

UMass
Extension

CENTER FOR AGRICULTURE

Berry Notes

Prepared by the University of Massachusetts Fruit Team

Thank you to our Sponsors!

Support the UMass Fruit Program

See Archived Berry Notes at:
<http://ag.umass.edu/fruit/berry-notes-archive>



IN THIS ISSUE:

SHORTS

ENVIRONMENTAL DATA

STRAWBERRY



RASPBERRIES/BLACKBERRIES

- ❖ West Meets East with Promising New Thornless Blackberry Cultivars
- ❖ New High-yield Strawberry & Raspberry Varieties Released

BLUEBERRIES

- ❖ Timely Blueberry Disease Control: Strategies To Control Bacterial Canker In Blueberries Should Start In The Fall
- ❖ Blueberry/Huckleberry (*Vaccinium* spp.) – Witch's Broom Rust

GRAPES

- ❖ Big, Blue Everest Seedless is Cornell's Newest Grape

GENERAL INFO

- ❖ Hummingbirds May Reduce SWD
- ❖ Cultural Management Strategies To Reduce Orchard Suitability For Spotted Wing Drosophila
- ❖ Northeast SARE Invites Farmer Grant Applications
- ❖ Bees' Medicine Chest Should Include Sunflower Pollen, UMass Amherst Study Suggests
- ❖ Reminder to Report Crop Damages Promptly

UPCOMING MEETINGS

Volume 30, Number 10 - October, 2018

SHORTS

Tunnelberries Project: TunnelBerries personnel at Penn State University have created a new video released by Penn State Extension that provides information on the types of high tunnels (single and multi-bay) that are commercially available and important features of each to consider. This is especially useful for growers new to tunnel production. Great job Matt Cooper and Kathy Demchak! To see this video, go to: <https://www.tunnelberries.org/tunnelberries-blog>.

Primocane fruiting raspberries produce fruit in the fall, but can be managed to produce both a summer and a fall crop using the techniques described in a newly released TunnelBerries video. "Double Cropping Primocane Fruiting Raspberries" details how to manage raspberries under a high tunnel for production on both floricanes and primocanes. To see this video, go to: <https://www.tunnelberries.org/tunnelberries-blog/archives/09-2018>.

Tarping Tested as Weed Control for Organic Vegetables [or fruit] - eOrganic has posted articles from students at the University of Maine and at Cornell University on the use of tarping to control weeds in organic vegetables in the Northeast. Both studies concluded that use of tarps could play a significant role in weed control in a northern climate. [*Reusable Black Tarps Suppress Weeds and Make Organic Reduced Tillage More Viable*](#) and [*Solarization and Tarping for Weed Management on Organic Vegetable Farms in the Northeast USA*](#) are available online.

CISA's Emergency Farm Fund is Open - CISA's Emergency Farm Fund offers zero-interest loans to assist farmers and farm businesses struggling to meet their immediate needs in the aftermath of extreme weather events. The Fund is open for applications from Pioneer Valley farms that have been affected by extreme weather events during the 2018 growing season, including the excessive rainfall in July and August. If your farm suffered damage this season you are eligible to apply for a zero-interest loan of \$5,000 to \$10,000. Applications will be accepted until October 31, 2018. To learn more or apply for a loan, [click here](#). Please call the CISA office at 413-665-7100 with additional questions.

ENVIRONMENTAL DATA

The following data was collected on or about October 3, 2018. Total accumulated growing degree days (GDD) represent the heating units above a 50° F baseline temperature collected via our instruments for the 2018 calendar year. This information is intended for use as a guide for monitoring the developmental stages of pests in your location and planning management strategies accordingly.

| Region/Location | GDD | | Soil Temp (°F at 4" depth) | | Precipitation (in inches) |
|-----------------|-------------|------------|-------------------------------|-------|------------------------------|
| | 2-week gain | 2018 Total | Sun | Shade | (2-Week Gain) |
| Cape Cod | 146 | 2,708 | 65 | 62 | 2.38" |
| Southeast | 153 | 2,843.5 | 64 | 63 | 4.35" |
| North Shore | 140.5 | 2,791.5 | 60 | 58 | 2.18" |
| East | 148 | 3,027 | 62 | 58 | 3.38" |
| Metro West | 111 | 2,725 | 58 | 57 | 2.25" |
| Central | 120 | 2,810 | 54 | 50 | 3.69" |
| Pioneer Valley | 96.5 | 2,913.5 | 64 | 59 | 4.74" |
| Berkshires | 111 | 2,577 | 63 | 59 | 5.00" |
| AVERAGE | 128 | 2,799 | 61 | 58 | 3.88" |

n/a = information not available

Drought conditions update: Not surprisingly, the map (dated October 2 in the link below) shows almost all of Massachusetts is free of any drought. The only exceptions are Nantucket, the eastern half of Martha's Vineyard and a southeastern slice of Cape Cod (about one fifth of the county's area) still being categorized as level D0-‘Abnormally Dry’. <http://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?MA>

(Source: UMass Landscape Message #21, October 5, 2018)

STRAWBERRY

Disease and Resistance Management in Strawberry; Top Considerations for the Coming Season

Guido Schnabel (Clemson University) and Natalia Peres (University of Florida)

The new strawberry season is just around the corner and we need to make smart choices for pest and disease management. At the Strawberry Expo 2014 in Pinehurst we talked about some important things to consider this coming season to ensure maximum disease and resistance management. Here they are in a nutshell:

Implement IPM practices in nurseries: It is not a secret that diseases often come in with transplants and we must do a better job avoiding that. Luckily, we received some funding that will enable us to work with nurseries, investigate their practices, and develop solutions to current problems. This will not happen overnight but will rather be work in progress over the next years.

Avoid Key Selectors: Some fungicides are key selectors for resistance to multiple fungicides in the gray mold fungus on the east coast. Resistance to multiple fungicides has built up in a stepwise fashion over time and resistance to some fungicides is the backbone of resistance to newer chemistries. Basically, if new resistance emerges, it is most often from a population that is already resistant to established fungicides. In particular, applications of fungicides from FRAC (Fungicide Resistance Action Committee) group 1 (e.g. Topsin M) and to some degree FRAC 11 (Abound, Cabrio, Pristine, Merivon) are frequently associated with resistance to other FRAC

groups that we need for disease control. Our recommendation:

- Avoid FRAC 1 fungicides
- Use FRAC 7/11 premixtures (Merivon, Pristine) ONLY if gray mold AND anthracnose are a threat BUT NOT for routine gray mold control.
- Use FRAC 11 solo products (Abound, Cabrio) only for anthracnose control
- Do not use FRAC 7/11 premixtures or FRAC 11 solo products more than twice per season.

Spray Strategically: If applications are needed prior to bloom, thiram, captan, and maybe biologicals should be used. During bloom, stick with captan as much as possible and use the ‘at risk fungicides’ (including FRAC 1, 2, 7, 9, 11, 12, and 17) only when the weather is favorable for disease development (Table 1).

Table 1. FRAC code, trade name, and primary target of fungicides frequently used for disease control in strawberry

| FRAC Code | Trade Name Examples | Primary Target |
|-----------|---------------------|----------------|
| 1 | Topsin M | Gray mold |
| 2 | Rovral | Gray mold |
| 7 | Fontelis | Gray mold |

| | | |
|------|-------------------|---------------------------|
| 7/11 | Pristine, Merivon | Gray mold and anthracnose |
| 9 | Scala | Gray mold |
| 9/12 | Switch | Gray mold and anthracnose |
| 11 | Abound | Anthracnose |
| 11 | Azaka | Anthracnose |
| 11 | Cabrio | Anthracnose |
| 17 | Elevate | Gray mold |

Spray less: Spraying less is the ultimate resistance management tool because we are selecting less. But that is only an option if we do not compromise disease control success. Research has shown that we are spraying way too many times and that often more than 50% of our applications are unnecessary. We are implementing an online tool, the Strawberry Advisory System (SAS), in southern states that notifies growers when an application is truly necessary. Growers will need to be near a weather station that is hooked up through the internet to a weather database. Contact us for more information if you are interested. But if you do not have access to this system, table 2 shows the weather conditions that you may use to decide whether to spray or not. You might be surprised how many sprays you can save without compromising control especially in a reasonably dry year.

