

scaffolds

Update on Pest Management
and Crop Development

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

April 3, 2017

VOLUME 26, No. 2

Geneva, NY

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HYDRO-
CARBON
BARGAIN

HIGHLY
REFINED
(Art Agnello,
Entomology,
Geneva; ama4@cornell.edu)



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.

❖❖ The season seems to have settled into a relatively moderate rate of progression for the time being, so it's worth taking the opportunity 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 climate, 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 we normally get.

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

The View from Mid-Century

The following advice developed from Paul Chapman's original decades-old 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, 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

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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, cold snaps and overnight frosts are always a wild card possibility, 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 undermine 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.

Finally, we do hear of concerns each year that prebloom use of oil might be damaging to the crop or even the trees, so why even consider it? I would note that, as with any crop protectant, it's certainly possible to use oil improperly and come away with poor or

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is published weekly from March to September by Cornell University—NYS Agricultural Experiment Station (Geneva) and Ithaca—with the assistance of Cornell Cooperative Extension. New York field reports welcomed. Send submissions by 2 pm Monday to:

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

Editor: A. Agnello

This newsletter available online at:
<http://www.scaffolds.entomology.cornell.edu/index.html>

even detrimental results, so it's wise to stay away from using oil if any of the following conditions apply:

- occurrence of sub-freezing temperatures less than 48 hr before or after an oil application
- presence of active captan or copper residues when oil is applied. It's generally wise to allow 7–10 days before or after applying oil to use either of these products; both can cause phytotoxicity to the buds and woody tissues when combined with oil's penetrant activity.
- poor drying conditions, which can promote spotting and burning damage to sensitive foliar and bud tissue. ❖❖

ADDING TO THE BURDEN

WEIGHING IN ON TREE DECLINE: SAN JOSE SCALE MANAGEMENT THIS SEASON

(Peter Jentsch, Entomology,
Hudson Valley Research

Laboratory; pjj5@cornell.edu)

The Short

❖❖ San Jose Scale (SJS) is in nearly every Hudson Valley orchard. Management of this insect will require season-long scheduling of directed applications to gain acceptable levels of control. An application of 1–3% oil targeting overwintering adults at dormant to delayed dormant, with or without insecticides, will significantly reduce the population. Oil will smother scale as they break dormancy and their need for oxygen demand increases while temperatures rise. Applications should be made within the next 10 days, as average temperatures increase and the soil dries out. Tractor speeds should not exceed 2.5 MPH with no less than 100GPA for best coverage. This application will significantly reduce European Red mite.

The Long

Going into the 2017 Season, Hudson Valley orchards vary in the degree of insect presence relative to last year's management. Factors that will contribute to the coming season management

needs include individual block proximity to woodland and abandoned orchards, levels of insecticide resistance, tree fruit varieties more or less prone to insect preference, and a host of factors related to new invasive pests, weather, seasonality (and the list goes on). Although there are differences between orchard infestations, two insects stand out in my conversations with growers with increasing pestilence. They are Dogwood Borer (DWB) and San Jose Scale (SJS). Under moderate levels of infestations in high density production systems, these insects cause tree decline in young orchards after two years of infestation.

For this week, these two pests should be on everyone's radar: Before the season takes you by storm, you should strongly consider managing these pests if you have live DWB larva in the base of your trees, either on M.9 or other highly dwarfing rootstock, or you have had even the slightest amount of SJS in your orchard at packout in 2016.

If San Jose scale damage to fruit has been found at harvest (**Fig. 1**), trees with infested fruit should, without question, be managed during this period to keep fruit from becoming overrun a second year, as significantly higher losses will certainly occur. Be mindful that a tree carrying a few SJS-damaged fruits last season will become



Fig. 1. Scale injury on Empire at harvest.

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an eruption of fruit injury the following year if left unmanaged.

We have two to three generations of San Jose scale each year. The scale overwinters as immature blackcaps; adults mature during the bloom period. Males emerge and mate at petal fall. First-generation crawlers begin appearing in early June in southern areas and continue for a month. These crawlers develop into mature adults by late July. Second-generation adults appear from late July to early September; and, if a third generation occurs, it appears in late October to early November. The life cycle is completed in about 37 days. Crawlers can usually be found from early June until a hard frost in the fall.

