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Berry News

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Berry "To Do" List:

All crops

- What a difference 2 weeks makes!! Most of the region has received in excess of 3" of rain right as strawberries ripen. So far most berries look good – and we really needed the rain, but the combination of wet and warm, sticky weather is perfect for fruit rot.

- Spotted Wing Drosophila traps have been deployed in most areas of eastern NY. SWD has been found for two consecutive weeks in Canada. Spray programs should be organized and begun as soon as finds are made. We will report any evidence of them ASAP.

Blueberries

- Some concern that the flagging that might be attributed to winter injury is actually Canker. Look for lesions on the stem. If you suspect canker please call Jim or Laura.

- Cranberry Fruit Worm adults have been seen in some plantings. They lay their eggs at the base of the newly set fruit. The larvae is greenish and about a half inch long with brownish red markings on the back. Lured traps are helpful to assist in spray timing. Two sprays are often needed to control them – there are many different effective products.



Cranberry Fruit Worm maggot. Photo courtesy of Bugwood

Raspberries/Blackberries

- Bloom is quite strong even on the canes with substantial winter injury. It also seems that bloom may be a week or two early in many locations. This may result in a short, condensed fruiting period, and result in strawberries, cherries and raspberries all coming on at once.

- Two spotted mites seen in raspberries. Use predators or Acramite, Zeal, Danitol or a number of other miticides.

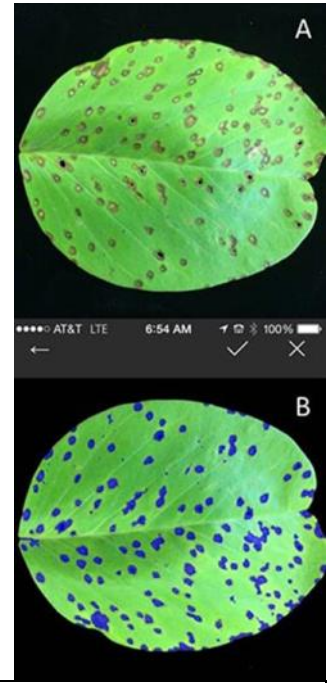
Strawberries

- Upick ongoing across the region. Early season berries slightly disappointing with some problems with secondary fruit. Please see short description later in this newsletter.

- Fruit rot of all types has been seen – although not in large amounts yet. See article in this edition.

For Your Information

- EPA's Proposal to Protect Bees from Acutely Toxic Pesticides – Public Webinar and Comment Period Extension** - EPA is hosting a public webinar that will provide background information and additional details about its proposed plan to prohibit the use of all highly toxic pesticides when crops are in bloom and bees are present under contract for pollination services. The plan also recommends that states develop pollinator protections plans and best management practices. The public webinar will be on June 23 from 3 – 4:30 p.m. EST and accessible online at <https://epa.connectsolutions.com/pollinatorproposal/>. EPA will also be extending the comment period on the proposal an additional 30 days, ending July 29. Please visit the regulatory docket for the proposal to protect bees from acutely toxic pesticides, [EPA-HQ-OPP-2014-0818](https://www.epa.gov/epahq/opp-2014-0818), to read the plan and submit comments. Learn more about the proposal and other [EPA Actions to Protect Pollinators](http://www2.epa.gov/pollinator-protection/epa-actions-protect-pollinators): <http://www2.epa.gov/pollinator-protection/epa-actions-protect-pollinators>
- USDA's National Farmers Market Directory!** - The Directory lists markets that feature two or more farm vendors selling agricultural products directly to customers at a common, recurrent physical location. Maintained by the Agricultural Marketing Service, the Directory is designed to provide consumers with convenient access to information about farmers market listings to include: market locations, directions, operating times, product offerings, accepted forms of payment, and more. This service is free to vendors and consumers alike. Google USDA Farm Market directories.
- Free app helps diagnose leaf-or-death situations - Leaf Doctor** analyzes a photograph of a damaged leaf and quantifies the percentage and severity of disease on that leaf, an important measure for researchers and extension agents in the field. The free app is available for iPhones, iPads and iPods, with an Android version in development. A paper describing the app was published in April in the journal Plant Disease. <http://news.cornell.edu/stories/2015/06/free-app-helps-diagnose-leaf-or-death-situations>.



The panel above shows the disease *Cercospora* leaf spot on a leaf (A). With the user's help, Leaf Doctor finds and clearly distinguishes diseased areas in blue (B) and can provide an accurate percentage of the surface area that is diseased and rate disease severity on a scale of one to 10

Young cane dieback becoming obvious in Michigan blueberry fields

by **Annemiek Schilder**, Michigan State University Extension

Phomopsis dieback of young canes is common in blueberry fields. Prune out diseased canes and use effective fungicides to protect new growth.