Botrytis control success is vastly improved if you know the resistance profile of your fields. Make sure you get the gray mold fungus tested. Download instructions at <https://www.clemson.edu/extension/peach/commercial/diseases/fungicideresistanceprofiling.html>.

Table 2. Decision Support Chart for Gray Mold Management in Strawberry

| Weather Conditions* | | Peak Bloom | Recommended Spray Strategy |
|---------------------|-----------|------------|---|
| LWD (h) | Temp (°C) | | |
| < 13 | any | Yes or No | No spray |
| > 14 | 17-25 | No | Captan, Thiram |
| | | Yes | FRAC 17 (e.g. Elevate); FRAC 7 (e.g. Fontelis) |
| > 18 | 17-25 | No | Captan or Thiram + FRAC 17 (e.g. Elevate) or FRAC 7 (e.g. Fontelis) |
| | | Yes | FRAC 12 (e.g. Switch) |

LWD = Leaf Wetness Duration in hours and Temp = temperature in Celsius during leaf wetness period.

In conclusion, after more than a decade of applying multiple fungicides of multiple FRAC codes, resistance is now common in the gray mold pathogen *Botrytis cinerea*. But the resistance profile is different from location to location and depends on spray history, nursery source, and nearby crops hosting the pathogen. Knowing your resistance profile will enable you to prevent ineffective

sprays and improve preharvest and postharvest disease control. We must make every effort to spray strategically and to limit the number of sprays and we must include nurseries in our efforts to control pests and diseases. Good luck! (*Source: UNC Strawberry Blog, 2015*)

RASPBERRIES/BLACKBERRIES

West Meets East with Promising New Thornless Blackberry Cultivars

Chad Finn, USDA-ARS, Corvallis OR

Eclipse, Galaxy, and Twilight are new thornless semi-erect cultivars that are promising for both eastern and western North America. These cultivars offer terrific earliness in berries that are firm, tough skinned, and a delight to eat!

For many years, the USDA-ARS/Oregon State University collaborative effort focused almost exclusively on trailing blackberries (e.g. Black Diamond, Columbia Star, and Marion) that were best suited for Mediterranean climates similar to those found in the Pacific Northwest and parts of California. But in the 1990s, we crossed Kotata or promising trailing selections with the eastern Navaho

variety expecting to get mostly sterile offspring due to chromosome number differences. Lo and behold, we got some really nice fertile selections. These in turn were crossed to semi-erect cultivars like Triple Crown leading to the cultivars Eclipse and Galaxy, and a selection (ORUS 2867-4) that when crossed with Ouachita produced Twilight. So while these three new cultivars grow mostly like the semi-erect cultivar Triple Crown, they have a mix of all three types grown in North America.



Eclipse blackberry

Eclipse [(Navaho x ORUS 1122-1) x Triple Crown] - This thornless cultivar produces a large, vigorous plant that is more erect in habit than Triple Crown or Chester Thornless. The most important characteristics of this cultivar are its early ripening and excellent fruit quality, particularly flavor and firmness. While Eclipse ripens later than most western trailing cultivars, it ripens with or ahead of Navaho and Loch Ness and 10-14 days before Triple Crown. The fruit are medium sized (6.5 g), comparable to or larger than Chester Thornless (5.7 g) but smaller than Triple Crown (7.5 g). Fruit firmness was rated similar to Chester Thornless and much firmer than Triple Crown. In storage trials by a commercial packer, Eclipse fruit were rated similar in overall quality after cold storage to Von, much better than Triple Crown, and slightly less than Chester Thornless. In Oregon, Eclipse has had far less heat/UV damage than Chester Thornless and Triple Crown, even during this past summer, which was much hotter than a typical Oregon summer, and in California's Central Valley in heat up to 109°F! Eclipse had moderate yields (13-16 lbs./plant), compared to Triple Crown (20-25 lbs./plant) and Chester Thornless (17-24 lbs./plant). You will not grow Eclipse for huge yields, but rather for its early crop of firm, delightfully flavored berries and very good yields.



Galaxy blackberry

Galaxy [(Navaho x ORUS 1122-1) x Triple Crown]- As Galaxy is a sibling of Eclipse it is not surprising that it has many traits in common. Galaxy is vigorous with a semi-erect thornless habit that it is less upright than Eclipse and Triple Crown. As with Eclipse, the fruit are early ripening with excellent fruit quality. Galaxy ripens with Eclipse and Loch Ness ahead of Triple Crown and Chester Thornless. In Arkansas, Galaxy ripened with or a little earlier than Ouachita. The fruit are large (7.5 g), larger than Chester Thornless (5.7 g) and Navaho (5.7 g) and comparable to Triple Crown (7.5 g). At maturity, the fruit rate similarly to Navaho and Chester Thornless for firmness, and firmer than Triple Crown. Galaxy fruit are blocky conic to barrel shape, with more uniformly sized, shaped and arranged drupelets than fruit of Navaho but not as nice as those of Eclipse. In commercial storage trials, Galaxy fruit were rated similarly to Chester Thornless and better than Von or Triple Crown. As with Eclipse, in Oregon, Galaxy has had far less heat/UV damage than Chester Thornless and Triple Crown in hot Oregon and California's Central Valley conditions. Galaxy had moderate yields (15-18 lbs./plant), comparable or greater than Navaho (10-20 lbs./plant). You will not grow Galaxy for monstrous yields, but rather for its early crop of firm, large, sweet berries and very good yields.

Galaxy and Eclipse both are among the earliest ripening semi-erect type cultivars available (comparable to Loch Ness), have very firm fruit with good skin toughness that taste great and store well as fresh fruit. The main difference is that Eclipse fruit are more uniformly shaped but smaller while Galaxy are less uniform, lumpier, and larger. Eclipse plants are very erect, which may allow more grower manipulation of canes through timing of tipping.



Twilight blackberry

Twilight, [Ouachita x [Triple Crown x (Navaho x ORUS 1122-1)]] – Twilight is also thornless with a vigorous semierect habit. Twilight for us is viewed as a replacement for Triple Crown. While we love to eat Triple Crown, we have a hard time shipping this even as far as farmers markets without it bleeding to death! The midpoint of

harvest for Twilight is relatively early for erect/semi-erect types. It is 3-4 weeks later than the standard trailing blackberries (i.e., Black Diamond, Columbia Star and Marion), only 4 days later than the semi-erects Eclipse and Von, and 10-14 days earlier than the semierects Triple Crown and Chester Thornless. Twilight fruit is a blocky-conical shape, similar to Eclipse, and are more uniform in size, shape, and arrangement of drupelets than Triple Crown or Chester Thornless. Twilight fruit are large (8.7 g), comparable to Triple Crown (8.1 g), and larger than Chester Thornless (6.3 g) or Eclipse (6.4 g). The fruit are a very glossy black. Whether due to earlier ripening or genetic differences, the fruit has had less incidence of UV/heat damage than Chester Thornless. At maturity, the fruit are firmer than those of Triple Crown and Chester Thornless. The resistance of the drupelet skin to tearing ("skin toughness") is higher for Twilight than Eclipse or Chester Thornless and much higher than for Triple Crown. The flavor of Twilight fruit in the field was rated excellent, much better than Chester Thornless and comparable to

Triple Crown and Eclipse. In informal fresh storage trials with a commercial packer, after 14 days in refrigerated storage in a clamshell, Twilight was scored similar to Chester Thornless, better than Eclipse and Von and much better than Triple Crown.