To address the SJS issue, seasonal programs will require targeted applications of specific insecticides during three key periods of the season. Simply, in years to come, this insect has and will continue to cause severe losses in tree fruit due to lack of prebloom oil use (often due to the widespread use of Captan fungicide), the industry loss of broad-spectrum insecticides such as PennCap-M and postbloom Lorsban, as well as the increasing likelihood of insecticide resistance. Addressing the overwintering population should begin at the first application of the season shortly after snow melt and navigable ground conditions if a resident population is found either through trapping and scouting or presence of SJS during the 2016 packout.

Monitoring

San Jose scale, *Quadraspidiotus perniciosus* (Comstock) (SJS): The SJS is now in the "Black Cap" overwintering stage. They can be observed on 1st and 2nd year wood more easily than older wood, as the branches will have a purplish hue. Cutting into the cambium will expose this color more vividly. You can observe the yellow females and males beneath individual "scale" coverings (Fig. 2), where they will complete development, mate and bear live young or "crawlers".



Fig. 2. Female scale beneath scale covering.

Management

Prebloom (now) is by far the most opportune time to manage SJS. The overwintering immature stages, protected beneath the waxy covering, are least protected from a spray application. However, developing foliage will increase "spray shadowing" as the season progresses, reducing application effectiveness. A most effective timing during this period is delayed dormant, from the time silver tip begins to 1/2-inch green. We are all familiar with the use of horticultural oil, Lorsban, Supracide, Esteem and Centaur directed against overwintered "black caps" during this period, as these are long-time standard control measures.

As the living scales need to breathe and metabolize food they obtain from feeding on the sap of the tree beneath their chitinous shell, smothering the insect using 1–3% horticultural oil can be very effective, alone or in combination with other insecticides. Interrupting the nervous system function through the use of Lorsban or Supracide is labeled in NYS, while the use of Esteem 35WP and Centaur can control the insect, without the need for oil as a penetrant, to disrupt SJS development.

As we approach tight custer tree phenology, the San Jose scale pest control options available to us are numerous, and to succeed, multiple strategies should be considered.

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Prebloom (Delayed dormant-Pink) options include:

- * Lorsban or Supracide foliar application
- * Esteem
- * Centaur
- * Oil

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 (pyrethroids, phosmet, neonicotinoids and pre-mixed formulations)
- * Esteem
- * Centaur
- * Oil

The Lorsban decision

EPA has dismissed the petition by the 9th Circuit Court to revoke all tolerances for use; i.e., this product can still be used in tree fruit insect pest management. If chlorpyrifos (Lorsban or similar generics) is used in a prebloom foliar application, then it cannot be used in a post-bloom trunk application. A prebloom 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), 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 of cooler temperatures and delayed petal fall of later varieties, a pink application provides increased management of migrating plum curculio, with less pressure to remove bees from a mixed block while active pollinators continue to work king flowers. It also provides a bit of insurance if beekeepers are delayed in removing hives from mixed-variety blocks.

Be aware that the active ingredient in Lorsban and the Lorsban generics is chlorpyrifos, which has a high bee-poisoning hazard. Judicious use of this product, well before bloom, is essential to

reduce the risk to active 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 prebloom application is made, further management of populations should be considered, as lingering pockets of scale in protected places are likely to remain in the tree canopy.

As a follow-up to prebloom 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 to address the San Jose Scale fruit injury at packout last year. The active ingredient in Movento, spirotetramat, is taken into the foliage, systemically moving through plant tissue to stems, roots, and leaves to be fed upon by emerging SJS nymphs during emergence and feeding. Our research 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 the 1st generation of this insect.

Softer insecticides, such as Esteem 35WP (pyriproxyfen) can be employed with or without oil, acting 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. Be aware that Movento, a systemic insecticide, cannot be used prebloom according to label restrictions, as there is insufficient foliage for effective uptake. Movento has been

continued...

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 strongly considered when vying for a weather opportunity for SJS management windows. ❖❖

ERRATUM AND CLARIFICATION OF FUNGICIDE PRODUCT UPDATE

(Kerik Cox, Plant Pathology & Plant-Microbe Biology Section, Geneva; kdc33@cornell.edu)

The Luna fungicide family from Bayer CropScience (Luna Sensation, Luna Tranquility, and Luna Experience) features the Group

7 SDHI fungicide fluopyram in combination with other fungicide chemistries. Luna Sensation is labeled on apples for control of apple scab, powdery mildew, and summer diseases. It is also labeled on stone fruit for several diseases including brown rot, cherry leaf spot, and peach scab. Luna Tranquility is labeled on apples for control of apple scab and powdery mildew. Luna Experience (NOT Tranquility, as reported last week) is labeled on stone fruit for several diseases including brown rot, cherry powdery mildew, and peach scab. All of the products are considered restricted use pesticides, and none are allowed for use on Long Island.

