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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Dept. of Entomology
NYS Agricultural Exp. Sta.
Barton Laboratory
Geneva, NY 14456-0462