While none of these have been tested in extremely cold environments, in the Pacific Northwest they have had no winter injury after winters that dropped for a night to -4°F and for multiple nights in a row to 5-7°F.

We would love you to trial any or all of these. Clean planting stock has been shipped to commercial wholesale nurseries and if orders are placed this fall, could be available as plug plants next spring. We are very excited to hear any feedback on how these have worked for you. Please let us know if you have any questions! (*Source: The Bramble Newsletter, Autumn 2018*)

New High-yield Strawberry & Raspberry Varieties Released

Krisy Gashler, Cornell University News Service

These berries yield like the dickens.

Cornell's berry breeding program is releasing two new varieties, which will be available for planting in spring 2019: a strawberry, Dickens, and a raspberry, Crimson Treasure. Both varieties produce large fruits with vibrant colors that maintain peak flavor for longer than most heritage varieties.

The new berries are the handiwork of berry breeder [Courtney Weber](#), associate professor in the College of Agriculture and Life Sciences based at [Cornell AgriTech](#) in Geneva, New York.

Dickens is a traditional, June-bearing strawberry with high yields and bright red fruit that continues bearing late into the season. The berries are firm, so they hold well on the plant and in the container, Weber said, but not so firm that they have no flavor. Strawberries are the third-leading fruit crop in New York state, but most strawberries sold in supermarkets are from California.



Crimson Treasure raspberries.

"With New York-grown berries, because we don't have to ship so far, we can handle a softer fruit. And people notice the softer, sweeter, juicier fruit," Weber said. "Customers can get supermarket strawberries any day of the week; the reason people make the effort to come to the farm stand or farmers market and buy the local product is because it tastes so much better. Maintaining that flavor is paramount to what we do in our breeding program."

The Dickens strawberry was first discovered in Weber's breeding fields in 2002 and was originally noticed for the plant's hardiness in surviving cold winters, making it especially suitable for New York and other cold-winter climates. Production trials throughout the region have shown Dickens to be an adaptable and consistent producer of high-quality fruit. Dickens has been tested in annual and perennial production systems, without soil fumigation, and found to be tolerant to root rot and other common diseases.

Weber has named his strawberry varieties after his favorite authors, including L'Amour, Clancy, [Herriot](#), Walker and, most recently, [Archer](#). Because this newest berry "yields like the dickens," Weber decided to name it after prolific English author Charles Dickens.

The new raspberry, Crimson Treasure, is also very high-yielding, with larger fruit than traditional varieties grown in the region. The well-known Heritage raspberry produces fruit of approximately 2.5 grams, while Crimson Treasure produces berries twice as large – averaging between 4 to 6 grams. That's typical of what you see with supermarket raspberries, Weber said.

Crimson Treasure is a fall-bearing raspberry with bright-red fruit that holds its color and texture well in storage.

"Color is a big deal. You need fruit that does not darken after you pick them," Weber said. "A lot of older varieties, after you pick them and put them in the cooler, they darken and then look overripe. This one doesn't; it holds its color and eating quality well."

Crimson Treasure was originally discovered in 2012. Weber has worked to speed the process of developing new raspberry varieties because the program has so many international collaborators interested in raspberries. These collaborators plant trial raspberries and collect data, giving

Weber more information on disease resistance and other traits that can inform his breeding trials.

The name continues another Weber tradition. This is the third raspberry in the "Crimson" series. Two previously released raspberries were named Crimson Giant and Crimson Night.

Cornell's berry breeding program is the oldest in the country and is the only one in the Northeastern U.S. The university's berries are grown all over the world: Crimson Treasure has been planted in trials in New York, California, Mexico and the European Union. The berry program works with commercial partners across North America, in Morocco, Spain and Portugal. Heritage, the most commonly grown raspberry variety in Chile, was developed at Cornell, and two Cornell raspberry varieties, Crimson Night and Double Gold, are under license in Japan.

The Dickens strawberry will be available from [Nourse Farms, a licensee in Whately, Massachusetts](#), 413-665-2658. Crimson Treasure raspberry will be available from [North American Plants, a licensee in McMinnville, Oregon](#), 877-627-4636. For information on licensing opportunities, [email Jess Lyga](#) at the [Center for Technology Licensing](#) at Cornell University. (*Source: Cornell Chronicle, Sept. 6, 2018*)

BLUEBERRIES

Timely Blueberry Disease Control

Strategies To Control Bacterial Canker In Blueberries Should Start In The Fall

Jay Pscheidt, Oregon State Univ.

Bacterial canker of blueberry shows up in the spring, but to get it under control, growers in areas such as western Oregon and Washington should make applications of copper-based pesticides in the fall. Here's the bottom line: Spray twice, first before fall rains, preferably the first week in October, and again four weeks later. Bacteria resistant to copper products have been detected frequently in the Willamette Valley and British Columbia. Cultural tactics include using resistant cultivars, removing diseased wood, and avoiding late-summer nitrogen applications.

There is very little published information for bacterial canker on blueberry. A report from Oregon (1953) and another from Tasmania (1984) speculate that infection occurs in the fall even though symptoms occur in the early spring. Each is based on sound observations and isolations of the bacteria. Three spray trials done by E.K. Vaughan and C.A. Boller in the 1950s clearly show fall applications of Bordeaux reduce the number of diseased plants in the spring. Fall applications were made in early October and again in early November. Unfortunately they did not test fall versus spring applications. Such a trial still needs to be done.

Without much more data on blueberries, we can only draw on similar diseases from other crops. This bacterium incites diseases on many crops. It can cause a "fall disease" (such as shoot dieback of Japanese Maple) or a "spring disease" (such as bacterial blight of lilac). Sometimes the bacteria are active both times of the year such as in cherries.

Bacterial canker of cherry has both fall (canker) and spring (dead bud) symptoms. "Fall" or "spring" indicates when the bacteria are actively invading plant tissue and when control tactics are more likely to be effective. Most of the time, symptoms occur in the very late dormant season or during spring growth for these crops—even if infection occurs in the fall. These diseases are notorious for being erratic in occurrence, devastating when they do occur, and frustrating to manage given the limited tools we have available.

Copper-based products are about the only legal materials one can use against these diseases. Chemical management of these diseases is next to impossible as a sole tactic. Unfortunately we see too much use of copper-based products alone. The notion of using a little more, at higher

rates, with more applications to get better timing is the wrong path to go down.

The Problem With Copper

There is published research that clearly shows bacteria resistant to copper-based products in blueberries in the Pacific Northwest. There was a time folks thought that bacteria could not be resistant to copper since it is such a broad-spectrum material hitting many biochemical systems in microorganisms. That changed in the 1990s as evidence mounted against that notion. The more copper is used, the more resistant the bacteria become. Just using higher rates and/or more frequently is not sustainable. The addition of other materials to copper mixes just increases the copper ion concentration and thus has the same effect.

In most cases, people reasoned that using more copper was OK thinking that even if they did not get any disease control, that was not a problem as long as it did not harm the plants. Recent published research on cherries, however, has found that applications of copper-based products made bacterial canker worse. In other words, the non-treated trees had significantly less disease than trees treated with copper-based materials.



A water-soaked lesion first appears on canes in January or early February. Then the lesions rapidly expand and turn reddish brown to black. Cankers may extend from a fraction of an inch to the entire length of 1-year-old canes (shoots). Buds in cankered areas are killed. If the stem is not girdled, buds above the canker grow. If girdled, the cane portion above the canker dies. Photo credit: Oregon State University Plant Clinic

Bordeaux was one of the first fungicides ever developed being used to combat a downy mildew problem on grapes in the mid 1800s. So much was used for so long that copper toxicity in soils became a problem. It is my opinion that we should, as an agricultural community, begin to limit the amount of copper that is used so we do not end up with the same problems.

Managing bacterial canker of blueberries will involve the use of one or two applications of copper-based materials in the fall, removal of diseased wood during the winter, and attention to horticultural needs of blueberry such as an acid soil pH. Use of copper-based materials in the spring misses the time of infection and increases the buildup of resistant bacteria.

For specific recommendations visit

<http://pnwhandbooks.org/plantdisease/blueberry-vaccinium-corymbosum-bacterial-canker>.

(Source: Peerbolt Small Fruit Update, Oct. 1 2015)

Blueberry/Huckleberry (*Vaccinium* spp.) – Witch’s Broom Rust

Adapted from Jay Pscheidt, Oregon State University

Cause: *Pucciniastrum goeppertianum*, a rust fungus that alternates between *Vaccinium* spp. (huckleberry, blueberry, and cranberry) and true firs. Infection of blueberry and huckleberry leads to extensive growth in the phloem each year. The telia encircle the swollen stems and produce teliospores that germinate in the spring. Teliospores produce basidiospores, which are dispersed during rain storms. These spores will infect grand, silver, balsam, and subalpine firs. Aecia produced on the fir needles shed aeciospores that infect huckleberry. A uredinial state has not been found. Cool, moist springs favor disease development. Although easily found in natural settings, it is not considered an economic problem.

[**Editor’s Note:** Reports and direct observations of this disease have increased in New England in recent years.]



Leaves are OK but stems are overly thickened. Photo by Jay W. Pscheidt, 1993.

Symptoms: Evergreen huckleberry (*Vaccinium ovatum*), highbush blueberry (*V. corymbosum*) and lowbush blueberry (*V. angustifolium*) develop a witches' broom of thickened stems with few or no leaves. Telia form in a reddish brown layer around stems each year. Branches are swollen, spongy, and distinctly yellowish to reddish brown in contrast to the greenish color of normal twigs.

Firs develop white tube-like fruiting structures (aecia) on the lower needle surface. Aecia can mature on current-year needles in late summer or on previous year's needles in early summer. Aeciospores are generally yellow. Severe infections result in needle drop.



In the center are dark old telia while new telia are forming to either side. They start out white and progressively turn dark red from the bottom up. Jav W. Pscheidt, 2008.

Cultural control

- Remove the alternate host for at least 1000 ft around plantations.
- Removal of the affected branches will have little affect beyond aesthetics.
- 'Rancocas' is considered to have some resistance to this disease.

Chemical control

No chemicals are specifically registered for this disease on huckleberry; however, the following if applied for labeled diseases may be effective.

- Proline 480 SC at 5.7 fl oz/A. Use up to two (2) applications. Do not use within 7 days of harvest. Group 3 fungicide. 12-hr reentry.
- QuiltXcel at 14 to 21 fl oz/A. Do not use more than 82 fl oz/A/season, more than two (2) sequential sprays or within 30 days of harvest. Sprayers should not be used on apples. Group 3 + 11 fungicide. 12-hr reentry.
- Tilt at 6 fl oz/A. Do not use more than 30 fl oz/A/season or within 30 days of harvest. 12-hr reentry.

Reference: Ziller, W.G. 1974. The Tree Rusts of Western Canada. Canadian Forestry Service Publication 1329. (**Source:** *Peerbolt Small Fruit Update, Oct. 1 2015*)

GRAPE

Big, Blue Everest Seedless is Cornell's Newest Grape

Krisy Gashler, Cornell Univ. Media Services



Bruce Reisch '76, professor of horticulture, examines clusters of Everest Seedless in a research vineyard at Cornell AgriTech. Photo: Erin Flynn

The newest offering from Cornell's grape breeders is a fruit that's big, bold and comes with a towering history.

Those factors led the grape's breeders to name the new variety Everest Seedless, a nod to the celebrated Nepalese

mountain, said Bruce Reisch '76, professor of horticulture in the [College of Agriculture and Life Sciences](#), and grape breeder with [Cornell AgriTech](#) in Geneva, New York.



Everest Seedless at Cornell AgriTech. Photo: Cornell University

“We were looking to develop very flavorful grapes with large berries and large clusters, and we’ve achieved that with Everest Seedless,” Reisch said.

The new variety is a cold-tolerant, blue-colored Concord-type, with berries that weigh up to 7 grams – roughly twice the size of the traditional Concord. It is also the first truly seedless Concord-type grape ever released. It’s intended as a table grape – meant primarily for eating fresh, rather than using for jams, juice or wine, as most American ConCORDS are used.

To breed a grape that’s seedless and nearly double the size of a Concord, Reisch used a unique genetic approach. Most cultivated grape varieties contain 38 chromosomes, but some contain 76 chromosomes (known as “tetraploid grapes”). The larger number of chromosomes results in naturally larger berries, but breeders have to be careful to match their crosses with varieties with an equal chromosome number.

In the 1980s, Reisch traveled to Japan, and collaborated with plant breeders there to gather pollen from some of their 76-chromosome grape varieties.

The ancestry of Everest Seedless includes two of those Japanese varieties, Kyoho and Pione, as well as the classic American Concord and Niagara varieties. Everest Seedless also descends from several other Cornell-developed grapes, such as Himrod and Ontario.

The grape that became Everest Seedless resulted from a cross made in 1998 and was first planted in 1999. It has since been field-tested at several locations.

“Everest is one of the largest mountains in the world, and this is one very large grape,” Reisch said. “With its formidable ancestry and big flavor, we feel this variety can live up to its name.”

The grape is tolerant of midwinter temperatures as low as 10 to 15 degrees below zero Fahrenheit, making it suitable for most of the grape-growing regions in New York, and into the Midwest. It’s moderately resistant to downy mildew and powdery mildew, the most troublesome grape diseases in the Northeast.

Insects don’t seem to bother these grapes, according to Reisch, who said the variety has thrived in research vineyards where insecticides are not applied, but insects could be a problem at other locations.

Because the grapes are relatively easy to grow and produce large, flavorful, seedless berries, Reisch predicts they will become popular with home gardeners as well as professional growers. Everest Seedless is being exclusively licensed in the U.S. to [Double A Vineyards](#) of Fredonia, New York, for 10 years, and vines can be purchased from them starting this fall.

“Double A Vineyards has worked with Bruce Reisch and Cornell to provide many of the releases from their breeding program,” said Dennis Rak, owner of Double A Vineyards. “We are especially pleased to partner with them in promoting Everest Seedless. It is a unique grape that we feel has a bright future.”

Last year, Reisch’s team [solicited name suggestions](#) for this variety and received nearly 1,600 submissions from around the world, but the team could not find a name that would work. They needed a name they could trademark, that was not already in use among vineyards or wineries, and that could help describe the fruit. Previous attempts to crowd-source a new grape variety name have been successful. In 2012, Reisch’s team named two new wine grapes, [Arandell and Aromella](#), based on public suggestions.



Everest Seedless is a cold-tolerant, blue-colored Concord type with berries that weigh up to seven grams, roughly twice the size of the traditional Concord. Photo: Cornell Univ.

(Source: Cornell Chronicle, Sept 13, 2018)

GENERAL INFO

Hummingbirds May Reduce SWD

Juliette Carroll, Cornell University

Research in raspberries at Cornell AgriTech over the past four years has uncovered a promising alternative tactic for reducing the impact of SWD on berries: hummingbirds, who eat up to 2,000 small insects per day while feeding their young.