Also, in the table below, note that Sercadis is only a Group 7 product (with no Group 11 component).

Table 1. Features of current and forthcoming SDHI fungicide products (corrected).

Trade name (Manuf.)	Fungicide Chemistries (FRAC Group)	Disease efficacy	Registration Status (Restricted)	Use on Long Island
Fontellis (DuPont)	SDHI (7)	High: apple scab, Low to Moderate: Rust and Mildew	SLN	No
Merivon (BASF)	SDHI (7) + QoI (11)	High: apple scab, Moderately High: Rust and Mildew	Restricted Use	No
Sercadis (BASF)	SDHI (7)	High: apple scab, Moderate: Mildew, Low: Rust	Restricted Use	No
Pristine (BASF)	SDHI (7) + QoI (11)	High: apple scab, Moderately High: Rust and Mildew	Not Restricted	Yes
Luna Tranquility (Bayer)	SDHI (7) + AP (9)	High: apple scab, Moderate: Mildew, Low: Rust	Restricted Use	No
Luna Sensation (Bayer)	SDHI (7) + QoI (11)	High: apple scab, Moderately High: Rust and Mildew	Restricted Use	No
Aprovia (Syngenta)	SDHI (7)	High: apple scab, Low to Moderate: Rust and Mildew	Outside NY	No

NEWS
FROM
EPADECISION ON LORSBAN/
CHLORPYRIFOS

❖❖ On March 29, the EPA announced that it would not proceed forward at this time with any restrictions for chlorpyrifos or changes to U.S. tolerances. In addition, EPA has notified the Courts that it is denying the NRDC (Natural Resources Defence Council) and PANNA (Pesticide Action Network of North America) petition in full, which was filed in

2007 to revoke U.S. food tolerances. Instead, EPA announced that it will focus its attention on updating and revising its human health assessment for chlorpyrifos under the standard procedures of the Registration Review process scheduled for completion on October 1, 2022 in order to support future decision making. This ruling means that this a.i. in Lorsban or similar generics remains available for use in tree fruit pest control programs, **with the same restrictions and regulations as were previously in place on product labels.** ❖❖

INSECT TRAP CATCHES
(Number/Trap)

	Geneva, NY			Highland, NY	
	<u>3/30</u>	<u>4/3</u>		<u>3/27</u>	<u>4/3</u>
Green fruitworm	0.0	0.5*	Green fruitworm	0.0	0.0
Redbanded leafroller	–	0.0	Redbanded leafroller	0.0	0.0
Spotted tentiform leafminer	–	0.0	Spotted tentiform leafminer	0.0	0.0

* first catch

PEST FOCUS

Geneva:
Green fruitworm 1st catch today (4/3).

PHENOLOGIES

Geneva:	<u>Current</u>	<u>4/10, Predicted</u>
Apple (McIntosh, Empire):	silver tip	green tip
Apple (Red Delicious):	silver tip	silver tip
Apple (Idared):	early silver tip	silver tip
Pear (Bartlett):	swollen bud	bud burst
Pear (Bosc):	dormant	swollen bud
Highland:		
Apple (all):	dormant	
Pear (all):	dormant	

UPCOMING PEST EVENTS

	<u>43°F</u>	<u>50°F</u>
Current DD* accumulations (Geneva 1/1-4/3):	104.4	38.7
(Geneva 1/1-4/3/2016):	146.7	58.7
(Geneva "Normal"):	88.0	34.4
(Geneva 1/1-4/10, predicted):	162.4	64.0
(Highland 1/1-4/3/16):	152.1	58.8

<u>Coming Events:</u>	<u>Ranges (Normal ±StDev):</u>	
Apple grain aphid nymphs present	128-488	63-247
Green fruitworm 1st catch	49-148	12-69
Green fruitworm peak catch	99-212	38-99
Pear psylla 1st oviposition	40-126	11-53
Pear thrips in pear buds	118-214	50-98
Redbanded leafroller 1st catch	113-177	42-82
Rosy apple aphid nymphs present	134-244	56-116
Spotted tentiform leafminer 1st catch	117-215	44-101
McIntosh silver tip	62-108	20-42
McIntosh green tip	98-144	37-63

*all DDs Baskerville-Emin, B.E.

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.

This material is based upon work supported by Smith Lever funds from the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture.