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Update on Pest Management
and Crop Development

F R U I T J O U R N A L

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OIL AND WATER

WORTH THE
SUSPEN-
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❖❖ While we're waiting for the other shoe to drop on this year's bud development derby, it's worth taking a little time to consider the potential value of using horticultural mineral oil as an early season pest management tactic. This used to be a pretty much universal practice years ago, when mites and scales were more problematic and the options for dealing with them were less abundant. Those of us familiar with fruit insect and mite trends still believe that it's worthwhile to consider the use of oil applications for early season mite and insect control in both apple and pear plantings, because of its effectiveness, relative affordability, and safety from a biological and pesticide resistance perspective. Taking advantage of the most favorable 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 factors are taken into account, and this year may offer more opportunities than are normally available.

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. Before you decide that it's too much trouble or cost to invest in a prebloom spray of oil, be sure you're aware of how much it could

cost you (biologically as well as financially) if a rescue treatment for mites or scales ends up being necessary later in the season. Probably first, chronologically, early oil applications are useful against pear psylla all throughout the swollen bud stage, which is where most of our region's diminishing pear plantings are situated currently.

Voice of Reason

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 in apples from green tip through tight cluster can be a favored approach for early season mite control,

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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, this is not always achieved in real life, mainly because of weather and coverage challenges, coupled with the difficulty of getting to a number of blocks during a fairly brief 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 else avoid 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 wet the winter months have been, 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. Naturally, when warm temperatures start as early in the year as they have this season, cold snaps and overnight frosts are a wild card, so be aware of any imminent changes in weather patterns that could result in tissue damage in oil-treated trees.

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 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 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 tactic to help ward off this damage, particularly if your fungicide program at this time doesn't present any compatibility problems. ❖❖

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ARMOR PIERCING

NAILING SCALE
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San Jose Scale

❖❖ Applications for San Jose scale (SJS) control should begin once the insect breaks diapause, as day-length and temperatures increase. For SJS, the developmental base temperature at which the insect becomes active is 50°F. Sustained temperatures of 50°F both day and night breaks diapause, increasing the insect's metabolism and respiration. Oil is effective against this insect due to its ability to smother respiration, while insecticides are metabolized and transferred to a specific target site within the insect to cause mortality. If even a small percentage of your fruit was lost to scale, those blocks need to be managed this spring to avoid losses in 2016. If left unchecked, exponential losses of fruit will occur this season (Fig. 1)



Fig. 1. San Jose scale damage on Empire

San Jose scale *Quadraspidiotus perniciosus* (Comstock) is now in the "black cap" overwintering stage. The yellow immature females and males are beneath individual "scale" coverings and will complete development around petal

fall, mate, and bear live young or "crawlers" in June. They need to breathe and metabolize food they obtain from feeding on the sap of the tree beneath their chitinous shell.

One shot may not be enough: The most effective options for SJS management include 1% horticultural oil, alone or in combination with an insecticide. The most effective materials include the insect growth regulators Centaur and Esteem, Lorsban, and 1% horticultural oil, alone or in combination with these materials, to improve distribution and help penetrate the chitin layer. The use of Lorsban to manage scale early (post-diapause) provides the greatest potential for coverage and reduces the negative impact on beneficial arthropods such as *Typhlodromus pyri* and *Amblyseius fallacies* mite predators. If SJS is not a primary concern (i.e., no SJS was found on fruit in 2015), Lorsban would best be applied at late tight cluster to the pink bud stage to optimize obliquebanded leafroller, green fruitworm, redbanded leafroller, and (perhaps) some early plum curculio management. Bear in mind that if dogwood borer and/or black stem borer management is required, a directed trunk spray using Lorsban should be considered by pink bud.

Pre-bloom (during the next few weeks) is by far the most opportune time to manage SJS. The overwintering immature scale, although protected beneath the armored scale cover, is at its least protected stage from a spray application at this time. However, the growth of new foliage will increase "spray shadowing" as the season progresses, reducing application effectiveness. We are all familiar with the use of horticultural oil, Lorsban, and Supracide, directed against overwintered "black caps" during this period, as these are long-time standard control measures.

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The use of these tools can suffocate the insect (oil) or kill them outright by interrupting nervous system function (Lorsban and Supracide). The use of Esteem and Centaur provide control without the need for oil as a penetrant, as these products inhibit SJS development. As we approach the tight custer bud stage, there are several San Jose scale pest control options available to us, and to succeed, multiple strategies should be considered.

Pre-bloom options include:

- * Lorsban foliar application (Delayed Dormant to Pink)
- * Supracide foliar application (Delayed Dormant)
- * Esteem (Delayed Dormant to Pink)
- * Centaur (Delayed Dormant to Pink)
- * Oil alone or with Lorsban/Supracide (Delayed Dormant to Pink)

Note: Avoid using oil 24-48 hrs before AND after frost and freezing temperatures.

Post-bloom 1st and 2nd crawler emergence options are:

- * Movento SC (spirotetramat) PF-1C (2-3 weeks prior to crawler emergence)
- * Contact insecticides at crawler emergence (Imidan, AdmirePro, Assail, Endigo, Leverage)
- * Esteem
- * Centaur
- * Oil alone or with certain insecticides used for SJS (Movento, Assail)

The Lorsban decision

A single yearly application of Lorsban (chlorpyrifos) can still be made to tree fruit. If chlorpyrifos is used in a pre-bloom foliar application, then it cannot be used in a post-bloom trunk application. A pre-bloom chlorpyrifos application made at early pink will have a considerable impact on San Jose scale (SJS), rosy apple aphid (RAA), emerging obliquebanded leafroller larvae (OBLR), and some impact on mullein and tarnished plant bug (MPB & TPB), European apple sawfly (EAS) and white apple

leafhopper (WALH). Most importantly, if bees are brought into a block in a season with cooler temperatures and delayed petal fall of later varieties, a pink application provides increased management of migrating plum curculio with less pressure to remove the bees from a mixed block while active pollinators continue to work the king flowers. It also provides a bit of insurance if beekeepers are delayed in removing hives from mixed variety blocks. Be aware that chlorpyrifos has a high bee-poisoning hazard. Judicious use of this product, well before bloom, is essential for reducing the risk to active pollinators. Mowing dandelion flowers ahead of a Lorsban application will also diminish losses of native pollinators.

