

SCAFFOLDS Fruit Journal, Geneva, NY

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Update on Pest Management and Crop Development

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COMING EVENTS

	43°F	50°F
Current DD* accumulations		
(Geneva 1/1-3/26):	56.0	20.1
(Geneva 1/1-3/26/2017):	89.9	34.8
(Geneva "Normal"):	63.7	24.2
(Geneva 1/1-4/2, predicted):	68.5	21.4
(Highland 1/1-3/26):	89.4	34.1

Upcoming Pest Events - Ranges (Normal +/- Std Dev):

Green fruitworm 1st catch	50-148	12-68
Pear psylla adults active	31-99	8-34
Pear psylla 1st oviposition	40-126	11-53
McIntosh silver tip	63-107	21-42
McIntosh green tip	99-145	38-63

*[all DDs Baskerville-Emin, B.E.]

[Section: GENERAL INFO]

NO SPRING FOR YOU?

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

[Box text: GROUND TRUTH]

I'd be the last to suggest that the lack of, let's say anxiety, that I've been sensing among fruit industry colleagues at any of several meetings attended during the past month could be the result of complacency about the imminent growing season. To be sure, the winter now reluctantly in retreat seems to have left no major scars – no drastic temperature plunges or freakish thaws; some respectable single-digit stretches that certainly satisfied chilling requirements; a healthy amount of snow cover; and a succession of Nor'easters to firmly resist any notion of rushing headlong into that unsettling "green panic" caused by buds pushing so quickly they're almost audible. But I'm going to suggest that growers (and those of us who work with them) simply have an anti-"spring surprise" threshold, an aversion to weather that's too nice too early, that strikes nearly everyone else as a little perverse.

Actually, we all want the winter to end, and once that threshold is passed, preferably after a few March storms to reassure us we haven't overslept yet, the business of growing fruit can start again in earnest. The National Weather Service reported last Thursday that all of the Northeast has snow on the ground, and in the

Mid-Atlantic, snow cover extends down to northern North Carolina and west into Indiana. Concrete-like patches of snow still occupy sections of my own backyard, but the yellow and white of crocuses and snowdrops aren't to be ignored, and are only the first of the spring parade that's slowly building under our feet.

Forgot password?

No need to worry - Scaffolds will continue to be available via email and online this year; no password is required. As always, we ask subscribers to inform us of any address changes, so that we don't need to guess about whether error messages are originating from a Russian bot or an attorney representing the estate of an exiled tycoon.

Scaffolds is sent 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***.

Also, we will 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.

[Section: DISEASES]

EARLY SEASON DISEASE MANAGEMENT IN 2018
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[Box text: PROTECTION RACKET]

Winter has been punctuated with unseasonably warm periods followed by Nor'easters bringing more snow. In the coming weeks, regional snow storms may give way

to regional rain storms, which could lead to problems with diseases in early April. Hence, we may need to be concerned about early season disease management for apple scab and other diseases. In the 2017 season, we had considerable rain from June to August, apple scab pressure was incredibly high, and there were fruit coming out of storage with bitter rot, black rot, and white rot. The 2017 season was one of the rainiest seasons I have experienced in my 11 years at Cornell. By mid-July, nearly all the 'Empire' fruit on untreated trees had apple scab and the severity of infection only increased as we approached harvest. This fall, the potential ascospore dose (PAD) in my research blocks was "off the charts", suggesting that fungicide applications will be warranted from green tip to tight cluster to effectively manage this level of apple scab inoculum. This may be the case for commercial operations that had difficulties managing apple scab in 2017.

