scaffolds

Update on Pest Management and Crop Development

FRUIT JOURNAL

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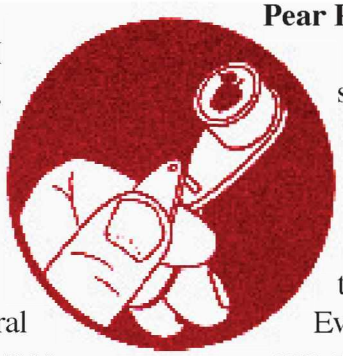
INSECTS

OIL'S WELL

A REFINED APPROACH (Art Agnello, Entomology, Geneva)



❖❖ The use of horticultural mineral oil as an early season pest management tactic is nowhere near as universal a practice as it used to be years ago, when mites and scales were more problematic and the options for dealing with them were less abundant. Nonetheless, those of us familiar with fruit insect and mite trends still consider it worthwhile to use oil applications for early season mite and insect control in both apple and pear plantings, because of its effectiveness, (still) relative affordability, and 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 all considerations are taken into account.

Mite and scale population trends are typically not the same each year, and weather conditions are certainly among the most variable of factors in the pest scenario from one year to the next, also. Before you decide that it's too much trouble or cost to invest in a prebloom spray of oil, be sure you won't mind having to pay several times as much if a rescue treatment for mites or scale ends up being necessary later in the season.

Pear Psylla

We've already enjoyed a few sunny days with warmer temperatures, and although I haven't actually gone out to any pear orchards to inspect for newly laid pear psylla eggs, it won't take long for this to happen once we get a few more. Even though it's impossible to make sure your pear trees are all protected by the time the first psylla adults start flying and ovipositing, several nice warm days in a row at this time of year don't result in more than a small number of psylla eggs, so you'll be more than adequately protected if you prepare now to get out there during the first real stretch of good weather.

Early oil applications are 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

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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 objective of using 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.

Chapman Slept Here

The following advice developed from Paul Chapman's original research is essentially unchanged from what I print every spring, which shows the durability of not only the information, 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 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 pick their way through the droplets or dodge them entirely. 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 the snowfalls have been in certain areas, local conditions will be the 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.

Obviously, good coverage of the trees is critical if you're to take advantage of oil's potential efficacy; 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 large 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 compromise your efforts if you end up

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Dept. of Entomology
NYSAES, Barton Laboratory
Geneva, NY 14456-1371
Phone: 315-787-2341 FAX: 315-787-2326
E-mail: ama4@cornell.edu

Editors: A. Agnello, D. Kain

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covering only a small fraction of the egg population with 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 ward off this damage, particularly if your fungicide program at this time doesn't present any compatibility problems.

San Jose Scale and Its Cousins

We have seen indications that our recent insecticide withdrawals and restrictions may have been promoting a return to the pest profiles of the past, with direct fruit pests (internal leps, apple maggot, various bugs) taking precedence over the indirect foliar feeders. San Jose scale is one of those historic problems that has already responded to some of the regulatory actions of the last few years. The disappearance of products like Penncap-M and Lorsban from our list of summer spray materials has been at least partly responsible for the fact that SJS persists or has returned to pest status in a number of orchards. It's therefore worth pointing out that 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, except sometimes in the case of a more recent alternative, Esteem, which has shown good efficacy when mixed with 2% oil at the pre-pink timing.

I was reminded just today of how many other "minor" pest species can also be affected by some of these incremental and seemingly nickel-and-dime regulatory developments. A colleague brought in a plum shoot that was virtually covered with European fruit lecanium scale, one of those old-time pests encountered by many fruit growers of yore. I was puzzled to hear he was unable to find it in our "Recommends", certain it was so well-established as to have been carried over from earlier editions since the year dot. In truth, it does get mentioned, albeit in peaches (which are marginally more numerous in NY than plums), but only during the delayed dormant period, when we naturally recommend oil. Now gone, however, is the advice that once appeared for dealing with the crawlers during the summer — because the only real option we had was azinphosmethyl, whose label eliminated stone fruits a few years ago. Now there is nothing effective registered for this use in NYS (although Diazinon and Lorsban can be used in stone fruits against other scale species).❖❖

INTERNET BUGS

MISSING LINK
(Art Agnello,
Entomology, Geneva)

❖❖ The web version of the Pest Management Guidelines for Commercial Tree Fruit Production is now available at: http://ipm-guidelines.org/treefruits/. We are working with the folks at PMEP to enhance the navigability and visual appeal of this reference as the season progresses, so look for a few improvements over the next few months. In the meantime, please don't hesitate to let us know of any errors or glitches you may encounter as you use this page, so that we can get them tweaked quickly. Suggestions for improvements are also welcome; these are always subject to the ability of programmers' time for addressing them, but we still like to hear your thoughts. ❖❖

DISEASES

FUNGI-SIDES

A REVIEW OF APPLE SCAB FUNGICIDES FOR 2009

Dave Rosenberger
(Plant Pathology, Highland)

❖❖ Mancozeb (i.e., Penncozeb, Manzate, Dithane) and captan were developed more than 60 years ago, but they still rank as the two most important fungicides for apple disease control. Both are widely used to control scab, but they perform in slightly different ways. Mancozeb is very effective against rust diseases and flyspeck, whereas captan provides only about 50% control of rust diseases and has shorter residual activity against flyspeck. Low rates of mancozeb (e.g., 3 lb/A) are relatively ineffective for controlling black rot, whereas captan (at rates equal to 3 lb/A of Captan 50W) provides good control of black rot on apples in the northeastern and midwestern growing regions of the United States. Neither captan nor mancozeb provides adequate control of powdery mildew.

