

scaffolds

Update on Pest Management
and Crop Development

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

March 30, 2015

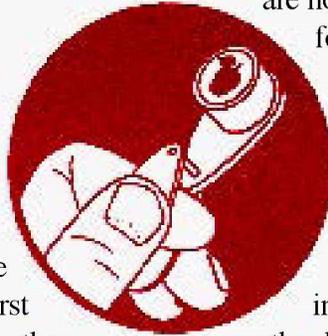
VOLUME 24, No. 1

Geneva, NY

GENERAL INFORMATION

SLOWLY,
BUT
SURELY

NEW YORK
STATE OF
MIND
(Art Agnello,
Entomology,
Geneva)



are no surprise gaps that could be mistaken for phishing scams, malware, spoofing, computer worms, or the darknet (bet you didn't think that was a real thing).

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

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❖❖ We normally would have begun this year's publication on the first Monday after the vernal equinox – in other words, last week – but to be honest, things haven't felt very spring-like this month, and last Monday I just couldn't imagine the still-concealed frozen ground beneath a solid snow cover as being anywhere near indicative of the growing season just around the corner. There's a poem by François Villon that has a famous refrain, "*Mais où sont les neiges d'antan?*" – "But where are the snows of yesteryear?" – which draws the comparison with everyday affairs that are ephemeral and, once gone, leave nothing tangible behind. This year's snows will eventually be gone, but it's less clear what they'll leave when they retreat, or how drawn out the process will be. There shouldn't be too many effects of the cold winter on either insect or disease incidence this season, since everything was mostly protected by the layers of snow; tree and bud damage could be a different matter, as it looks like at least some of the stone fruits have suffered from the prolonged low temperatures. It doesn't look like we'll have a quick spring, however; if the long-term forecasts are anywhere near accurate, this season could be quite delayed. At least until that famous NY heat machine gets fired up.

Don't Look For Us on Facebook

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

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- ❖ New year of Scaffolds intro

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- ❖ Tree fruit fungicides for 2015

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- ❖ Product registration update

UPCOMING PEST EVENTS

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. ❖❖

RESISTANCE MOVEMENT

2015 FUNGICIDE
UPDATE FOR NEW
YORK

(Kerik Cox & Dave
Rosenberger, Plant
Pathology, Geneva &

Highland; kdc33@cornell.edu, dar22@cornell.edu)

❖❖ Disease management programs for apples have not gotten any simpler. The problems of fungicide resistance may have appeared to present fewer problems with the advent of the succinate dehydrogenase inhibitor (SDHI) fungicides and fungicide premix products. Without careful use, however, it will only be a matter of time before the new fungicide chemistries are overcome. While the paradigm of marketing pre-mix fungicides may fall out of favor in the coming years, complex tank mixes and incompatibilities between new and existing products will continue to present new problems. Below we present an update on the new fungicide products and our perspectives on the use of existing products.

Overwintering inoculum

If an orchard had high levels of apple scab in the fall, inoculum reduction should be practiced. If inoculum reduction was practiced in the fall, it is not necessary to repeat such practices in the spring. If blocks are in need of inoculum reduction, it would be important to implement the practice as soon as the snow is melted and tractors can enter the orchard. The two best inoculum reduction options are to shred leaves with a flail mower or treat the leaf litter with an application of urea. In the case of flail mowing, the leaves need to be swept or raked from underneath the canopy to the row middle. Subsequently, the row middles would be mowed with the flail mower set to scalp the sod. Urea applications should be made by applying 40 lbs. of urea per acre in 100 gallons of water. If dolomitic lime is used instead, it should be applied at rate of 2.5 tons per acre. Of the two options, applying urea is typically the simplest approach, but take care to rinse the sprayer with water afterwards since the urea is caustic and can wear out a sprayer pump over time.

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scaffolds

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Available fungicides

Dodine (Syllit)

Syllit (dodine) should be applied in the early season and no applications are allowed after pink, according to the new label language. (Applications after bloom are still allowed on pears.) Although it's been several years since we've detected dodine resistance, Syllit should still be applied in combination with mancozeb and in no more than two applications. If there are heavy rains prior to pink, Syllit may be a good choice, as it has some post-infection utility, even in blocks that have been shifted towards resistance. Since copper is often applied at silver/green tip to suppress fire blight inoculum, Syllit plus mancozeb could be applied at late green tip to pre-tight cluster. If powdery mildew is a concern, Syllit may not be a good choice at tight cluster, as it has no activity against mildew. Although the key application timings for powdery mildew usually occur from bloom to 1st cover, the reduced mildewicide activity of demethylation inhibitors (DMIs) and quinone outside inhibitors (QoIs) due to resistance in some orchards means that mildewicide programs must increasingly be initiated at tight cluster to prevent the buildup of inoculum before the first control is applied. Syllit also has no activity on rust diseases, but in most cases these can be controlled by mancozeb; this is recommended as a tank-mix partner for Syllit.

