

scaffolds

Update on Pest Management
and Crop Development

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

March 24, 2014

VOLUME 23, No. 1

Geneva, NY

IT'LL
COME
'ROUND

CURVATURE OF
THE EARTH
(Art Agnello,
Entomology,
Geneva,
ama4@cornell.edu)



Live Feed

Scaffolds will continue to be offered via email and online this year. We encourage subscribers to inform us of any address changes, so that there are no surprise gaps that could be mistaken for hijacked email accounts, data security breaches, viral marketing, or random memes (got all that? let's hope not).

❖❖ I remember being puzzled when, as a child, I would stand on the shore at one of the Rochester beaches and look across Lake Ontario, straining my eyes to see whether I could make out the skyline of Toronto, which I knew was just across the lake. Even on the clearest of days, I never got as much as a glimpse of our sister city to the north, and as kids will do, began to worry that I didn't have very good eyesight. I was only marginally consoled by being told that the shape of the earth prevented me from being able to see anything on the northern shore, because light didn't bend the way the landscape did (something else that took me a long time to grasp). I've gotten to feel a bit like that this year, but the object of my search is instead meteorological -- that is, I know the growing season is out there someplace, but it's maddening not to be able to see it yet. As in: I just spoke to a colleague in Oregon, who's worried that the pears will need another oil spray for psylla, since the foliage has already outgrown the first one. And as for the peaches in California, you don't even want to know... On the other hand, another colleague in Québec tells me the ground isn't even showing yet because of the snow cover (technically, the same holds here, but that's just because of the "dusting" we got last night). Anyway, one thing I do know about NY springs is that they always make up for not always being timely; one of the more respected long-term weather models is predicting this summer to be among the warmest and driest in history. Watch this space.

We will again be sending Scaffolds out as a pdf file via email each Monday afternoon. For those desiring a more screen-friendly format than the double column we currently use, I can send an unformatted plain text version to anyone who requests it, in addition to (or in place of) the pdf. There is also a web version available, which should be up and ready for viewing at the same time as the emailed pdf is sent. Scaffolds can be found online at: <http://www.scaffolds.entomology.cornell.edu/>.

continued...

IN THIS ISSUE...

GENERAL INFO

- ❖ New year of Scaffolds intro

INSECTS

- ❖ San Jose scale

DISEASES

- ❖ Tree fruit fungicides for 2014

CHEM NEWS

- ❖ Product registration update

UPCOMING PEST EVENTS

Please make a note of this address in any bookmarks you may maintain that point to Scaffolds.

Also, we will continue to post a version of Scaffolds online that is formatted to be more easily read on smartphones and other mobile devices. Look for "ScaffoldsMD for Mobile Devices" under the current link to the PDF version.

As always, we are happy to consider contributions (particularly from N.Y. sources) in the form of articles on topics in any of the fruit crop protection or crop production areas, as well as N.Y. field observations, trap data, etc. Our preferred deadline for such dispatches is 2 p.m. on Monday.



LET'S
JUST
SAY...

DESPITE THE FORECAST,
LIVE LIKE IT'S SPRING
(Peter Jentsch, Entomology,
Highland; pjj5@cornell.edu)

Plan For Early Scale Management

❖❖ The forecast for this fourth week in March is for increasing signs of spring, despite the lingering presence of arctic vortex. We may not be hard-pressed into decision-making considerations for pest management, but strategies for controlling early season insects, especially San Jose scale (SJS), *Quadraspidiotus perniciosus* (Comstock), should have been a part of your winter musings if pack-out fruit showed signs of SJS infestation. Be mindful that a tree carrying a few SJS-damaged fruit last season can become an eruption of fruit injury the following year if left unmanaged. To address an SJS issue, seasonal programs will require targeted applications of specific insecticides during three key periods of the season.

Pre-bloom is by far the most opportune time to manage SJS. The overwintering im-

mature stages, protected beneath the waxy covering, are least protected from a spray application, as the developing foliage increases 'spray shading' as the season progresses. A most effective timing during this period is delayed dormant, from the time silver tip begins to 1/2" green. We are all familiar with the use of horticultural oil, Lorsban, Supracide or Esteem 35WP directed against overwintered "black caps" during this period, as these are longtime standard control measures.

In low to moderate population levels, horticultural oil alone in a 2% dormant application or a 1% green tip (GT) application, applied to infested trees with complete coverage, has been shown to control this pest (Table 1). In moderate to high populations, the oil should be applied in combination with other effective insecticides. Supracide 25WP can only be applied during pre-bloom (delayed dormant) of apple, as stated by the label. Lorsban can be applied once during the pre-bloom season, only as a foliar application through pink OR as a trunk application pre- or post-bloom up to 28 days before harvest. Consider alternating the use of Lors-

continued...

scaffolds

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

Editors: A. Agnello, D. Kain

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

ban for scale and borer management every other year. Dogwood borer (DWB) in M.9 plantings of high-density slender spindle blocks can cause considerable damage to young establishing trees. From our observations, DWB is very prevalent throughout many of the Eastern NY orchards with young plantings.