Many blueberry fields in Michigan have been hard-hit by the low temperatures this past winter. Typically, the oldest canes are dead and fruit set may be poor. However, more recently, one- and two-year-old canes have started dying, showing wilting leaves and brown discoloration of stems. Often multiple canes per bush are affected and there may be a mix of dead and dying canes. This is probably the earliest in the season that we have seen “flagging” and dieback, especially of younger canes. When you look closely, you may see brown lesions (cankers) somewhere along the cane, often centered around old leaf scars or moving in from dead twig stubs. Cankers can expand in both directions from the point of infection, although they tend to move downward more quickly. From superficial infections in the bark, the fungus progresses into the vascular system and then girdles the stem, at which point the portion of the cane above the canker dies for lack of water, hence the rapid wilting of leaves.

Symptoms are most common in Bluecrop, Jersey and Berkeley fields, especially those that had vigorous new shoot growth last year and the year before. Blueberry bushes tend to push a lot of new growth after winter injury or heavy pruning. There may also be a link with aerial fungicide application, which may provide inferior fungicide coverage of the base of the bush where these infections are taking place, particularly later in the season when the canopy is full. The good news, if there is any, is that this is a cane disease and the bush has the ability to renew itself once diseased canes are removed.

While we are still trying to determine the causal agent of the outbreak, the fungal pathogen *Phomopsis* appears to be the likely culprit, possibly in conjunction with secondary fungi that move in after *Phomopsis*. In surveys in Michigan blueberry fields in recent years, the fungus *Phomopsis vaccinii* was the most common pathogen found in dying canes. While cultivars Jersey and Berkeley are known to be rather susceptible to *Phomopsis*, cultivar Bluecrop is generally considered resistant. However, we discovered in inoculation experiments that current-season growth of Bluecrop is highly susceptible to *Phomopsis* infection, much more so than in Jersey and Elliott. This phenomenon has also been observed in field situations, where new growth of Bluecrop was repeatedly infected to the point that bushes were not able to outgrow the disease and remained small.



Cane dieback in blueberry field.

The big question is when these infections took place. My best guess is they happened last year (2014) during rainy periods in mid- to late summer or even early fall. Symptoms on two-year-old canes suggested a similar scenario in 2013. Both summers were cool and relatively wet in comparison to 2012. *Phomopsis* overwinters in old, infected canes and twigs, which are a ready source of inoculum hovering over the new growth. *Phomopsis* spores are splash-dispersed by rain and irrigation water. While peak spore release usually occurs in April and May, the fungus may be active all summer into early September, even producing a second crop of



Wilted leaves on dying cane (left) and *Phomopsis* lesion (canker) on cane (right).

spores later in the season on newly infected twigs. Rapidly growing new shoots are very tender and susceptible to infection by *Phomopsis*, especially at moderate temperatures (68-75 degrees Fahrenheit) with extended wetting periods (48 hours or more). These conditions can occur during several consecutive rainy days. Over-fertilization can also contribute to excessive growth. Such canes may not harden off properly and be damaged during early fall freezes, which could also predispose them to fungal infection. Mechanical harvesting can wound canes, allowing fungal pathogens entry. In addition, herbicide drift injury, such as from glyphosate or paraquat, can weaken young canes and predispose them to *Phomopsis* infection. The blueberry cultivar Duke appears to be especially sensitive in that regard

So what are the management options? It is important to prune out infected and dead canes as soon as possible as they are or may become a source of spores that will be raining down on new shoots. It is best to cut canes well below the lesions and close to the ground. MSU Extension recommends pruning during dry weather to prevent new infections from occurring, especially on fresh pruning wounds. Also, try to remove canes with gray or tan-colored blotches where spores are most likely produced. Burn or bury canes to destroy the inoculum. If you can't collect them, chop them up into small pieces with a mower to speed up decomposition. Limit nitrogen, including foliar fertilizers, so as not to encourage lush cane growth.

As soon as possible after pruning, apply an effective fungicide with ground equipment to protect young canes and pruning wounds from infection, ensuring the lower part of the bush is well-covered. If you are applying sprays for fruit rots anyway, keep a nozzle aimed at the base of the bush. As for fungicide options, Pristine (zero-day pre-harvest interval or PHI) and Quash (seven-day PHI) would probably be the most effective. Indar, Tilt and QuiltXcel are also effective, but have a 30-day PHI. Aliette, or other phosphite material, or Ziram could also be used, but are not as strong. The best options for organic growers are Sil-Matrix, Serenade and Double Nickel 55, which are expected to provide moderate protection.



Winter injury affecting mostly older canes.