The conditions for fire blight development were also favorable in 2017, and a "delayed-dormant" application of copper at silver/green tip may help reduce inoculum for both apple scab in buds and fire blight in cankers. As the weather begins to warm (>60°F) in the coming weeks, fire blight cankers could begin to ooze. While

we had considerable warm weather in January and February, overwintering cankers appeared to remain dormant in my fire blight research orchards during these periods. It's important to note that cold weather will not kill fire blight bacteria overwintering in cankers. The bacteria will remain viable at low (<32°F) temperatures. By the time we reach bud break, cankers could be oozing. To reduce early season apple scab and fire blight inoculum, make an application of a high (>15%) metallic copper equivalent (MCE) copper fungicide (e.g., Badge, Kocide, Cuprofix).

Reduction of orchard floor inoculum may also greatly reduce the magnitude of apple scab and potentially even summer fruit rot epidemics. As soon as it is possible to enter the orchard, remove any remaining fruit drops and pruned shoots left on the floor from winter pruning that may contain bitter rot or black rot inoculum. If apple scab leaf inoculum reduction was not practiced in the fall, it will be important to do this as soon as the tractors can enter the orchard to reduce apple scab pressure. Even if the planting has reached green tip, inoculum reduction may still provide some benefit by reducing inoculum pressure by tight cluster or pink when tissues are at their greatest susceptibility to apple scab.

The two best options for inoculum reduction 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 into row middles. Then mow the row middles with the flail mower set to scalp the sod. If applications of urea are used, applications should be made at 40 lbs. of feed grade urea per acre in 100 gallons of water. Dolomitic lime can be used instead, applied at a rate of 2.5 tons per acre. Of the two options, applying urea is the simplest approach, but take care to rinse the sprayer with water afterwards since the urea is caustic and can corrode a sprayer pump over time. The use of orchard floor urea may have other applications beyond that of reducing apple scab inoculum. The application of urea on the orchard floor will also enhance the decay of any plant organic matter, including fruit drops and pruned shoots. Although it's not been validated, this practice should, in principal, have a similar effect on overwintering inoculum sources in other pathosystems (e.g., cherry leaf spot).

Once green tip is reached, it's advisable to continue with protectant fungicides. At green tip, it is generally

safe to apply copper. As with the silver tip application, select a high MCE (>15%) copper fungicide (e.g., Badge, Kocide, Cuprofix). If the buds are approaching 1/4" green, then one may wish to stick to a program of Captan with Mancozeb at half maximal rates. The combination is referred as "Captozeb" in the vernacular sense. The combination has good protectant and redistribution properties, but has little to no post-infection activity, and must be applied before rains. Re-application is warranted when unprotected tissues emerge or when considerable rainfall (> 1") occurs.

It is advisable to use the NEWA apple scab forecasting system

(<http://newa.cornell.edu/index.php?page=apple-diseases>) to identify predicted ascospore releases and

potential infection events to improve spray timing.

When practical, one can apply fungicides to get the best coverage prior to predicted large releases of ascospores (>15% discharge) during weather conditions conducive to infection.

As bloom approaches, consider some of the modern single-site fungicides (e.g., Luna Tranquility, Luna Sensation, Flint, Fontelis, Merivon, Syllit, Rally, Rhyme, Inspire Super, Aprovia). Many of the single-site

fungicides will provide a broader range of activity against other fungal pathogens like powdery mildew and fruit rots, which may cause latent infections at bloom, whereas the "Captzeb" combination does not. Given fungicide resistance concerns, it's no longer recommended to apply single-site fungicides for post-infection activity. Instead, think of making applications of single-site fungicides between infection periods. Use the NEWA system to identify periods where substantial ascospore release (>15% discharge) has occurred and another infection period is predicted soon after.

For example, apply your selected single-site fungicide (with 3 lb/A mancozeb) for "next week's" infection within 24–48 hours after the last infection period. It should protect against the next predicted infection and perhaps afford some curative activity if any germinating spores slipped through the fungicide coverage from the previous week. Of the single-site materials available, Dodine, sold as Syllit, will likely be your strongest performer for applications between infection periods. However, Syllit may only be applied twice before pink. Another option would be to use Luna Tranquility or Inspire Super. Both products are highly effective on apple scab and include an anilinopyrimidine (AP)

fungicide, which works best in the colder temperatures that often occur prior to bloom.

Summary

A strong early disease management program should begin with applications of copper at silver tip and green tip. These applications will help reduce overwintering apple scab and fire blight inoculum and protect against early season apple scab infections. Orchard floor inoculum reduction should follow by sweeping the orchard to remove prunings and any remaining apple drops, which may harbor inoculum from several fungal pathogens. After sweeping, apply urea to degrade overwintering leaf litter to reduce apple scab inoculum and any other plant debris not removed by sweeping. From green tip to bloom, a program of protectant fungicides centering around captan and mancozeb should be implemented to protect the developing fruit clusters. If there is a long wetting period in the early season, an application that includes mancozeb along with either Syllit, Luna Tranquility, or Inspire Super may be helpful. As we proceed toward bloom, additional applications of single-site fungicides (e.g., Luna Tranquility, Luna Sensation, Flint, Fontelis, Merivon, Syllit, Rally, Rhyme, Inspire Super, Aprovia) may be needed to manage powdery mildew and other fungal

diseases that may begin as latent infections during bloom.

SPRINGTIME SANITATION FOR BITTER ROT CONTROL

(Dave Rosenberger, Plant Pathology, Highland;
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[Box text: THE MUMMIES' REVENGE]

In blocks where bitter rot was a problem last year, growers should implement pre-bloom sanitation strategies to reduce inoculum for this disease. The bitter rot pathogen can overwinter in decayed fruit mummies, in old fire blight strikes left in the tree, and in dead twigs left beneath trees. Dead wood and mummied fruit (especially the larger mummies) still hanging in trees should be removed during winter pruning. Then fruit mummies and prunings (including small twigs) should be swept from beneath tree rows before the season starts. The debris swept from beneath the trees into the sodded row middles can be chopped with a flail mower and should disintegrate into the sod before it can release spores to infect this year's crop. A rubber paddled brush rake may be the best way to remove debris from beneath trees if it can be used without tangling trickle irrigation lines. Hand raking can also be used if the bitter rot hot spots

involve only limited areas. Honeycrisp blocks warrant special attention because this cultivar is especially susceptible to bitter rot.

The fungi causing bitter rot (*Colletotrichum* species) can infect fruit early in the season, then remain quiescent and invisible for many weeks, showing up as fruit decays only later in the season or during storage when conditions favor fruit invasion. Most infections probably occur later in summer (after 15 July in the Hudson Valley), but we really don't know how much early season infections might be contributing to the overall disease incidence. Fruit infected with bitter rot that dropped prematurely last year will persist as dried mummies within the herbicide strip and may still provide inoculum for midsummer infections if they are not removed. It is quite clear that bitter rot problems tend to persist from one year to the next in blocks that had a lot of fruit infection the previous year. If we have a hot, wet summer, controlling bitter rot with fungicides alone can be nearly impossible in blocks with high carry-over inoculum. Therefore, springtime sanitation is a critical component for controlling bitter rot in blocks that had problems last year.

[Section: CHEM NEWS]

PRODUCT REGISTRATION UPDATE

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

[Box Text: CHEM BRIEFS]

Following is a list of the changes we are aware of to the insecticides available for use in NY tree fruit crops for the 2018 growing season; expect more to follow on an irregular schedule:

Cancelled

- Ambush (permethrin, AMVAC) is no longer registered in NY; Pounce 25WP (FMC, EPA Reg. No. 279-3051 remains labeled for use in apples, pears, cherries and peaches.
- Azatin XL (azadirachtin, Certis) registration is in discontinued status, indicating that it won't be registered after its next renewal date (6/30/18), and product is most likely no longer available in NY.

