

VOLUME 7, ISSUE 7
JUNE 2019

BERRY NEWS



Berry 'To Do' List

Maintain Nutrition in Berry Crops—Plan to do foliar nutrient testing done in late July or early August – more information about this process will be in next issue of the Berry News. All Blueberry and Raspberry fertilization should end by July 1. DN strawberries should be receiving weekly applications of N that are close to 5# actual N per acre per week. This should continue through September. June bearing strawberries should be renovated as soon as picking ceases – a small amount of fertilizer is applied then and again in September – both of these windows are important for maintaining plant vigor.

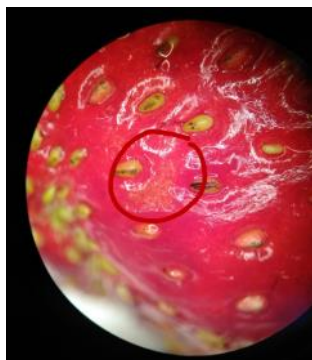
Spotted Wing Drosophila (SWD) adults are being caught in many traps across the state. With the upcoming heat, populations are expected to increase. This timing puts out later than normal June-bearing strawberry crop at risk, and late cultivars, such as AC Valley Sunset and certainly Malwina, risk infestation. Larvae has been found in fruit in the Hudson Valley already this season.

Strawberries: Harvest strawberries thoroughly and renovate (or mow off leaves) promptly after harvest in order to promote breakdown of unharvested fruit. This is especially important if you also grow raspberries or blueberries because there is potential for build-up of SWD populations on strawberry fruit left behind prior to renovation. If you are using

herbicides that require a delay of several days after application before mowing (e.g. 2,4-D), make sure that they are effective on your problem weeds, and are worth the necessary delay. Those who do not use herbicides may want to skip mowing altogether; this often spurs the growth of weeds, and temporarily gives them the upper hand over strawberries – allowing them to get a head start.



SWD larvae in strawberry.
Photo: UNH



Breathing tubes of SWD larvae
in a June-bearing strawberry.
Photo: J. O'Connell

Till in strawberry fields slated for removal as soon as possible and then

(Continued on page 2)

Table of Contents

- 1 Berry 'To Do' List
- 2 How To Put Out a Mummy Berry Plot
- 3 Raspberry Viruses
- 5 Are You Exempt From FSMA?
- 6 Upcoming Events

(Continued from page 1)

seed a cover crop or a late season vegetable. If you cannot till the field, then mow it close to the crown or cultivate aggressively to help crush and dry down the remaining berries. This will help limit SWD population growth in the remaining late-ripening fruit.

Applying an insecticide will not be as effective as this treatment in reducing the population of SWD in an abandoned strawberry field.

Begin spray program when SWD is found in your region – monitor fruit for infestation. See the notes below for pesticide application tips.

Raspberries and blackberries are the preferred host for SWD. This fruit is very vulnerable. Keep rows narrow and thin canes to allow good air circulation and light penetration. SWD prefer cooler, humid, shaded areas of the crop canopy. Monitor fruit whenever possible.

Blueberries: eliminate branches below knee high (on mature bushes) that cast shade on the ground and open the upper canopy to allow for good air circulation and light penetration. This will improve spray penetration and efficacy, too. As with other berry crops, maintain an open canopy as much as possible.

Harvest all crops frequently (daily if possible) and thoroughly and avoid letting fruit fall to the ground. Anything you can do to reduce cull fruit left in the field will help reduce SWD infestations.

Test ripe fruit for infestation: do a salt flotation test to determine how many SWD larvae are present. See this description of how to conduct the SWD salt flotation test, with images.

Refrigerate fruit as quickly as possible; storing at 32-35°F can arrest the development, and even kill eggs/larvae that may be present--if held for several days at that temperature. If spraying, use a tight schedule (5-7 days) once a crop is ripening and SWD have been

confirmed in or near the crop. Spraying in the evening may increase residual efficacy because some materials degrade more quickly in sunlight. SWD is also more active in the evening, especially when the weather is hot.