Captan and Mancozeb

Combinations of mancozeb and captan on a 5–7-day schedule have been popular for the last few years. However, these two fungicides are contact fungicides and must be applied before rains. Moreover, they have little to no effect on powdery mildew and may be weak against rust in high-inoculum situations. As the season progresses to bloom and the tank mixes become complicated by the fact that growers need to manage insects, diseases, and thin apples, captan should be used with caution because it is phytotoxic if absorbed by plant cells. Adjuvants, oils, and other tank mix partners that cause excessive wetting or enhance uptake will increase chances that captan will get through the cuticular layer of leaves and fruit. This is especially

the case when there are slow drying conditions in the early morning, in the late evening, or during a light rain. For this reason, we have been suggesting that growers avoid applications of captan at petal fall and first cover when the tank mixes are increasingly complex and the cuticles of apple leaves and fruit are not fully developed. When planning to avoid captan at these timings, it will be critical to also avoid any prebloom applications of mancozeb or polyram that exceed 3 lbs/A. At petal fall and 1st cover, it will still be important to have a multi-site contact fungicide for resistance management, but if rates of mancozeb higher than 3 lbs/A are used at any time during the early season, the label will not allow post-bloom applications of mancozeb.

SDHI fungicides

There are several SDHI fungicide chemistries registered for apples, and several more are forthcoming (Table 1). The SDHI fungicides are either marketed alone or pre-mixed with another fungicide chemistry such as a QoI or AP (anilinopyrimidine) fungicide. The SDHI fungicides in general have a high level of activity against apple scab and a low to moderate level of activity against apple rust diseases and powdery mildew. The AP fungicides are typically more effective in colder weather; hence, it would be best to apply products with AP fungicides prior to bloom. The SDHI fungicide products with QoI mix partners provide a little better control of powdery mildew and apple rust diseases; therefore, these premix products could be applied from bloom to 1st cover. Since the SDHI + QoI premix products also work well for summer disease, making applications at first cover as well as in the final pre-harvest covers would be advisable. While there are concerns about QoI fungicide resistance, the performance of the SDHI + QoI premix products does not seem to be affected by the presence of QoI-resistant apple scab or powdery mildew. Regardless, it is advisable to include 3 lbs of mancozeb (a multi-site contact fungicide) with all of the SDHI fungicide products, to preserve the

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Table 1. Features of current and forthcoming SDHI fungicide products.

Trade name (Manuf.)	Fungicide Chemistries	Disease efficacy	Registration Status (Restricted)	Use on Long Island
Fontellis (DuPont)	SDHI	High: apple scab, Low: Rust and Mildew	SLN	No
Merivon (BASF)	SDHI + QoI	High: apple scab, Moderately High: Rust and Mildew	SLN	No
Luna Tranquility (Bayer)	SDHI + AP	High: apple scab, Moderate: Mildew, Low: Rust	SLN	No
Luna Sensation (Bayer)	SDHI + QoI	High: apple scab, Moderately High: Rust and Mildew	Outside NY	No
Aprovia (Syngenta)	SDHI	High*: apple scab, Moderate: Rust and Mildew	Not Registered	NR
Isofetamid** (ISK)**	SDHI	High*: apple scab, Low: Rust and Mildew	Not Registered	NR

* In high disease pressure years, I have observed an exceptionally high level of apple scab efficacy.

** Trade name has not been announced.

lifespan of the fungicide chemistry. Mancozeb is preferable to captan, given the concerns with captan use at petal fall and 1st cover. Moreover, many of the SDHI fungicides are petroleum-based SC formulations, which could slightly enhance the uptake of captan under slow drying conditions. Table 1 summarizes the various features of the current and forthcoming SDHI fungicide products.

QoI or Strobilurin fungicides

The QoI or strobilurin fungicides provide a high level of activity against apple scab, apple rust diseases, and powdery mildew. Unfortunately, resistance to QoI fungicides in apple scab is widespread in Michigan, and is reported in NY and many states east of the Mississippi. The development of resis-

tance may appear gradually at first, but can quickly progress to a near complete loss of effectiveness not unlike that experienced for the benzimidazole fungicides. Given the risk and uncertainties with the level of QoI resistance present in orchards over the last few years, it may be best to avoid using the QoI fungicide products alone from pink to 1st cover. Instead, consider using an SDHI + QoI fungicide premix product such as Merivon. It would provide the same activity as Flint or Sovran, but with less risk of resistance development.

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DMI fungicides

Resistance to the DMI fungicides (Rally, Indar, Topguard, Inspire Super) in apple scab is fairly widespread, and we believe that DMI resistance in apple powdery mildew may also be fairly widespread. Resistance to this group of fungicides is rate-dependent and gradual, meaning that resistance may sometimes be overcome by higher product rates and the use of DMI chemistries with higher intrinsic activity, especially in orchards with only low to moderate disease pressure and/or on cultivars that are less than highly susceptible to scab (i.e., more resistant than McIntosh). To date, it seems that the apple scab pathogen has hit a (metabolic ceiling) point at which the level of resistance the fungus can achieve cannot exceed the amount/potency of difenoconazole when Inspire Super is applied at the upper end of the label rates. Simply put, if Inspire Super is applied at the high end of current labeled rates, if spray intervals are kept to roughly 7 days, and if sprayers provide good coverage, then an effective dose of difenoconazole on fruit and foliage may be higher than the scab fungus can tolerate, even in populations where there has been a significant shift toward DMI resistance. That being said, DMI fungicides should still be used with extreme caution, and should not be relied on for post-infection activity.

One of the more noticeable effects of DMI resistance is the failure of DMI fungicides to provide the exceptional control of powdery mildew that has historically been observed. This is most pronounced with the DMI fungicides difenoconazole and fenbuconazole (Indar 2F). Compared with the DMI chemistries in the fungicide products Rally (myclobutanil) and Topguard (flutriafol), difenoconazole and fenbuconazole are weak against powdery mildew. If DMIs are used for powdery mildew control, it may be worthwhile to include a low rate of sulfur to compensate for the presence of DMI resistance.

Summary

In summary, a strong fungicide program with good fungicide resistance management would begin with an application of copper and include two applications of Syllit plus mancozeb and/or two applications of an SDHI fungicide plus mancozeb before bloom. Later applications during petal fall to 1st cover could include two applications of a QoI or SDHI plus QoI (Merivon). It would also be advisable to use a DMI plus sulfur during petal fall and first cover for rust or powdery mildew, and save the remaining SDHI or QoI applications in the form of Merivon or Pristine for pre-harvest cover sprays. ❖❖

CHEM BRIEFS

PRODUCT
REGISTRATION
UPDATE
(Art Agnello,
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❖❖ Following is list of some changes to the insecticides available for use in NY tree fruit crops for the 2015 growing season; more are sure to follow:

Thionex - All endosulfan products are currently registered for use in apples only, with an EPA-mandated stop-use date of July 31, 2015.

Madex - As a reminder, last May, Madex HP (EPA Reg. No. 69553-1) from Certis USA, was registered for use in controlling codling moth and oriental fruit moth in NYS pome and stone fruit crops. The active ingredient, *Cydia pomonella* granulosis virus isolate V22, has activity against both of these tortricid pest species, is OMRI approved for use in organic production, and is harmless to natural enemies and

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other non-target organisms. Application should target the 5% egg hatch point of each generation of OFM and CM, and can be applied on a 7-day interval. It has a 4-hr REI and no PHI.

Envidor - Last August, The NYS DEC approved a FIFRA 24(c) Special Local Need label for Envidor 2SC miticide (Bayer CropScience, EPA Reg. No. 264-831; active ingredient, spiroticlofen) for use against mites, including European red mite and Twospotted spider mite, on pome fruit. A maximum of 1 application per season is allowed at a rate of 16–18 fl. oz./A, with a PHI of 7 days; not for sale, distribution or use in Nassau and Suffolk Counties.

Exirel - In January, NY registered Exirel SL insecticide (DuPont, EPA Reg. No. 352-859; active ingredient Cyazypyr®/cyantraniliprole) for use against a range of chewing and sucking pests on pome fruits, including codling moth, oriental fruit moth, obliquebanded leafroller, plum curculio, European apple sawfly, pear psylla, and rosy apple aphid. It has a PHI of 3 days, and a 12-hr REI.

Isomate CM/OFM Mist (Pacific Biocontrol Corp., EPA Reg. No. 53575-44), a battery powered aerosol emitter for delivering codling moth and oriental fruit moth pheromones, received a registration this past winter for use in pome and stone fruit orchards. The supply canister is designed to last all season long (160 days); the unit has an internal clock and temperature sensor, which controls pheromone release. This product is for single season use and is to be disposed of at the end of the season; the unit is compatible for recycling.

Tourismo (Nichino America, EPA Reg. No. 71711-33), a suspension concentrate pre-mix of flubendiamide (the same a.i. as in Belt) plus buprofezin (the same a.i. as in Centaur), has been labeled in NYS for several years for use in pome fruits and stone fruits against leafrollers and internal-feeding Lepidoptera. It has a 12-hr REI, and a PHI of 14 days; not for sale, distribution or use in Nassau and Suffolk Counties.

From Kerik Cox, Plant Pathology, Geneva (kdc33@cornell.edu):

Kasumin 2L, a new antibiotic, has been registered for use on fire blight in NY by Arysta LifeScience (EPA Reg. No. 66330-404). The active ingredient is kasugamycin, an antibiotic with a different mode of action than streptomycin and oxytetracycline, that doesn't have veterinary or human medicinal uses. Kasugamycin does not have systemic activity like streptomycin, but has been equally effective against blossom blight in field trials throughout the US. It should be noted that orchards treated with Kasumin 2L may not be used for livestock grazing. Refer to the label for further use restrictions.

From Debbie Breth, CCE Lake Ontario Fruit Program, Albion (dib1@cornell.edu)
BASF

Merivon – Group 7/11, a combination of fluxapyroxad and pyraclostrobin, now has a full label in NYS and has been classified as “Restricted Use” in stone fruit, pome fruit, and strawberries. It is no longer a SLN label as in 2014. The current label says "Do Not Use Merivon with: Emulsifiable concentrate (EC) or solvent-based formulation products, or Crop oil concentrate (COC), or methylated seed oil (MSO) adjuvants." It is not allowed in Nassau and Suffolk Counties.

Vivando (metrafenone) is a new fungicide that affects several steps in the infection process of powdery mildew in grapes and has a supplemental label for pome fruit. It has a new mode of action, Group U8, different from other mildew fungicides. It has no curative effect and must be applied before signs of infection. It has a 12-hour REI, applied at 15.4 oz/acre with 3 applications per year (total season use of 46.2 fl oz/acre), with a 7-day PHI. Do not mix Vivando with horticultural oils. Silicone adjuvants are best. Do not make more than 2 sequential applications. There is also a supplemental label for 2 sprays per season in cherry, apricots, peaches, and hops.

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Certis

Certis bought all copper products formerly owned by DuPont, including Kocide 2000, 3000, and Mancocide. Make sure you change the EPA number for the product you are using for your records. They will continue to support Cueva, a low-rate (0.16 lb metallic copper/gallon) copper using a 2 qt/acre rate; it has a 4-day REI in pome and stone fruit. PHI Is 0 days.

Double Nickel LC and WDG 55 was registered for use in NYS in 2012 but more growers had opportunity to use it with heavy pressure in 2014. It is a biological OMRI-approved formulation of *Bacillus amyloliquefaciens* strain D747*. It has a 4-hour REI. It is labeled for use on many bacterial diseases in pome and stone fruit, cane and bushberries and strawberries. For fire blight control, it must be integrated or alternated with an antibiotic program for blossom blight, and mixed or rotated with low-rate copper for shoot blight control. For bacterial diseases on stone fruits, mix or rotate it with copper products. The common commercial use rate for Double Nickel is 1 qt per acre for the LC, and 0.5 lb per acre for the WDG. PHI is 0 days.

Dupont

Vydate – Because of an accident at their manufacturing facility, DuPont will have Vydate only in short supply in 2015.

Valent

Asana is now a Valent material with a new EPA registration number: 59639-209.

Aceto

A Syllit label change on new material prohibits use after pink bud on apples, with no more than 2 applications per season using 1.5 pt/acre mixed with captan or mancozeb. The old label still in the system is still legal until the supply is depleted. It should not be mixed with copper, chlorpyrifos or foliar nutrients.

On Hudson's Distant Shore

The following is a list of products that have been registered by EPA, but have not yet gained a NYS registration. New York labels for these materials are in various stages of review by the NYS DEC:

Closer (a.i. sulfoxaflor; from Dow AgroSciences) - a sulfoxamine (IRAC Group 4C) for aphids, white apple leafhopper, and plant bugs; suppression of San Jose scale and pear psylla

Sivanto (a.i. flupyradifurone; from Bayer CropScience) - a butenolide (IRAC Group 4D) for aphids (except WAA), leafhoppers, San Jose and oystershell scales, and pear psylla

Nealta (a.i. cyflumetofen; from BASF) - a respiration inhibitor miticide (IRAC Group 25) for European red mite and two-spotted spider mite in pome fruits

Please note that the 2015 Cornell Pest Management Guidelines for Commercial Tree Fruit Production is available this year from the Cornell Store, both in a printed book format as well as online once again; however, the online version is not free, but must be purchased (for \$38.00, the same price as the print version). There is also a bundle option, which provides both for 40% more than the cost of either version alone. If you do not receive the Tree Fruit Guidelines as part of your membership in a county-based CCE fruit program, visit <https://demo.cuguidelines.net/> for purchasing details. ❖❖

UPCOMING PEST EVENTS

	<u>43°F</u>	<u>50°F</u>
Current DD accumulations (Geneva 1/1–3/30/15):	5.1	1.0
(Geneva 1/1–3/30/2014):	18.1	3.9
(Geneva "Normal"):	79	25
(Highland 1/1–3/30/15):	15.6	2.7
<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.

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