Mancozeb is more rain-fast than captan and therefore provides better scab control during periods of heavy and extended rainfall. Dr. Mike Szkolnik at the Geneva Experiment station ran greenhouse trials for many years wherein he sprayed potted trees with fungicides, exposed them to two inches of simulated rainfall, then inoculated the trees with apple scab conidia and held them in the greenhouse with no further leaf wetting until disease severity could be assessed. His results clearly showed that mancozeb had better residual activity than captan (Table 1). Note that rates shown in Table 1 and subsequent tables are rates per 100 gal of dilute spray. These rates must be multiplied by 3 to arrive at the comparable rate per acre for medium to large-size trees.

Table 1. Results of greenhouse trials conducted by Dr. Mike Szkolnik from 1976–84 showing comparisons of residual activity of Dithane and Captan against apple scab after sprayed trees were exposed to two inches of simulated rainfall.

Rate/100 gal of dilute spray	No. of trials included in the means	mean % disease control*
Dithane 80W 1.5 lb	9	99.2
Captan 50W 2 lb	9	91.4
Captan 50W 1 lb	5	78.2
Captan 50W 1/2 lb	2	68.0

*Data was derived from published reports in Fungicide and Nematicide Tests, Volumes 31–39.

If mancozeb has more residual activity than captan, then a logical corollary is that captan will redistribute better than mancozeb during rain events. Redistribution of fungicides results in improved disease control during periods of rapid leaf expansion when newly unfolded leaves must be protected via redistribution of fungicide residues from older leaves and from bark surfaces. The superior scab-control activity of captan has been demonstrated in many field trials. Results from one such trial is shown in Table 2. In that 1997 field trial, treatments were applied on 11, 20, and 30 April and 8, 21 and 29 May. Captan proved far more effective than Dithane or Polyram because of the extended spray interval between 8 May (full bloom) and 21 May (5 days after petal fall), a period when trees were pushing out many new terminal leaves. Rainfall events and accumulations during that interval included 9 May (0.16 in.), 13 May (0.10 in.), 17 May (0.06 in.), and 19 May (0.95 in.). These rains effectively redistributed captan to new foliage and fruitlets, whereas mancozeb (Dithane in this case) was less effective for protecting new foliage.

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Table 2. Apple scab incidence on McIntosh as determined 17–19 June 1997 in a field trial* conducted at the Hudson Valley Lab.

Fungicide and rate per 100 gal of dilute spray	scab incidence(%) cluster leaves	terminal leaves	fruit
Unsprayed control	70 c**	47 c	91c
Captan 50W 1 lb	1 a	4 a	0 a
Dithane 75 DF 1 lb	4 b	18 b	9 b
Polyram 80DF 1 lb	5 b	17 b	6 b

*From Fungic. Nematic. Tests 53:25-26 (1998).
**Mean separations: Fisher's Protected LSD ($P \leq 0.05$).

Differences in the retention and redistribution properties of mancozeb and captan help to explain why using combinations of mancozeb and captan have proven so effective in scab control programs in recent years. The mancozeb/captan combination sprays benefitted from both good retention and good redistribution.

But what about retention/redistribution properties of other fungicides? A trial completed at the Hudson Valley Lab in 2008 showed that Flint had retention/redistribution properties that were as good as or better than those of mancozeb, whereas Scala, Vangard, Indar, and Inspire-Super did not redistribute very well (Table 3). (Indar and Inspire Super are not yet registered in New York State!) In this trial, all trees except controls were sprayed with mancozeb on 8 and 17 April. Test treatments were applied at tight cluster on 25 April. Trees were not treated with fungicides again until they had reached petal fall on 11 May, when mancozeb was again applied to all of the plots. Three scab infection periods occurred during the interval between 25 April and 22 May, with precipitation of 1.6 in. on 28–29 April, 0.4 in. on 1–4 May, and 0.5 in. on 9–10 May. Flint provided the best control of leaf scab (Table 3), indicating that it redistributed to new foliage better than any of the other fungicides while still having sufficient residual activity to remain active through the 2.5 inches of accumulated rainfall that occurred during this spray interval. The other fungicides tested would all have provided excellent scab control if applied on a normal spray schedule, but this trial clearly indicated that Flint had the best residual/redistribution properties among the fungicides evaluated. Sovran was not evaluated, but I suspect it would have performed much as Flint did.

Table 3. Apple scab incidence on Jerseymac as determined on 13 June 2008 in a field trial at the Hudson Valley Lab that was designed to evaluate residual and redistribution capabilities of various fungicides.