When SWD is known to be in the area, and you have ripening fruit, we are suggesting you start monitoring berries for infestation and begin a spray schedule. Research has shown that beginning the spray rotation with the strongest and most effective pesticide to help keep the population low from the beginning is a more successful strategy than trying to reduce the population once it has exploded. Additionally Assail has been found to have some limited larvicide activity so it might be good to add to a spray tank once you know you have infestation. Add Nu Film P at 4-16 oz per 100 gal with all materials to improve insecticide efficacy. If it rains after you spray a material, re-apply if the label allows.

Organic insecticide options are limited. One multi-year study found Entrust SC to be the most effective spray for SWD control, with Grandevo also showing effectiveness controlling 3rd instar larvae within infested fruit.

Consider insect netting on smaller plantings. This must have < 1mm mesh, be applied before ripe fruit are present, and edges must be sealed.

Weed mats beneath blueberry or raspberry bushes may prevent SWD pupae from digging into the soil for protection, though this has not been well studied. Mats may also make removal of fallen berries easier. Mats could be put in place temporarily during the harvest and clean up period, then removed before winter to prevent voles from moving in.

Source: Compiled information from UNH, UVM and

How to Put Out a Mummy Berry Plots

Seanna Annis, University of Maine

If you have not put out your mummy berry plot, now is the time! You can still find mummies at this time. Walk around a crop field and look for any mummies left on the plants, typically under that plant, you will find a lot more mummies. The mummy berries should still have some grey and shriveled ones on the ground that can be spotted. Typically if you see a few mummy berries still on the plant you will find four to ten times as many fallen to the ground under those plants. You will need about 60 minimally and preferably about 150 mummy berries in total if you put out three plots (20 to 50 mummies per plot). You can also collect mummy berries from processing lines if you see them then. If you do not have any mummies and would like to put out a plot, please contact me and we can see about getting you some. Please see below for instructions on how to put mummy berry plots.

We are looking for growers who are willing to check their mummy berry plots twice a week and report to me on the development of the mummy berry cups. We want to place our weather stations in fields with monitored mummy berry plots next year. Please let me know if you would be willing to put out a mummy berry plot and have a weather station in your field.

If you are willing to have a weather station and monitor plots but do not have the experience to put out mummy berry plots, we can help you set up the plots. Please contact Seanna Annis at 207.581.2621 or via email at sannis@maine.edu if you are willing to be a monitor of mummy berry next year or have any questions.

How to put out Mummy Berry plots

Collect about 150 mummy berries (50 for each mummy berry plot) from your crop field(s) near harvest (or from the process line or winnow piles if you have them). The mummy berries will be whitish grey and smaller than the berries and will have dropped onto the surface of the

(Continued on page 3)

(Continued from page 2)

leaf litter under the plants, typically where you still see some amongst clusters of healthy berries on stems. Often clones produce different amount of mummy berries, so if there are no mummy berries in one spot, try another area in your field. Often there are more mummy berries at the edges of fields.

As soon as possible after you have collected the mummy berries, put them out in the field you will be monitoring. Do not store them in the fridge or in a hot place before you put them out. The best spot is in a paper bag in the shade or cool spot and to put them out as soon as you can. In next year's crop field, choose three areas within your blueberry field. I suggest three areas because some years one of our plots has not worked in a field. Each area should be about 3" by 3" that is clear of stems but amongst the plants. Choose areas that look like they have damp soil most of the time and will be easy for you to access next spring. These areas do not need to be widely spread around the field, 5 to 10 ft. between each one will be fine. If you have different exposures, soil types or large shaded areas



in your field you may want to place your mummy berry plots around your field to get the full range of when the mummy berries develop. The areas should not be on slopes where the mummy berries will be washed away, in hollows where they will be water-logged or in areas with lots of frost-heaves.