Remember, the earlier the application against the overwintering black cap phase, the greater the likelihood of success. Coverage is critical in scale management, requiring a slow travel speed (<2.5 MPH), low wind speed (<5 MPH) and as close to a dilute application as possible. Increased foliage equates to "shadowing" and reduced coverage, which of course is the essential control component against the overwintering life stage. Infestation levels that exceed just a few fruit at harvest in multiple blocks should be taken seriously. Even after a pre-bloom application is made, follow-up management of summer populations should be considered, as pockets of lingering scale in protected places are likely to remain in the tree canopy.

As a follow-up to pre-bloom control of SJS, consider the use of Movento 240SC at 6-9 oz/A plus a non-ionic penetrant such as 0.25% to 1% horticultural oil or LI-700. The active ingredient in Movento, spirotetramat, is taken into the foliage, systemically moves through plant tissue to stems, roots, and leaves, and is fed upon by emerging SJS nymphs during emergence and establishment on the fruit. Our research

continued...

has found the single application of 9 oz/A at PF or two applications at 6 oz/A at PF and 2C will effectively control 1st generation SJS. Remember that Movento (spirotetramat), cannot be used pre-bloom according to label restrictions. Movento has been found to be most effective after PF in one to two applications, and requires a penetrating non-ionic surfactant. Incompatibility concerns over Captan use in early pest management programs for apple scab can be a formidable barrier when considering the use of oil. The possibility of phytotoxicity when using Captan near oil applications should be kept in mind when scanning for an application window for SJS management. Esteem (pyriproxyfen) can be employed with or without oil, and acts against the pest as an insect growth regulator (IGR), a unique mode of action for use against the immature scale. As the insect matures, the insecticide acts as a juvenile hormone analog to reduce the insect's capacity to molt. Centaur 0.7WDG (buprofezin), also an IGR, does require a penetrating non-ionic surfactant such as 0.25% v/v oil to be effective.

White Prunicola Scale

Another scale we've been seeing in upstate NY orchards that might otherwise have been identified as white peach scale (*Pseudaulacaspis pentagona*) is almost certainly a closely related species (*P. prunicola*), which has the common name of white prunicola scale. According to scale authorities, this species is so closely related to *P. pentagona* that for years no one was aware that the white peach scale was not one but two species. Evidently, the prunicola scale is more common in temperate climatic zones, and scales found in upstate NY and New England will most likely be *P. prunicola*.

Infestations on apple and, cherry as well as peach, are characterized by numerous white scales that cluster on the trunk and scaffolds, giving them a whitewashed appearance (Fig. 2).

Feeding reduces tree vigor, and foliage of affected trees may become sparse and yellow; heavy



Fig. 2. Apple trunk heavily infested by white Prunicola scale.

infestations can cause death of twigs, branches and entire trees if left unattended. This species overwinters as an adult female and deposits eggs in the spring. Horticultural oil is recommended as a dormant spray in April, and insecticides can be used against crawlers in mid-June through early July (about 700–1150 DD base 50°F from March 1). Materials such as Movento or Centaur would be two good candidates at such a time. [Refs: Johnson & Lyon 1988, Insects that Feed on Trees and Shrubs; Davidson et al. 1983. Proc. Entomol. Soc. Wash. 85: 753-761].❖❖

UPCOMING PEST EVENTS

	<u>43°F</u>	<u>50°F</u>
Current DD accumulations (Geneva 1/1–3/28/16):	116.6	43.6
(Geneva 1/1–3/28/2015):	5.2	1.0
(Geneva "Normal"):	59.9	22.4
(Geneva 1/1-4/4, predicted):	140.8	25.7
(Highland 1/1–3/28/16):	231.3	99.9

<u>Coming Events:</u>	<u>Ranges (Normal ±StDev):</u>	
Apple grain aphid nymphs present	128-488	63-247
Green apple aphid present	111-265	38-134
Green fruitworm peak flight	97-209	37-97
Pear thrips in pear buds	118-214	50-98
Redbanded leafroller 1st catch	113-177	41-83
Rosy apple aphid nymphs present	134-244	56-116
Spotted tentiform leafminer 1st catch	115-215	44-102
McIntosh half-inch green	148-198	63-93

all DDs Baskerville-Emin, B.E.

PHENOLOGIES

Geneva:	Current	4/4, Predicted
Apple (McIntosh, Empire):	silver tip	green tip
Apple (Red Delicious):	silver tip	green tip
Pear (Bartlett):	swollen bud	swollen bud-bud burst
Pear (Bosc):	dormant	swollen bud

Highland:		
Apple	(McIntosh): green tip (as of 3/17)	
	(Red Delicious, Ginger Gold, Empire): green tip	
Pear	(Bartlett, Bosc): swollen bud	
Plum	(Stanley): swollen bud	

INSECT TRAP CATCHES (Number/Trap/Day)

	Geneva, NY		Highland, NY	
	<u>3/25</u>	<u>3/28</u>	<u>3/21</u>	<u>3/28</u>
Redbanded leafroller	1.0*	8.5	0.4*	1.0
Spotted tentiform leafminer	0.0	0.0	<0.1	3.7

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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