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. 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 (spirotetramat), a systemic insecticide, cannot be used pre-bloom as per label restrictions. Movento has been found to be most effective after PF in one to two applications, when there is sufficient foliage for effective uptake, 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 searching for a weather window as an opportunity for SJS management. ❖❖

Table 1.

Evaluation of insecticides for controlling San Jose scale on apple, NYSAES, Hudson Valley Lab, Highland, NY - 2005

Treatment	Quantity	Timing	<u>% mortality per # of days post-application</u>				
			7 d	14 d	21 d	28 d	45 d
1. Damoil	3.0 gal/100	GT	100.0 c	100.0 c	100.0 c	100.0 c	100.0 c
2. Damoil	2.0 gal/100	HIG	100.0 c	100.0 c	100.0 c	100.0 c	100.0 c
3. Lorsban	1.0 pt/100	HIG	100.0 c	100.0 c	100.0 c	100.0 c	100.0 c
4. Esteem	1.25 oz/100	HIG	48.5 b	41.3 b	37.5 a	51.4 b	59.4 b
5. Assail	1.25 oz/100	HIG	51.6 b	44.6 b	78.4 b	94.1 c	99.9 c
9. Untreated	–	–	2.7 a	23.0 a	37.5 a	36.0 a	34.9 a

a) Data from "Empire" evaluation on 11 July for 1st generation SJS black cap population. 1/4" GT on 7 April, 1/2" GT (HIG) on 12 April, Pink on 26 April, Bloom on 8 May, PF on 19 May @ 80% PF of Empire. 310DD crawler emergence timing from adult biofix on 14 June, following 10d application on 24 June. 310DD crawler emergence timing for 2nd generation on 29 July.

b) Means separation by Fisher's Protected LSD ($P < 0.05$). Treatment means followed by the same letter are not significantly different.

A LOT TO THINK ABOUT

FUNGICIDE CONSIDERATIONS FOR TREE FRUITS IN 2014

(Dave Rosenberger &
Kerik Cox, Plant

Pathology, Highland & Geneva;
dar22@cornell.edu, kdc33@cornell.edu)

❖❖ Designing disease control programs for tree fruits is increasingly complex as we deal with fungicide resistance issues (and the resulting higher inoculum levels in many orchards), while at the same time we are challenged to learn the intricacies of new products and how changing crop management practices affect fungicide use. Following is an overview of our current perspectives.

Fungicides for apples

Apple orchards with high levels of apple scab last year (i.e., with high inoculum for this spring) should either have received an inoculum reduction treatment last fall, or such a treatment should be applied as soon as possible this spring. Inoculum reduction can be achieved by leaf shredding with a flail mower set to scalp the sod, but that approach is only effective if leaves beneath trees are raked into the row middles. The sod scalping generated by effective flail mowing of leaf litter can result in a slippery surface for subsequent pesticide applications in a wet spring. Better alternatives would be applications of either urea (40 lb/A in 100 gal of water) or of 2.5 tons/A of dolomitic lime. All inoculum reduction practices should be completed before green tip if possible, but there may still be some benefit even if they are implemented shortly after green tip.

Syllit (dodine) should be applied in combination with mancozeb in two early season sprays in high-inoculum orchards unless dodine-resistant apple scab is known to be present in the block. If copper is used in the first spray for fire blight suppression, then Syllit plus

mancozeb could be used in the second and third applications. Syllit is incompatible with some formulations of copper fungicides and with some formulations of chlorpyrifos insecticide. Combining Syllit and chlorpyrifos has sometimes resulted in buttering out in the sprayer tank. Syllit is less useful after tight cluster because it does not control rust or mildew. Including a mildewcide at tight cluster and pink is becoming increasingly important, as mildew populations are becoming increasingly resistant to the DMI fungicides (Rally, Indar, Topguard, Inspire Super). None of the other fungicide groups will effectively control mildew if the first mildewcide application is delayed until petal fall.

Combinations of mancozeb and captan have worked well for many growers in prebloom sprays, but this program of contact fungicides is unforgiving because it provides no post-infection or anti-sporulant activity to suppress scab that may develop as a result of less-than-perfect application timing or fungicide coverage. The latter can result from spraying in the wind and/or from alternate row spraying. Therefore, we strongly recommend that growers include one of the more potent modern fungicide chemistries (i.e., an SDHI, QoI, or DMI, in that order of preference) in either their tight cluster and pink sprays or in their pink and bloom sprays, so as to reduce risks of having secondary scab emerge after petal fall. Growers who opt to continue relying on the captan-mancozeb mixture through bloom should at least add several pounds per acre of sulfur to the tank mix at tight cluster and pink to suppress mildew.