In each 3" by 3" area, clear off the leaf litter to one side and scrape off about 1/4" of hard packed soil and put aside. Place about 50 mummy berries on the surface of the soil and press the mummy berries firmly into the soil (with your fingers or step on them). The mummy berries need to be buried in soil but not more than 1/2" deep at most. Cover the mummy berries with a small amount of dirt (1/4") on top and press them firmly down again. You should NOT be able to see the mummy berries. Replace the leaf litter over the mummy berries to provide protection over the winter.

VERY IMPORTANT: Stake or flag the plots on either side so you can locate them in the spring. Two stakes or flags makes it much easier to figure out where to look in the spring.

Raspberry Viruses

Sources: Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), Penn State Extension and PNW Handbooks

Identification

Virus diseases cause various symptoms that include leaf curl and pucker and a yellow-mottled discoloration known as mosaic. Virus infected plants often produce small crumbly berries and low yields.

Aphids transmit raspberry mosaic and raspberry leaf curl virus from infected to healthy plantings. Dagger nematodes spread tomato ringspot virus. Pollen transmits bushy dwarf virus.

Symptoms of virus diseases can be confused with similar symptoms from other causes. For example, herbicide injury, poor crop nutrition, root rots or drought cause poor vigor and yellowing or curled leaves. Poor pollination, plant bug injury or a crop nutrition problem can cause crumbly berries.

Monitoring

Leaves of virus-infected plants may not always show virus-like symptoms. Symptoms may appear in the spring and disappear again. The best time to sample plant tissue for virus disease is in the spring, when plants are in an active growth stage. Diagnosis of virus diseases is difficult and should be considered when other potential causes of the problems have been ruled out. Elisa tests are an affordable and accurate way to test for virus. You can send the samples directly to AgDia for processing. Visit www.agdia.com for more information.

Management notes

The following steps help minimize the spread of -viruses:

- Use virus-tested, disease-free planting stock from an accredited plant propagation program.
- Destroy all nearby wild raspberries and blackberries because these are frequently infected with virus diseases.

(Continued on page 4)

(Continued from page 3)

- Set new plantings at least 16 m from older plantings to reduce the spread of aphids from one planting to another.
- Black and purple raspberries are very susceptible to virus diseases. To reduce the spread of virus from black and purple varieties to red raspberries, do not plant red raspberries close to purple and black raspberries.
- Rogue out and completely destroy all virus-infected plants as soon as symptoms of mosaic or leaf curl appear.

Virus Specifics:

Raspberry bushy dwarf virus (RBDV) causes primocanes to have a yellow interveinal chlorosis as they emerge in the spring. The leaves look like they have Simazine herbicide injury. Leaves may also exhibit yellow blotches, rings and lines. The fruit is crumbly. RBDV affects red and black raspberries and is pollen-born. Wild

raspberries may host the virus. Some cultivars don't exhibit any symptoms. Raspberry bushy dwarf virus (RBDV) can cause a variety of symptoms, and may cause no symptoms in some cultivars.

The best way to diagnose raspberry bushy dwarf virus is early in the season, when temperatures are fairly cool and



Raspberry Bushy Dwarf Virus
Photo: Laura McDermott

symptoms are most evident. Collect a few young but fully expanded leaves with symptoms and send to a diagnostic laboratory. ELISA test kits have been developed to diagnose this virus and most diagnostic labs will provide this service.

Raspberry bushy dwarf virus is a big problem because it is spread to new plants in pollen from infected raspberry plants. Some varieties are more tolerant than others, and some plant breeders have developed varieties with resistance to this disease. Primocane fruiting varieties are prone to RBDV because of their long bloom period. Management of RBDV includes the following steps:

- Purchase virus-tested plants from an accredited nursery.
- Control wild raspberries around the field and farm.
- Rogue out infested plants.
- **Remove bloom in the establishment year of a raspberry planting.**

Raspberry

mosaic virus

symptoms vary with the raspberry variety, the type of virus infection, and the time of year. In general, symptoms might include

delayed leafing out, dieback of shoot tips, and stunted canes or clusters of shoots from the same node. Plants usually die in a few years. Mottling or yellowish spotting and cupping or blistering of the leaves are common symptoms most easily seen in the early spring when the new leaves are expanding. Leaf symptoms often disappear during hot weather later in the season. Red raspberries are not as severely affected as black ones, but they still suffer reduced plant vigor and yield. Care must be taken in diagnosis since these symptoms can be mimicked by late spring frosts, powdery mildew, mite injury, fungicide and herbicide sprays, and boron deficiency.

The mosaic virus complex overwinters in infected plants and is spread by aphids. Feeding time needed to transmit viruses in the complex is only a few minutes. Standard control practices of establishing plants as far as possible from wild or older populations of brambles and using planting stock propagated from virus-free plants are useful. Controlling aphids may assist in slowing the spread of viruses within the planting; however, because the viruses are transmitted very quickly, it is unlikely that transmission can be thwarted. Of purple and black raspberries, Black Hawk, Bristol, and New Logan are tolerant; Cumberland is very susceptible. Canby, Reveille, and Titan, red raspberries are reportedly resistant because aphid vectors avoid them; most other red raspberry varieties are susceptible. Aphid vectors also avoid Royalty.

Raspberry ringspot virus is caused by Tomato ringspot virus (ToRSV), which is spread at a rate of about 6 ft. a year in the row by dagger nematodes (*Xiphinema americanum*). It is common in

red raspberry and some cultivated and wild blackberries. Common weeds such as dandelion and chickweed host the dagger nematode

(Continued on page 5)



Raspberry Mosaic Virus
Photo: Penn State Extension



Raspberry Ringspot Virus caused by Tomato Ringspot Virus.
Photo: PNW Handbooks

(Continued from page 4)

and thus encourage the spread of ToRSV. An infected nematode can transmit the virus to plant hosts for several months. Soil adhering to machinery can move the infected nematodes within fields and to other fields.

Symptoms usually are most noticeable in newly infected plants. Leaf symptoms vary from mottled, chlorotic, mosaic leaves to leaf curling and ring spotting. Delayed emergence of primocanes may also occur. Infected plants often show no symptoms but have low vigor and yield. The virus also may cause crumbly fruit. On some cultivars it causes a severe dwarfing that resembles root-rot damage. Many red raspberry cultivars are susceptible and probably most cultivars are severely weakened when affected.

Management of ringspot virus:

- New planting sites should be tested for dagger nematodes at least 1 year before planting. Do not plant in soil containing *Xiphinema* spp.
- Use certified planting stock.
- Fallow a site for 18 months prior to replanting to eliminate

nematodes.

- Use a cover crop for a year that is a non-host for ToRSV such as sudan grass that allows the nematodes to multiply. This flushes the virus from the nematode.
- Rogue out and destroy suspicious or diseased plants from fields once the presence of Tomato ringspot virus has been confirmed. In addition to the diseased plants, rogue out at least the next five plants beyond the last plant in which you see symptoms because they probably are infected already. If more than 5% of the plants in a field are diseased, the value of roguing is doubtful.
- Clean equipment thoroughly between operations to remove soil-containing nematodes.
- Begin operations in fields that are not dagger-nematode-infested before moving to infested fields.
- Control weeds such as dandelion. Establish a perennial grass in the alleyways to minimize soil movement on equipment. This greatly reduces the spread of Tomato ringspot virus in the field.
- Maintain adequate fertility.

| Virus | Symptoms | Vector |
|--|---|-----------------------|
| Raspberry bushy dwarf | Leaf mottling, shortened internodes, reduced vigour | pollen |
| Raspberry mosaic, Raspberry leaf curl | Leaf mottling, curling, reduced vigour | large raspberry aphid |
| Raspberry ringspot (tomato ringspot virus) | Crumbly fruit, yellow leaf mottling, declining vigour | dagger nematode |

Table 1: Raspberry Virus Diseases and Their Vectors

Wondering if you have virus in your raspberry or blackberry planting?

Cornell University is participating in a nation-wide survey of bramble viruses and will collect, prepare, submit the samples for FREE testing! Results will not be immediate, but should arrive this season.