As first documented in the column “Berry Growers Sharing Great Ideas” (May 14, 2014) in Growing Produce, Robert Hays of Hays Berry Farms in Dumas, Mississippi, reports using hummingbird feeders to attract these beautiful, pugnacious, and voracious birds. He installs 25 hummingbird feeders per acre in his six acres of blackberry plantings, and filled each with a plain, clear, sugar-water solution. “He estimates there are more than 500 hummingbirds flying around his fields on picking days, some even landing briefly on pickers’ arms or hats. Between his beneficial insects and his hummingbirds, he has not had to spray.”

of the field without feeders. However, when numbers are moderate, there was a difference. Along a transect down the length of the field, the trend was for fewer SWD in the hummingbird feeder area compared to the no-feeder area, as shown in figure 1.

When SWD numbers are moderate, the trend was for fewer SWD in the hummingbird feeder area compared to the no-feeder area.

Two grower demonstrations were undertaken this year, as well: one

in blueberry and one in raspberry. Both growers undertook cleaning the feeders and changing the sugar solution twice per week to keep the hummingbirds well fed and active within their plantings. At a workshop held in Salem last month, several of the tiny birds were seen dashing about. (See figure 2.)

Placing and maintaining 25 hummingbird feeders per acre, as at Hays Berry Farm and in our research and grower demonstration plots, may be a bit too arduous for some

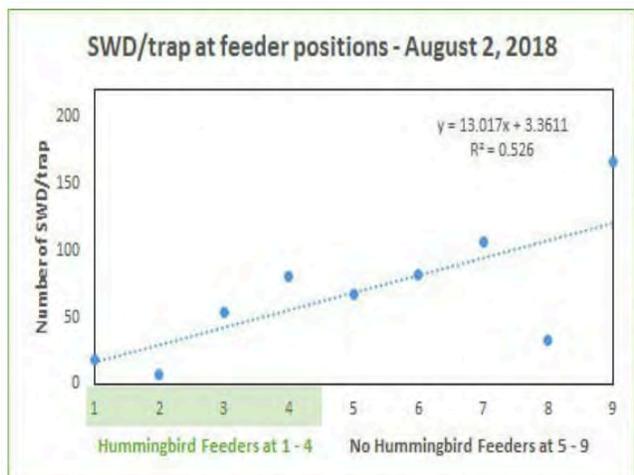


Figure 1 (left): A trend of fewer SWD caught in traps in positions 1-4, where hummingbird feeders are located, compared to more being caught in positions 5-9, where there are no hummingbird feeders, in a transect along a raspberry planting. **Figure 2 (right):** A grower at the SWD workshop watches as a hummingbird visits a feeder in the raspberry planting.

The diet of an average hummingbird consists mostly of flower nectar and insects. Flower nectar provides sugar to support their high metabolic rate—even higher during flight due to their rapid wing flapping rates. The insects hummingbirds eat provide them with protein, amino acids, and necessary vitamins and minerals. The insects must be small enough to swallow whole during light—watch out, SWD!

Cornell researchers have expanded on this concept with their own monitored plantings. Preliminary data analysis for 2018 shows that when SWD numbers are very low or very high, there is little to no difference in the number of SWD caught in Scentry traps placed in the area of the field with hummingbird feeders compared to those in the area

growers. There are other ways to attract hummingbirds to your berry planting that don't rely on the use of feeders, such as allocating space for flowering plants the birds prefer. Interplanting with rows of monarda (bee balm), for instance, is one approach. Of course, SWD is around a lot longer than hummingbirds, which have, at this point in time, likely flown off to the South on their journey to the Yucatán peninsula in Central America. Flying across the Gulf of Mexico or along Mexico's coast, they make their way to their overwintering grounds. And as SWD populations explode in late summer it is difficult to control them, let alone rely on a flying predator. Still, hummingbirds show promise as part of an integrated pest management program, as well as being a delight to watch, both good reasons to encourage them to visit your farm.

Hummingbird Q&A

The Cornell Lab of Ornithology has an extensive FAQ with a wealth of information on hummingbirds—all of which support the idea that attracting these birds into your berry plantings, especially late-summer crops like fall raspberry, blackberry, and elderberry, could prove highly beneficial in controlling SWD.

Attracting Hummingbirds to Your Area

Q. When should I hang my hummingbird feeders?

A. In May. Use fairly small feeders at first, and change sugar water at least every couple of days in hot weather or if feeders are in direct sunlight, and every 2 to 4 days when it's cooler and feeders are shaded. Flowers in your garden, especially those with tubular red corollas, attract hummingbirds.

Q. What's the best recipe for hummingbird nectar?

A. The sugar content of natural flower nectar varies, and is roughly comparable to sugar water mixtures ranging from a quarter to a third cup of sugar per cup of water. During hot, dry weather, when hummingbirds risk dehydration, it's best to make your mixture no stronger than a quarter cup of sugar per cup of water. But during cold, rainy spells, making the mixture a bit stronger, up to about a third cup of sugar per cup of water, will not hurt your birds and may help them.

Q. Should I use red food coloring in hummingbird food?

A. There is absolutely no reason to add any red dyes to hummingbird sugar water. After all, natural flower nectar is clear, and hummingbird feeders have colorful parts that attract hummingbird regardless of the color of the sugar water.

Q. How do I keep ants out of my hummingbird feeder?

A. Many hummingbird feeders—especially the saucer variety—have a center “moat” separate from where the sugar water is placed. These feeders are easy to keep ants out of by filling that moat with water. The ants that do get down into it drown, but usually just don't even try. If you have another kind of feeder, make sure it's hanging by a simple rod rather than string, and coat a center spot all around, about an inch wide, with petroleum jelly. The ants won't cross that.

Q. Should I stop feeding birds in fall so they can start their migration?

A. Keeping your feeders up has no influence on whether a bird will start its journey south. A number of factors trigger the urge for birds to migrate, and the most significant one is day length. As days grow shorter in late summer, birds get restless and start to head south, taking advantage of abundant natural food, and feeders where available, to fuel their flight. Hummingbirds are no different from others and will migrate regardless of whether feeders are kept up. However, we encourage people to keep feeders up for several weeks after the last hummingbird leaves the area, just in case a straggler shows up in need of additional energy before completing the long journey south.

Hummingbird Behavior

Q. How much do hummingbirds eat each day?

A. This varies depending on the caloric value of the food, the bird's activity levels, and the temperature of its environment. Hummingbirds can consume 100 percent of their body's weight in sugar water or nectar every day, in addition to as many as 2,000 tiny insects! Before migration, it's not unusual for a hummingbird to double its weight, adding a huge amount of fat to power the long journey.

Q. Why do hummingbirds fight so much?

A. Hummingbirds are aggressive for a good reason: they can't afford to share flowers during times when not many blossoms are available, because they may have to wander a long way after nectar is depleted. This aggression is so deeply ingrained that they just can't figure out that feeders are different. Overall, you'll feed far more hummingbirds by setting out four tiny one-port feeders than one giant eight-port one. Spread them out and the birds won't have to see one another, arousing their territoriality. You'll get to watch them through more windows, and they'll be much happier, too.

Q. Why do I see fewer hummingbirds in midsummer?

A. Adult male hummingbirds aggressively defend their territory, and if your yard is within the territory of one, he may drive all other male hummingbirds away during the nesting season. If you have a nesting female nearby, she will visit your feeder only periodically, spending most of her time incubating her eggs. After the eggs hatch, she usually concentrates her feeding at flowers that supply tiny insects as well as nectar; insects contain the protein that her nestlings need in order to grow. Once the young have fledged, she continues feeding them for several days until the fledglings have mastered getting their own food. At this time, she may bring them to your feeders to teach them how to take advantage of this easy food supply, too. This is also when males begin migrating, with adult females soon following. So many of the hummingbirds that suddenly appear are actually migrants from farther north, just passing through.

Hummingbird Migration

Q. Do hummingbirds migrate in flocks?

A. Hummingbirds migrate individually. When a late-October straggler in the East is a ruby-throated hummingbird, it's usually an immature bird from farther north whose mother got a late start with that nest. Ruby-throated hummingbirds are strongly migratory, but their bodies need a high level of fat to fly long distances. As people bring in their feeders in fall and frosts kill nectar-bearing flowers, those hummingbirds remaining have to go long distances between feeders, so yours may remain for a week or two before its body is replenished enough to continue. Hummingbirds are surprisingly hardy as long as they can get enough food each day, and they need extra calories during cold spells. When it's cold, it's not a bad idea to up the concentration of sugar to 1/3 cup per cup

of water to give it more calories, which they burn while shivering. Tragically, some of these stragglers do end up dying, but your feeder really isn't keeping your hummingbird from migrating. Rather, your feeder is giving it its best chance to restore its body to continue on.

Q. There's a hummingbird at my feeder in the dead of winter. Will he be okay?

A. Hummingbirds are remarkably tolerant of cold weather, so it's likely your bird will be fine if it can continue to find food. You can get an idea of where hummingbirds have been found in winter by looking at maps from eBird (ebird.org). (*Source: NYBerry News, #10, Oct. 2018*)

Cultural Management Strategies To Reduce Orchard Suitability For Spotted Wing Drosophila

David Jones and Nikki Rothwell, Michigan State Univ.

Summary of 2018 research investigating cultural management strategies to reduce SWD in tart cherry orchards. This work was made possible thanks to funds from the Michigan Cherry Committee.

trial blocks in 2017. These findings provide a foundation to further explore cultural management methods that could develop into an additional and reliable strategy for SWD control that could be employed by commercial growers.



Unpruned treatment (left) and pruned treatment (right) in early spring, 2018.

Manipulation of the tart cherry orchard environment to reduce suitability for spotted wing Drosophila (SWD) has been suggested as a promising new component to SWD management systems. The team at the [Northwest Michigan Horticulture Research Center](#) successfully demonstrated that both annual pruning and bi-weekly mowing strategies reduced SWD infestation in no-spray

However, prior to 2018 these cultural strategies had not been evaluated on commercial farms in combination with grower-standard insecticide programs. Furthermore, the 2017 trials evaluated treatments that were either mowed or not mowed at all, and these mowing strategies differ from conventional commercial mowing practices.

All commercial tart cherry growers mow at least two times per season. Research by Nikki Rothwell, [Michigan State University Extension](#), showed a difference between never mowing and mowing every two weeks, but these differences may not be evident in a comparison of two mows per season compared with four to five mows per season. Growers are also universally applying insecticides every seven to 10 days in the three to four weeks prior to harvest to manage SWD, and the 2017 trials were conducted without insecticides.

The economic impact of adopting these cultural modification changes to the traditional tart cherry system may be significant. Tart cherry growers traditionally prune established trees only every two to three years, and they remove four to six larger limbs and clean up brush inside of the canopy. The standard mowing practice is to mow one time within a few days of Memorial Day weekend,

and then to mow once more about a week before harvest to provide easier passage for mechanical harvesters. These strategies are low in cost and have been effective for traditional growers for decades. These low cost strategies are critical to grower returns, particularly at a time when tart cherry market prices are historically low.

Increasing the number of times a grower mows to a bi-weekly program can add two to three trips through the orchard, meaning additional time and cost to the production system. Pruning tart cherry trees on an annual basis also adds significant labor and costs to the system. Given the substantial added costs of either or both of these practices, clear data in commercial settings demonstrating significant SWD management benefit from the adoption of these changes is needed in order to provide clear recommendations on cultural and pest management practices to the tart cherry industry.

Four commercial tart cherry orchards in west central Michigan worked with MSU Extension on this trial. We established the following four treatments of 150 tart cherry trees per treatment for a total of at least 600 trees per site:

1. Winter pruned with the standard mowing regimen (mowed over Memorial Day weekend and within a week of harvest).
2. Winter pruned with a bi-weekly mowing regimen.
3. No winter pruning with a standard mowing regimen.
4. No winter pruning with a bi-weekly mowing regimen.

Three standard SWD cup traps were placed in the center of each treatment spaced at least 25 feet apart for a total of 12 traps per location. Traps were counted weekly from May 15 through harvest. Growers applied a standard SWD management program starting when fruit turned yellow or straw-colored. Growers applied two to three sprays from either the pyrethroid or organophosphate insecticide classes every seven to 10 days. All products applied are currently labelled “excellent” for SWD management.

Past research has shown SWD has a preference for higher humidity. Based on this information, researchers investigated whether more humid areas in the tart cherry tree canopy (i.e., interior or bottom of the canopy) were more attractive to SWD than the less humid areas (i.e., top or outside of the tree).

Fruit samples were collected one week before harvest and at harvest; fruit were collected from the bottom of the tree, the top outside of the tree and the top middle of the tree. Three gallons of fruit were taken from each of these three locations in each of the four treatments on the two sample dates. Fruit were soaked in a standard sugar water solution for 15 minutes, strained through fine mesh and inspected for SWD larvae under a dissecting microscope.



Left: Harvest of fruit from three different canopy positions. Top right: Suspension of tart cherries in sugar water solution. Bottom right: Inspection of particles strained out of tart cherry larval extraction solution.

Results

Trap catch results

No significant differences in weekly trap catch through harvest was observed at any of the four sites between any of the four treatments in 2018 (ANOVA, $p > 0.05$). In general, trap catches were abnormally low across the west central region in 2018 compared to 2017, and this trend was observable in the trapping numbers over the course of this study (Figures 1-5). SWD were observed in traps four to six weeks later in 2018 than in 2017, and population numbers never climbed to the levels observed in 2017 (Figures 1-5). Although differences were detected at the Northwest Michigan Horticulture and Research Center in 2017 in a no-spray situation between no mow versus two-week mow treatments and prune versus no prune treatments, these differences were not observed in 2018 in commercial sites.

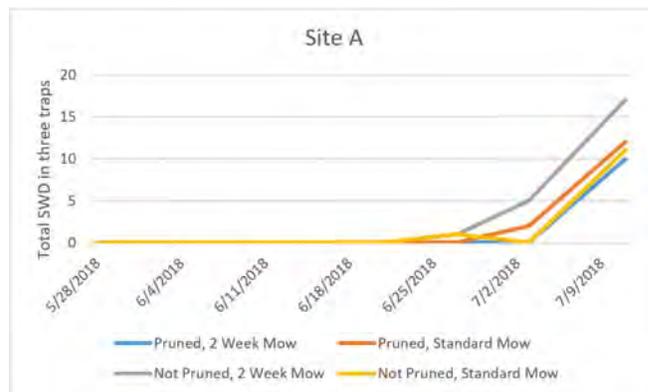


Figure 1. Site A – Sum of trap catch for each of the four cultural treatments at four commercial tart cherry orchards in west central Michigan, 2018.

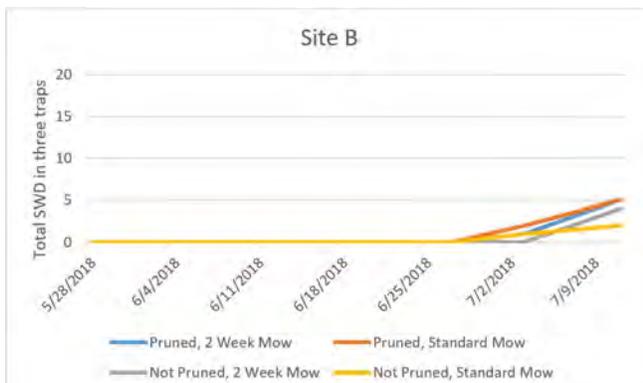


Figure 2. Site B – Sum of trap catch for each of the four cultural treatments at four commercial tart cherry orchards in west central Michigan, 2018.



Figure 3. Site C – Sum of trap catch for each of the four cultural treatments at four commercial tart cherry orchards in west central Michigan, 2018.

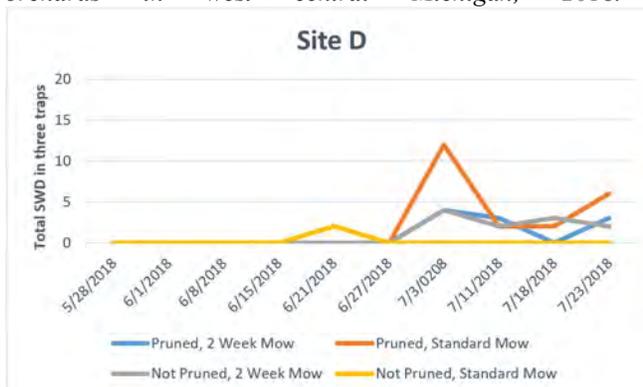


Figure 4. Site D – Sum of trap catch for each of the four cultural treatments at four commercial tart cherry orchards in west central Michigan, 2018.

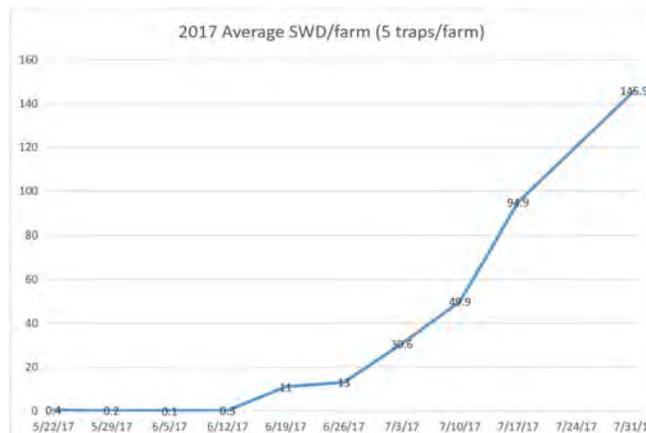


Figure 5. Average of the total SWD captured in five SWD cup traps per farm in 2017. By comparison, total trap accumulations of all 16 traps placed at each farm in the 2018 work did not exceed the total of just 5 traps per farm at any point after mid-June.

Fruit sampling

No SWD larvae were detected in any samples of any treatment from any of the positions on the tree. Growers at all four sites successfully harvested the crop without any detectable larval contamination. Samples collected one or more weeks post-harvest may have had differences in numbers of larvae, but sampling was not possible in this commercial orchard research because few (if any) cherries remained on the trees after harvest.

Impact of weather in 2018

In general, we saw far fewer SWD in 2018 compared with past seasons, both throughout the region and the state. We hypothesize that fewer SWD may be due at least in part to environmental factors. The spring of 2018 was abnormally late, and west central Michigan had several late snowfalls and freezes after brief warming periods in to late April. Following this long winter with variable temperatures, weather conditions were drier and hotter than the five-year average for the region from July through the first half of August.

These trends are in sharp contrast to 2017, which was a historically challenging year for SWD in the industry throughout the state. The summer of 2017 was more moderate in temperature, had an earlier spring and saw higher rainfall. The west central region accumulated 1,273 growing degree-days (GDD) base 50 in 2017 between April 30 and Aug. 1 compared to 1,560 GDD base 50 in 2018. In that same time span for both seasons, there was 13.94 inches and 223 hours of rainfall in 2017 compared to only 9.05 inches and 176 hours with rainfall in 2018. Three of the 10 commercial sites evaluated in 2017 were infested prior to harvest, while no infestation was detected in 2018.

We hypothesize that weather conditions that are more favorable for this pest would have shown differences between the different management practices. These

results demonstrate the need for further data on these practices.

Impact of insecticides in 2018 trials

Differences in infestation in 2017 at the Northwest Michigan Horticulture and Research Center were observed in no-spray conditions. It is probable that the application of a commercial insecticide program mitigated differences that might have been observable in a no-spray scenario, particularly in a low-population year like 2018. However, higher SWD populations may have resulted in differences between cultural management treatments, even with commercial insecticide programs.

Conversely, it is possible differences in population or infestation risk that may be observed in cultural management trials under no-spray settings are generally wiped out in commercial settings by a high caliber insecticide program. Replication of this work in commercial settings is needed to gather more information on this subject.

Discussion

One year of data in commercial settings, particularly in a year with historically low SWD populations, is not adequate to make recommendations to commercial tart

cherry producers. The weather likely contributed to the overall low SWD populations, and with no larval infestation in any of the treatments, we cannot draw any conclusions. Further replicating this trial in a year with higher SWD populations, such as 2017, may determine if bi-weekly mowing, annual pruning or both practices will impact SWD infestation.

Based on work at the Northwest Michigan Horticulture and Research Center, we can conclude that these cultural practices do impact SWD infestation, but we do not have data from commercial orchards to determine if adoption of these practices merits additional costs every season. More data are needed for recommendations in commercial tart cherry orchards.

This article was published by [Michigan State University Extension](#). For more information, visit <http://www.msue.msu.edu>. To have a digest of information delivered straight to your email inbox, visit <http://www.msue.msu.edu/newsletters>. To contact an expert in your area, visit <http://expert.msue.msu.edu>, or call 888-MSUE4MI (888-678-3464).

(Source: MSU Fruit & Nut Production News, Sept. 28, 2018)

Northeast SARE Invites Farmer Grant Applications

Katie Campbell-Nelson, University of Massachusetts

The Northeast Sustainable Agriculture Research and Education (SARE) Program has released the call for applications for 2019 Farmer Grants. **Proposals are due online by Tuesday, November 27, 2018 at 11:59 p.m. E.T.** Funded projects will be announced in late February 2019, and projects may begin in the spring.

Northeast SARE Farmer Grants are intended for farm business owners and managers who would like to explore new sustainable production and marketing practices, often through an experiment, trial or on-farm demonstration. Reviewers look for innovation, potential for improved sustainability and results that will be useful to other farmers.

Application materials, including detailed instructions and supporting documents, are posted on the Northeast SARE website at www.northeastsare.org/FarmerGrant. Questions about the grant program should be directed to northeastsare@uvm.edu.

Farmer Grant projects must be conducted in Connecticut, Delaware, Massachusetts, Maryland, Maine, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, West Virginia or Washington, D.C. Awards are capped at \$15,000 and projects may address the wide range of issues that affect farming in the Northeast. To search topics that SARE has previously funded, please access the national database of projects at projects.sare.org/search-projects.

Applicants must work with a technical advisor—typically a Cooperative Extension educator, Natural Resources Conservation Service staff, nonprofit organization employee, private crop consultant, veterinarian or other service provider—who provides support and advice to the farmer applicant.

Northeast SARE will host a Farmer Grant webinar on Oct. 10 from 12:30 to 1:30 p.m. Carol Delaney, grant program coordinator, will provide information on program eligibility, how to apply, types of projects SARE funds, allowable expenses and more. The webinar is free. To register, visit <http://go.uvm.edu/farmergrant19>. To request a disability-related accommodation to participate, contact Debra Heleba at (802) 651-8335, ext. 552, by Oct. 3.

If you have questions about applying for a farmer grant in Massachusetts, contact your state Coordinator: Katie Campbell-Nelson, UMass Extension Vegetable Program, kcampbel@umass.edu or 413-545-1051.

-- Debra Heleba, NESARE Communications Specialist (Debra.Heleba@uvm.edu)

Northeast SARE, which is funded by the U.S. Department of Agriculture's National Institute of Food and Agriculture, offers competitive grants and sustainable agriculture education.