The SDHI fungicides Fontelis, Luna Tranquility, Luna Sensation, and Merivon are effective against scab, rust, and mildew, but only Fontelis and Luna Tranquility are currently registered in NY (via special local needs labels), and none of these products are labeled on Long Island due to concerns about the potential for ground water contamination. Merivon may get a New York label

continued...

later this spring. For early season disease control, these products are best used between tight cluster and first cover. Our preference is to use them before petal fall. That is especially true for Luna Tranquility, which is a premix of Luna (the SDHI component) and Scala (pyrimethanil). Scala alone is not effective in protecting fruit from scab or in controlling rust, and the Luna component, like many of the SDHIs, has only moderate activity against rust diseases. Controlling cedar apple rust on leaves is usually most difficult during the period of rapid shoot growth after petal fall, so Luna-T is does not fit very well after bloom.

All of these SDHI fungicides should be applied in combination with either mancozeb or captan. This is essential for both fungicide resistance management and because the SDHI fungicide products may not redistribute well enough to protect newly expanding leaves that develop between sprays. In most cases, we prefer to see these products combined with mancozeb rather than captan because of the additional rust control provided by mancozeb and because Fontelis, which is formulated with mineral oil, can enhance uptake of captan into leaves and fruit where captan will cause injury under certain environmental conditions. Merivon has label warnings against tank-mixing with oil sprays or other pesticides formulated as emulsifiable concentrates.

The strobilurin or QoI fungicides (Flint and Sovran) also control scab, rust, and mildew in most New York orchards, but they are losing activity against mildew in some orchards and they can fail catastrophically against scab, as has already occurred in many orchards in Michigan. Resistance to QoI fungicides in scab begins as a gradual loss of activity, especially post-infection activity, but can suddenly change to a total loss of activity. In the field, the final loss of activity would mimic the scenario that occurred when apple scab populations became resistant to the benzimidazole fungicides. Because control failures resulting from QoI fungicide resistance can occur quickly and unpredictably, and because we have already used QoIs

for many years, we believe it is safer to avoid using them during the prebloom and bloom periods in apples, when both scab pressure and the negative consequences of control failures are greatest. Where the QoIs are still working, their best fit may be at petal fall and/or first or second cover sprays.

Both Luna Sensation and Merivon are package mixtures of QoI and SDHI fungicides, so we suspect that using either of these products in prebloom sprays will add to selection pressure for QoI resistance. That selection pressure would certainly be minimized by the presence of the SDHI in those package mixtures, and the recommended inclusion of a contact fungicide (captan or mancozeb) with those products would further reduce selection pressure. Nevertheless, a spray program that starts with two sprays of Syllit plus contact fungicide, followed by two sprays of either Fontelis or Luna-T plus contact fungicide, and ending with two sprays of either Flint or Sovran plus contact fungicide at petal fall and first cover, should provide excellent resistance management because that program includes back-to-back sprays of at least three different and non-overlapping at-risk fungicide groups (i.e., dodine, SDHI, QoI). Where labeled, Merivon can be used as a substitute for Pristine in preharvest sprays, so excluding it from the scab spray program does not reduce its importance in apple disease control programs.

The DMI fungicides (Rally, Indar, Topguard, Inspire Super) can still be very useful where resistance has not emerged as a problem. However, they are losing activity against both scab and mildew in many orchards in the eastern United States. Hence, it may be wise to avoid trusting them for prebloom scab control for the same reasons cited for avoiding Flint and Sovran in prebloom sprays. Where mildew pressure is high and they have been used for many years, they may also fail to provide acceptable control of mildew when used at petal fall and first cover. This is especially true for Inspire Super, which is very weak on mildew if the

continued...

mildew population has shifted toward DMI resistance. Nevertheless, the DMI fungicides are still the most effective products for controlling rust diseases, against which they provide exceptional post-infection activity. If Inspire Super is used for scab control, adding a few pounds per acre of sulfur may compensate for Inspire Super's weakness against mildew. Of course, sulfur cannot be used if oil is included in the tank mix.

Captan issues

For a variety of reasons, we are suggesting for the first time this year that apple growers avoid captan in their petal fall and first cover sprays. Growers who choose to follow this suggestion will need to avoid any prebloom applications of mancozeb or Polyram that exceed 3.2 lb/A, because mancozeb will be needed as a contact fungicide in the petal fall and first cover sprays. If mancozeb is applied at more than 3.2 lb/A in any spray, then the label does not allow for any use of mancozeb after bloom.