100 samples from NYS are needed. The farmer needs to know the cultivar in order to get the testing done.

Please contact Laura McDermott - 518-791-5038 or lgm4@cornell.edu if you are interested.

Are You Exempt from FSMA?

Elisabeth Hodgdon, ENYCHP, Cornell Cooperative Extension

With all the talk of FSMA (the Food Safety Modernization Act) lately, one of the lingering questions in many growers’ minds is, “Am I exempt?” While safe growing and handling of produce is important on all farms, knowing whether or not you need to comply with the specific requirements within FSMA’s Produce Safety Rule (PSR) will be critical in making management decisions. Whether your farm is covered by FSMA depends on the type of produce you’re growing, your total produce sales, and to whom you are selling the produce.

The Food and Drug Administration has a handy color flow chart to assist with determining whether or not your farm is covered by FSMA: <https://www.fda.gov/media/94332/download>

For more information, contact Elisabeth Hodgdon at eh528@cornell.edu.

Calendar of Events

July 15 – FSMA/PSA Grower Food Safety Training Course **CCE Warren County office, Schroon River Road, Warrensburg, NY**

A grower training course developed by the Produce Safety Alliance (PSA) that meets the regulatory requirements of the Food Safety Modernization Act (FSMA) Produce Safety Rule. This one-day training is a requirement for farms growing more than \$25,000 worth of fruits and vegetables. Cost: \$35/person. For more information, contact Elisabeth Hodgdon at eh528@cornell.edu or 518-650-5323. Register here: <http://bit.ly/JulyFSMA>

July 29 - Last Monday Grant Webinar for Fruit and Vegetable Growers

The webinar will be limited to grants that are relevant to fruit and vegetable farmers in Eastern New York. More information and register at <https://enych.cce.cornell.edu/events.php>.

August 1 - Post-Harvest Washing and Cooling Workshop **Pleasant Valley Farm, Argyle, NY**

Workshop will feature FSMA compliant workstations that you can use on your small vegetable and berry farms. There will also be a forced-air cooling demonstration—all things that you can easily (and affordably!) build yourself. Chris Callahan from UVM Extension Ag Engineering program will be leading the workshop. More information soon.

August 8 – VT Berry Growers Workshop **Sunshine Valley Berry Farm, 129 Ranger Rd, Rochester, VT—4pm-7pm**

Rob Meadows and Patricia Rydle invite you to a tour of their 6-acre PYO organic blueberry and raspberry farm. Come see, and possibly try out, their new Easy Harvester for blueberries. Rob will explain his laser and distress call systems for bird control, and we will see their farm store and cool room setup. The farm is open until 6 pm so please park so as not to compete with customers. Attendance is free for members of the Vermont Vegetable and Berry Growers Association. The cost is \$10 per-person for non-members, payable on-site. Refreshments will be served. For more information: www.uvm.edu/vtvegandberry/meetings/2019VegandBerryFarmWorkshops4-16-19.pdf

August 27 – Willsboro Farm Trial Field Day **Cornell Willsboro Farm, 48 Sayward Ln, Willsboro, NY—5pm-7pm**

Jud Reid (Cornell Vegetable Program, Harvest NY) and Elisabeth Hodgdon (ENYCHP) will lead a tour of high tunnel research projects, including insect exclusion netting demonstrations and variety trials for trellised cucumbers and new trellising systems and varieties of ground cherries and goldenberries. Participants will have the opportunity to taste test and provide feedback on ground cherry and goldenberry varieties. Registration information to follow.



Berry Specialist

Laura McDermott
Phone: 518-791-5038
Email: lgm4@cornell.edu

Business Specialist

Liz Higgins
Cell: 518-949-3722
Email: emh56@cornell.edu

ENYCHP Office

Chelsea Truehart
Phone: 518-746-2553
Email: ct478@cornell.edu

Newsletter Design:
Chelsea Truehart
Editor: Laura McDermott

www.enych.cce.cornell.edu



Find us on
Facebook & Instagram