Make sure to read the fungicide labels for the pre-harvest and restricted entry intervals and other restrictions. Follow-up fungicide sprays may be helpful during rainy periods in August and early September to continue to protect new growth. In late fall or early spring, apply Sulforix, Lime Sulfur or Sulfur 6L as a dormant spray to eradicate overwintering inoculum. You may have to follow this procedure two years in a row to gain control over the problem.

SAVE the DATE!!

Tuesday, July 14—2 to 5 PM—Cornell Raspberry High Tunnel Open House—featuring a high density black raspberry planting and florican and primocane red raspberry trials in a multi-bay commercial tunnel system at the Lucy-Robbins Farm in the town of Geneva, NY. A comprehensive program of production, pest management and pest control approaches for high tunnel raspberry production will be presented. Fruit samples from the trial and from the Cornell Raspberry Breeding Program will be available for observation and tasting including samples from new selections of thornless black raspberry. The Lucy-Robbins farm is located at 3320 Sutton Rd., Geneva, NY

Registration is required—contact Lou Ann Rago at (315) 787-2394 or lar38@cornell.edu. Questions? Contact Dr. Courtney Weber at (315) 787-2395 or caw34@nysaes.cornell.edu

July 21st – Blueberry Variety Review Field Day, Winney’s Farm, Schuylerville, NY. More details to follow.

August 19th—Controlling Birds in Fruit Crops, 4H Training Center, Ballston Spa, NY. More details to follow.

September 16th—Strawberry Low Tunnels, Stanton’s Feura Farm, Feura Bush, NY. More details to follow.



Berry Problems Abound

The photo above illustrates some challenges with this year’s strawberry crop. The top two buds are darkened flowers – a beautiful illustration of frost damage to the flowers when they were most sensitive. Overall I think the loss due to frost in eastern NY might be around 12-15%. Not terrible but as it’s an average that means some growers have significantly more. The small, light brown bud right in the middle of the picture shows a clipped bud – evidence that strawberry clipper is the problem for those potential fruit. The small green berry at the bottom right may be the result of late planting the prior spring. If strawberries are planted in mid-late June then the plants simply don’t have time to establish themselves AND put energy into laying down buds in the crown. The added effect of a very dry spring exacerbated the lack of buds this year.

Welcome New Eastern NY technicians!

Annie Mills (right) is a new addition to the team and will be working as a technician in counties around the Capital Region of New York. She recently graduated from Cornell University with a major in Agricultural Science and a minor in entomology. Over the next season her duties will include insect pest monitoring, assistance with horticultural varieties trials, and helping with the newsletter, along a variety of other tasks. Annie is originally from Schoharie County and is very thankful for the opportunity to work with growers here in eastern New York during the upcoming season!



Sarah Rohwer (left) is our newly hired ENYCHP technician based at the Hudson Valley Lab in Highland, NY. She will be assisting educators with research and extension programs in fruits and vegetables. She grew up in Ulster County and got her Biology degree at Binghamton University where she assisted in research on the effects of deer in local forests.



Entrust® Insecticide May Lose Berry Registration

Dr. Richard Cowles of the Connecticut Agricultural Experiment Station recently shared a letter he received from Dow AgroSciences stating that the registration of Entrust® insecticide (active ingredient spinosad) may be withdrawn by the company due to reports of misuse (primarily overuse) by growers, which could threaten the viability of the product by encouraging the development of insect resistance to it. Entrust® has been a very important tool for the management of spotted wing drosophila (SWD), especially for organic berry growers, as the product is Organic Materials Review Institute (OMRI) approved. Dr. Cowles states “This is not an idle threat to withdraw sales of Entrust® to New England states. Abuse of Conserve SC® by greenhouse growers in the Southeast led to widespread flower thrips resistance, whereupon Dow withdrew marketing of that product to that region. The problem that I see is that there currently are very few effective proven alternative options to spinosad available to organic growers, besides frequent clean harvesting of crops and use of exclusion netting (for certain crops).”

All berry growers should intensively monitor for SWD adult activity with effective traps and baits, and only consider insecticide sprays when both (a) SWD adults are present and (b) fruit are ripening sufficiently to almost be susceptible to egg laying. The prospect of losing an important tool in the management of SWD emphasizes the importance of following the label directions of pesticides in all regards, including the limitations for use of Entrust® on individual crops and on entire farms, due to concerns for insecticide resistance prevention.

Fruit Rots of Strawberry

Leather Rot in Strawberry

Leather rot caused by *Phytophthora cactorum* can cause losses during warm, wet weather with extended periods of rainfall. Infection can take place during all stages of fruit development as long as favorable conditions are present. Infected fruit turn brown and have blotchy tough appearance. Infections typically occur in fruit that are in direct contact with the soil, but the pathogen can also be splashed onto fruit via rainfall and wind.



Research by Dr. Mike Ellis, Ohio State University, has shown that FRAC code 11 fungicides such as Abound are effective against leather rot. If Pristine has been used to control gray mold or anthracnose you would also have protection. Additionally, foliar applications of a phosphite-based product on 7 day intervals can be done as long as favorable disease conditions occur.

Gray Mold (Botrytis Fruit Rot) of Strawberry

Gray mold is often a serious problem during extended cool, wet periods when fruit are sizing and reaching maturity.



Symptoms of gray mold are the diagnostic grey, fuzzy growth that will cover entire fruit.

Control of gray mold, like the other diseases, begins with recognizing the conditions for its development, its

symptoms, and preventative fungicide applications. Start sprays when plants begin to bloom, because 90% of fruit infections occur through the flower, and repeat every 7-10 days. Increase spray intervals during persistent dry periods, but decrease intervals to 5-7 days during very wet periods. Four weekly sprays starting at 5-10% bloom are usually sufficient for season-long control. Tank-mix and rotate fungicides from different FRAC codes to reduce the chances for fungicide resistance development.

Anthracnose Fruit Rot

Anthracnose fruit rot can cause serious losses if not controlled. Symptoms of

anthracnose include the development of circular, sunken lesions on infect fruit. Often pinkish/tan colored spore masses will develop in the center of lesions. Anthracnose in strawberry is caused by *Colletotrichum acutatum*.



Spore production, germination and fruit infection are favored by warm, humid weather. The fungus can overwinter on infected plants, in plant debris or on weed hosts. Spores are dispersed by splashing water and can infect green and mature fruit.

Control begins with protectant fungicides from flowering through harvest. Begin sprays no later than 10% bloom or prior to disease development and continue on a 7 to 10 day interval. Use the higher rate and shorter intervals when disease pressure is high. Do not make more than two consecutive applications of fungicides other than Captan or Thiram before switching to a fungicide in a different chemical class.

2015 Weather Table—The weather information contained in this chart is compiled using the data collected by Network for Environment and Weather Applications (NEWA) weather stations and is available for free for all to use. For more information about NEWA and a list of sites, please visit <http://newa.cornell.edu/> This site has information not only on weather, but insect and disease forecasting tools that are free to use.

2015 Weekly and Seasonal Weather Information						
	Growing Degree Information Base 50⁰ F			Rainfall Accumulations		
Site	2015 Weekly Total 6/08- 6/14	2015 Season Total 3/1 –6/14	2014 Season Total 3/1 - 6/14	2015 Weekly Rainfall 6/08- 6/14 (inches)	2015 Season Rainfall 3/1 –6/14 (inches)	2014 Total Rainfall 3/1 - 6/14 (inches)
Albany	148.5	764.4	616.5	2.98	7.63	9.69
Castleton	141.2	722.1	588.0	3.61	8.08	9.36
Clifton Park	143.8	734.8	555.9	2.57	8.65	9.02
Fishkill	150.2	728.6	Na¹	0.02	4.05	Na¹
Glens Falls	132.7	623.6	581.0	1.57	1.57	13.81
Griffiss	124.1	579.6	517.0	3.06	13.23	17.28
Guilderland	Na	Na	Na	Na	Na	Na²
Highland	149.8	786.8	653.3	1.49	11.03	13.02
Hudson	151.7	788.4	639.9	1.60	7.53	12.93
Marlboro	149.8	733.1	595.4	1.21	8.64	11.84
Montgomery	152.1	753.1	616.0	2.18	9.72	13.68
Monticello	124.2	558.6	434.0	0.37	7.74	6.65
Peru	113.1	566.0	517.2	3.04	7.98	11.26
Red Hook	146.6	735.8	636.6	0.67	8.54	5.22³
Shoreham, VT	132.3	640.1	537.2	1.56	8.02	9.71
Wilsboro	117.5	546.3	486.6	2.60	10.18	4.55
South Hero,	116.6	570.5	506.0	3.20	10.86	11.85
N. Adams, MA	134.5	557.5	466.5	2.79	7.90	10.05
Danbury, CT	144.7	643.2	531.0	0.14	10.01	13.41

Na¹: The Fishkill site is new for 2015 so there is no historical data to report.

Na²: The Guilderland weather station was not properly reporting precipitation data in 2014 so no data will be shown for this site.

Na³: Precipitation data for this site did not begin until May of 2014.

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.

Diversity and Inclusion are a part of Cornell University’s heritage. We are a recognized employer and educator valuing AA/EEO, Protected Veterans, and Individuals with Disabilities.