Our suggestion for avoiding captan in petal fall and first cover sprays is based on the increasing complexity of tank mixtures applied at those timings. Tank mixes at petal fall frequently include one or two plant growth regulators, two or three fungicides, one or two insecticides, foliar nutrients, pH buffers, water conditioners and/or spreader-stickers, and perhaps streptomycin for controlling fire blight on late flowers. These complex mixtures increase the likelihood that something in the mixture will enable the transport of captan across the cuticle into plant cells where it will cause leaf injury and/or fruit russetting. The potential for injury from captan in complex tank mixtures is especially high if the weather between late bloom and first cover is cool, overcast, and wet. We observed or received numerous accounts of fruit and foliar damage throughout the northeastern United States in 2013, but the frequency of damage from captan has gradually been increasing over the past decade. Therefore, in the interests of minimizing risks of crop damage, we believe it would be wise to avoid captan in the petal fall and first cover sprays when

tank mixes are complex and fruit are most vulnerable to damage.

Bee toxicity issues

Several reports in the past year have implicated fungicides as potential contributors to widespread honeybee mortality that is commonly known as colony collapse disorder (CCD). In particular, chlorothalonil (Bravo and generics) and Indar have been shown to interact synergistically with some insecticides, meaning that some insecticides become more toxic to some bee species when mixed with those fungicides in laboratory tests (Biddinger et al. 2013; Zhu et al. 2014). There is still much that remains unknown about these interactions. Whether these fungicides are having any real impact on bee mortality under field conditions remains unclear. Ultimately, EPA will evaluate all of the data and require label changes if there is solid scientific evidence that these fungicides contribute to bee mortality.

References

Zhu, W., Schmehl, D.R., Mullin, C.A., Frazier, J.L. 2014. Four common pesticides, their mixtures and a formulation solvent in the hive environment have high oral toxicity to honey bee larvae. *PLoS ONE* 9(1): e77547. doi:10.1371/journal.pone.0077547. On-line at <http://www.plosone.org/article/fetchObject.action?uri=info%3A-doi%2F10.1371%2Fjournal.pone.0077547&representation=PDF>

Biddinger, D.J., Robertson, J.L., Mullin, C., Frazier, J., Ashcraft, S.A., Rajotte, E.G., Joshi, N.K., and Vaughn, M. 2013. Comparative toxicities and synergism of apple orchard pesticides to *Apis mellifera* (L.) and *Osmia cornifrons* (Radoszkowski). *PLoS ONE* 8(9): e72587. doi:10.1371/journal.pone.0072587. On-line at <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0072587>



CHEM
BRIEFS

PRODUCT
REGISTRATION
UPDATE
(Art Agnello,
Entomology, Geneva,
ama4@cornell.edu)

❖❖ Following is a brief (so far) list of changes to the insecticides available for use in NY tree fruit crops for the 2014 growing season; more are sure to follow:

Guthion/Azinphos-methyl - Just to be sure, a reminder that this product and a.i. is no longer registered for use in fruit crops.

Thionex - All endosulfan products are currently registered for use in apples only, with an EPA-mandated stop-use date of December 31, 2014.

A new pre-mix insecticide has been registered in NY by FMC; Gladiator, a mixture of avermectin B1 and zeta-cypermethrin, is reg-

istered against a wide range of insect pests as well as European red mite in pome fruit and stone fruit. For best effectiveness and insecticide resistance management, the use of pre-mix products should be reserved for situations when multiple pest species are present and appropriately matched to the combination of active ingredients and modes of action contained in the product.

Please note that the 2014 Cornell Pest Management Guidelines for Commercial Tree Fruit Production are available only as a hard copy this year. A visit to the PMEP website (<http://ipmguidelines.org/treefruits/>) gives the following explanation: 'Due to budgetary constraints, the 2014 Cornell Pest Management Guidelines for Commercial Tree Fruit Production will not be available online. We are currently exploring options that will allow us to recover the costs of posting this publication online. We hope to have the Guidelines back online in 2015.' Distribution has been taken over by the Cornell Store, and can be purchased online at: <http://store.cornell.edu/c-875-guidelines.aspx> or through your local Cornell Cooperative Extension office. ❖❖

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–3/24/14):	8.4	0.3
(Geneva 1/1–3/24/2013):	31	8
(Geneva "Normal"):	61	16
(Highland 1/1–3/24/14):	8.7	0
<u>Coming Events:</u>	<u>Ranges (Normal ±StDev):</u>	
Green fruitworm 1st catch	50–152	11–71
Pear psylla adults active	31–99	8–34
Pear psylla 1st oviposition	40–126	11–53

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.