New Registrations

- Venerate XC (*Burkholderia* spp., Marrone; EPA Reg. No. 84059-14) is a biological insecticide derived from a bacterium; labeled in pome fruits against San Jose scale, pear psylla, stink bug and plum curculio, and in stone fruits against leafrollers and other leps. OMRI-approved, low toxicity to bees and most beneficials.

- Grandevo (*Chromobacterium subtsugae*, Marrone; EPA Reg. No. 84059-17) is a microbial containing fermentation solids from a bacterium, labeled against internal feeding leps and leafrollers in pome and stone fruit. OMRI-approved, low toxicity to bees and most beneficials.
- Sivanto Prime (flupyradifurone, Bayer; EPA Reg. No. 264-1141) is a butenolide registered in pome fruits against aphids (except WAA), leafhoppers, San Jose scale, and pear psylla. EPA Reduced-Risk, low bee toxicity and safe to beneficials.
- Banter SC (bifenazate, UPI; EPA Reg. No. 70506-322) acaricide registered in pome and stone fruits; same a.i. as Acramite.
- Onager Optek (hexythiazox, Gowan; EPA Reg. No. 10163-337) acaricide registered in pome and stone fruits; same a.i. as Savey, liquid (emulsion) formulation.
- Cidetrak CMDA Combo Meso-A (codling moth pheromone, Trécé; EPA Reg. No. 51934-16) is a mating disruption dispenser for codling moth registered in pome fruits; a "meso" formulation, hand-applied at 18-36 dispensers per acre.

Please note that the 2018 Cornell Pest Management Guidelines for Commercial Tree Fruit Production is available 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 \$41.00, 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://ipmguidelines.org/> for purchasing details.

[SECTION: HORTICULTURE]

ANATOMY OF A WET YEAR: INSIGHTS FROM NEW YORK FARMERS

(Shannan Sweet & David Wolfe, SIPS-Horticulture, Ithaca; sks289@cornell.edu, and Rebecca Benner, The Nature Conservancy, Albany)

[Box Text: WHO'S SOGGY NOW?]

Key Findings

- The 2017 heavy rainfalls and flooding impacted farms across New York State
- Crops grown on clayey soils suffered an estimated 53% loss in crop yield and crops grown on gravelly, sandy or siltier soils suffered estimated crop yield losses of 25% or less

- In addition to yield losses, 95% of farmers said the *quality* of their crop was negatively impacted
- 30% of farmers said they would have increased their drainage infrastructure, including adding tiling and drainage ditches, if they had known how wet 2017 would be

Background

A wet spring, followed by higher than average precipitation and heavy rainfall events (e.g., the heaviest 1% of all daily rainfall events) during the 2017 growing season ([NRCC](#)) led to saturated soils and flooding on many farms throughout New York State (NY). The frequency of heavy rainfall events have already increased by 71% in NY over the last half century ([NCA 2014](#)), and this trend is predicted to continue in the future ([Wuebbles et al. 2014](#)). Given this, and to get a sense of how farmers were affected by these conditions, as well as how they coped, we surveyed farmers across NY State throughout September of 2017. The survey was distributed online and in paper format with help from Cornell Cooperative Extension, The Farm Bureau, and New York State Department of Agriculture & Markets. A majority of the 45 farms in 24 counties were in areas of the state that experienced the heaviest rainfalls, and we had fewer

responses from farms in the Adirondacks region and southeastern part of the state, where heavy rains and flooding were less prevalent.

Heavy rainfall and flooding impact

Of the farmers surveyed, those with heavier clay soils estimated crop yield losses of 53%. More gravelly soils led to lesser yield losses (17%), and for crops grown on siltier or sandier soils, farmers estimated yield losses of 22 to 25%. Vegetable, field, and fruit crops suffered estimated yield losses of 38%, 32%, and 24%, respectively. Importantly, 95% of farmers said the *quality* of their crop was negatively impacted by issues related to the heavy rainfalls in 2017.

When asked what the economic impact of the heavy rainfalls was on their farm, 80% of farmers said it was either "moderate" or "severe", 17% said it was "minor", and 3% said the heavy rainfalls were merely a "nuisance" and had almost no economic impact. In rating the importance of various issues related to heavy rainfalls in 2017 in terms of economic impact on their farm, over half of the farmers rated saturated soils and field flooding, delays in or inability to plant or harvest, inability to use equipment, lack of field access, and crop disease as "extremely or very" important.

Adaptive capacity

82% of farmers said they use drainage ditches or drainage tile to help deal with heavy rainfalls, yet over half of farmers said they did not have enough infrastructure and/or equipment to deal with heavy rainfalls. Further, 70% of farmers said the 2017 heavy rainfalls led to the recognition of weaknesses or limitations in the infrastructure on their farm, particularly in relation to manure management and drainage infrastructure. And when asked what they would have done differently if they had known how wet 2017 would be, there was a variety of responses. Nearly 1/3rd of farmers said they would have expanded their drainage capacity (e.g., more drainage tiles and ditches, etc.). Nineteen percent would have changed their fertilizer, herbicide, or pesticide application timing, and another 10% would have adopted better soil health practices, such as using cover crops, reducing tillage, and using composts or mulches.

We also gave farmers a list of soil health practices and asked them to tell us if, for the ones they use on their farm, any of them lessened the impact of heavy rainfalls in 2017. Aside from "the use of mulches", which 67% of farmers said did not help them, a large majority said other soil health practices did help. Over 70% of farmers said

that practices such as "use of winter cover crops", "reduced tillage", "use of composts or manure", "leaving crop residues", and/or "changing crop rotations" did lessen the impact of the very wet 2017 season. To learn more about soil health check out <https://blogs.cornell.edu/soilhealthinitiative/>.

Insights for extension educators, researchers and policy makers

Over half of the farmers reported experiencing issues on their farm related to heavy rainfalls or flooding every 1 to 4 years. The other 46% reported this occurrence rarely or only every 5 to 6 years. While climate projections for NY indicate that we are likely to expect more heavy rainfall events, as well as more short-term summer droughts in the future ([NCA 2014](#), [Wuebbles et al. 2014](#), [Sweet et al. 2017](#)), our survey results suggest that, though farmers were concerned about the impacts of these events in the future, they are not as convinced that these events will occur more frequently in the future. For instance, 49% of farmers said they were "extremely or very" concerned that heavy rainfalls and flooding will negatively impact their farms in the future. Yet, only 38% said they were similarly concerned that such events may occur more frequently in the future. Also, given the drought in 2016 ([Sweet et al. 2017](#)), we asked farmers a similar series of questions

pertaining to drought. Though 31% of farmers were "extremely or very" concerned that drought may negatively impact their farm in the future, only 24% were concerned that drought may occur more frequently in the future.

With climate change, NY farmers are likely to continue facing unique challenges related to both increased heavy rainfall events as well as short-term summer droughts. Resource managers and planners, engineers, researchers, extension agents, NGOs and other farm-support organizations need to prepare to help farmers adapt to and become more resilient to an uncertain future. Information collected from farmers about how they might adapt to future climatic events suggests there could be potentially dramatic consequences, not only for farmer livelihoods and food production, but also for NY natural resources. For example, certain adaptation practices could impact downstream water quality and availability.

Based on our survey results, here are some ideas farmers had on how the above mentioned organizations might help farmers better prepare for and cope with heavy rainfalls events in the future:

- Low-cost loans or "in kind" grants to help with costs of improving drainage (e.g., drainage ditches and tiles)

- Continued education on nutrient management planning
- Advice on how to increase soil organic matter for improved drainage capacity
- Information about cropping options and strategies to cope with heavy rainfalls
- Lower cost and better fungicides for wet years
- Increased town drainage (e.g., more funding for ditch digging and for clearing debris out of ditches)

References

NRCC – Northeast Regional Climate Center. URL:

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