Fungicide and rate per 100 gal of dilute spray	scab incidence(%) terminal leaves	fruit
Unsprayed control	55 c*	90 d
Manzate 75DF 1 lb	29 b	0 a
Flint 50WG 0.67 oz	11 a	0 a
Scala 600SC 3.3 fl oz	30 b	14 bc
Vangard 50WG 1.67 oz	24 b	20 c
Inspire Super 338SE 3 fl oz	29 b	10 bc
Indar 2F 2.67 fl oz + LI700 8 fl oz	23 b	8 ab

*Mean separations: Fisher's Protected LSD ($P \leq 0.05$).

Following are some other key points concerning options for early season fungicides for apples. Any place that Captan 50W is mentioned, one could substitute equivalent rates of a different captan formulation.

• Copper applied at silver tip to green tip will control scab just as well as a mancozeb spray. There is no need to mix another scab fungicide with copper.

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• Given the increased cost for mancozeb fungicides this season, Vangard and Scala may be cost-effective choices for sprays at green tip and/or half-inch green. These products do not redistribute, so they are best used in combinations with low rates (3 lb/A) of mancozeb or Captan 50W to ensure that any buds that are missed due to incomplete coverage will still be protected via redistribution of the contact fungicide. Vangard and Scala can provide up to 72 hr of post-infection activity, but post-infection activity is dependent on complete spray coverage. After half-inch green, Flint and Sovran may be better options than Vangard or Scala because redistribution capabilities become increasingly important as the pace of bud development speeds up.

• The combination of a mancozeb fungicide at 3 lb/A plus Captan 50W at 1.5 to 3 lb/A is still an excellent choice for a protectant program. Neither of these products provides true post-infection activity, although they can be effective if applied within 12–18 hr of the start of rain periods. Where this combination is used continuously through petal fall or first cover, it may be necessary to add 3 to 5 lb/A of sulfur to the mancozeb-captan mixture starting at the pink bud stage in order to control powdery mildew. Remember that neither captan nor sulfur is compatible with oil!

• The stroby fungicides (Flint and Sovran) are "super protectants" (i.e., more effective than either captan or mancozeb). They are especially useful for enhancing scab control and mildew control programs from tight cluster through early cover sprays. For resistance management reasons, these fungicides should be tank-mixed with either captan or mancozeb and should not be applied more than twice in direct succession. Mancozeb is the preferred combination product where rust diseases are a problem. Remember that Sovran is toxic to some sweet cherry cultivars and Flint can damage some grape cultivars.

• The SI fungicides are still very effective for controlling apple scab in some orchards, whereas scab has become resistant to them in other orchards. SI fungicides registered in NY include Rally (formerly Nova), Rubigan, and Procure. Indar and Inspire Super are registered in other states and will hopefully have their NY State registrations shortly. Indar and Inspire Super are more active against scab than the older SI fungicides and they will therefore provide more reliable scab control in orchards where the scab population is shifted toward SI resistance. Inspire Super is the most active and it may initially control scab fairly well in orchards that have experienced failures with Nova or Rubigan. However, no one can predict the reliability of Inspire Super if it is applied repeatedly in orchards where Nova and Rubigan have failed.

The SI fungicides are incredibly valuable for arresting scab epidemics, so growers may wish to minimize the use of SI fungicides prior to petal fall so as to extend the life expectancy for SIs in their orchards. This is especially true for use of Inspire Super in orchards where Rubigan or Nova have already failed because Inspire Super may prove to be the only remaining "bail-out" material for those orchards and it might be effective through only several more scab episodes. No other fungicides with equivalent scab activity are anywhere on the horizon, so preserving SI activity as long as possible could pay off in a big way if future years bring weather conditions that make it impossible to control scab with protectant fungicides alone.

Although we may wish to preserve SI fungicides for problem blocks and problem years, I think it makes sense to continue using SI fungicides at petal fall (PF) and first cover (1C) in orchards where SI fungicides are still working against scab. Using contact fungicides for prebloom sprays and delaying SI use until PF will minimize exposure of the scab populations to SI fungicides because most scab ascospores are released prior to PF. The PF timing for SI fungicides is ideal for controlling powdery mildew and rust diseases (although rust protection must be initiated with other fungicides prior to bloom). When applied at PF and 1C, the SIs also inactivate the occasional primary scab lesion that might have slipped through the protectant program and that could potentially cause problems later in the summer or fall if not inactivated. Even where SI fungicides are no longer active against scab, they may still be needed at PF and 1C to control mildew. ❖❖

PHENOLOGIES

Geneva, Highland: All dormant

PEST FOCUS

Highland:
Pear psylla egg laying has begun.

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–3/30/09):	72	22
(Geneva 1/1–3/30/2008):	44	16
(Geneva "Normal"):	72	26

Coming Events:	Ranges (Normal ±StDev):	
Green fruitworm 1st catch	58–130	16–58
Pear psylla adults active	31–99	8–34
Pear psylla 1st oviposition	40–126	11–53
McIntosh at silver tip	57–113	18–44

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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