(Source: UMass VegNotes, 9/27/18)

Bees' Medicine Chest Should Include Sunflower Pollen, UMass Amherst Study Suggests

UMass News & Media Services

AMHERST, Mass. – A new study by Jonathan Giacomini and his former advisor, evolutionary ecologist Lynn Adler at the University of Massachusetts Amherst, with others, found that eating sunflower pollen dramatically and consistently reduced a protozoan pathogen infection in bumble bees and reduced a microsporidian pathogen of the European honey bee, raising the possibility that sunflowers may provide a simple solution to improve the health of economically and ecologically important pollinators.

Adler explains, “There is a whole literature of plants that use chemicals to protect themselves against insects. Monarch butterflies are the prime example; they are insensitive to the poison in milkweed plants they eat, but it makes them poisonous in turn to their predators. For some reason, no one had thought about this in terms of bees, but they do eat plant pollen and nectar.”

The ecologist says she has long been interested in whether “floral rewards” like nectar and pollen might have protective effects against disease and parasites for pollinator insects, but her own experimental results with nectar were inconsistent. She points out that, “compared to nectar, pollen has far more concentrated defensive chemicals.”

The current study began as an honors undergraduate experiment by first author Jonathan Giacomini, who is now a graduate student of co-author Rebecca Irwin at North Carolina State University. Details are in the current issue of *Scientific Reports*.

The researchers studied a common parasitic infection of bumble bees caused by the protozoan *Crithidia bombi* and conducted a pilot study of the microsporidian *Nosema ceranae* in honey bees. Adler says up to 80 percent of bumble bees found in western Massachusetts where the study took place are infected with *Crithidia*. It has been shown to impair learning and foraging, reduce lifespan and the likelihood of queens founding new colonies. “In the lab it may be benign,” she notes, “but with the stress of outdoor life it becomes more of a problem for bees.”

“From the plant’s point of view, pollen is a gamete and you want the pollinator to come and eat your nectar and carry the pollen to fertilize another plant, but pollinators do eat pollen because it’s a great protein and fat source, which is

difficult for plant eaters to find. Any vegetarian will tell you that,” Adler quips.



Jonathan Giacomini

For this work, the researchers infected groups of bees and fed them one of four different pollen diets: sunflower, buckwheat, rapeseed or a fourth mix of all three, then measured *Crithidia* infection in the insects.

Adler reports, “Sunflower pollen was amazing. When the bees ate sunflower pollen most of them just didn’t have detectable *Crithidia* counts. It was like nothing we’d ever seen with nectar, it was really dramatic and very exciting.” She also reports that mortality was not different for bees receiving the different treatments after one week. In small bee

colonies they studied, all bees had better reproduction when reared on sunflower compared to buckwheat pollen, but slightly lower adult survival.

“We realize that this is not a cure to all bee diseases, and we haven’t looked at many other pathogens yet, but the effects we have seen are dramatic,” the ecologist notes.

Further, “Bees do not do well eating just sunflower, but it may be part of a solution. They are going to need other and varied food for their health, but the cool thing about sunflowers is that they are grown agriculturally and are also a common wildflower native to North America. Incorporating them into pollinator gardens is a simple thing we can do to help bees.”

The team also sampled bees from farms around Amherst and measured how much sunflower was growing at the farm and the bees’ *Crithidia* load. “There were a lot of uncontrolled variables, but still the more sunflowers were grown at the farm, the lower the *Crithidia* load for the bees at that farm,” Adler says.

The authors suggest that “given consistent effects of sunflower in reducing pathogens, planting sunflower in agroecosystems and native habitat may provide a simple solution to reduce disease and improve the health of

economically and ecologically important pollinators.”

This work was supported by the National Science Foundation, the U.S. Department of Agriculture and UMass Amherst’s Commonwealth Honors College. (Source: UMass New’s and Media Services, September 26, 2018)



queen bee on sunflower

Reminder to Report Crop Damages Promptly

Producers covered by a Federal Crop Insurance Policy are reminded to monitor their crops for insurable damage throughout the growing and harvesting season. If you notice damage contact your crop insurance agent within 72 hours of discovery, 15 days before harvesting begins and within 15 days after harvesting is completed on the insurance unit. Two other important reminders:

- Direct marketed crops must have a yield appraisal before they are harvested, if loss is anticipated.
- Do not destroy crop evidence that is needed to support your claim without clear direction, in writing, from the insurance adjuster.

Producers having coverage under the Noninsured Crop Disaster Assistance Program (NAP) administered by the USDA - Farm Service Agency have similar loss reporting requirements. NAP producers should contact the FSA Office that serves their farming operation to report losses.

UMass Extension works in partnership with the USDA Risk Management Agency (RMA) and various agricultural organizations to educate and inform Massachusetts producers about Federal Crop Insurance and Risk Management Programs. For more information, please visit www.rma.usda.gov or contact UMass Extension Risk Management Specialists Paul Russell at pmrussell@umext.umass.edu or Tom Smiarowski at tsmiarowski@umext.umass.edu or check out our website: <https://ag.umass.edu/risk-management>



UPCOMING MEETINGS:

- October 11, 2018** – *Cover Crop Workshop for Vegetable Growers*, 9am – 3pm. Mass Division of Fisheries & Wildlife Headquarters, 1 Rabbit Hill Rd., Westborough MA. For more information or to register, go to: <http://worcesterconservation.org/event/cover-crop-workshop/>.
- October 29, 2018** - *Produce Safety Alliance Grower Training for fruit and vegetable growers– Grafton,* from 9 am to 5 pm. Brigham Hill Community Farm, 37 Wheeler Rd, North Grafton, MA 01536 For more information or to register, go to: <https://umasscafe.irisregistration.com/Form/PSAGrafton18>
- October 31, 2018** – *North Country Fruit & Vegetable Seminar & Trade Show*. 9:00am – 3:30pm. Town & Country Inn & Resort, 20 State Rte 2 - Shelburne, NH For more information go [here](#) or contact Heather Bryant at: heather.bryant@unh.edu.
- November 4, 2018** – *Massachusetts Cultivated Blueberry Grower’s Assoc Winter Meeting*. 12-3pm. Harvey’s Conference Center, 68 Hopkinton Rd., Rte 135, Westborough MA. Featured speaker Dr. Richard Cowles on Spotted Wing Drosophila. \$27 per person for dinner; \$10 additional charge for non-members. RSVP to Elisabeth Patt at cap1226@verizon.net.
- November 7-8, 2018** – *Northeast Greenhouse Conference & Expo*. Boxboro Regency Hotel, 242 Adams Pl., Boxborough, MA For more information or to register, go to: <https://www.negreenhouse.org/registration.html>.
- November 7-9, 2018** – *Great Lakes Fruit Workers Annual Meeting*. The Hotel Ithaca, 222 South Cayuga St. Ithaca, NY. For more information visit <https://greatlakesfruitworkers.weebly.com/>.
- January 9-11, 2019** – *North American Raspberry & Blackberry Conference*. Savannah Georgia. For program information and to register, go to: <http://www.raspberrylblackberry.com/2019-north-american-raspberry-blackberry-conference/>.
- February 27-28, 2019** – *Harvest New England Marketing Conference and Trade Show*. Sturbridge Host Hotel, Sturbridge MA. More information coming soon.

Berry Notes is edited by Sonia Schloemann with articles written by other contributors with attribution; sources are cited. Publication is funded in part by the UMass Extension Agriculture & Landscape Program, subscription fees and generous underwriting.

Questions can be directed to Sonia Schloemann at sgs@umass.edu. Please cite this source if reprinting information that originates here.

Massachusetts Berry Notes is a publication of the UMass Extension Fruit Program, which provides research based information on integrated management of soils, crops, pests and marketing on Massachusetts Farms. No product endorsements of products mentioned in this newsletter over like products are intended or implied. UMass Extension is an equal opportunity provider and employer, United States Department of Agriculture cooperating. Contact your local Extension office for information on disability accommodations or the UMass Extension Director if you have complaints related to discrimination, 413-545-4800