

Northern Michigan FruitNet 2016 Northwest Michigan Horticultural Research Center

Weekly Update

FruitNet Report – June 14, 2016

CALENDAR OF EVENTS

6/24	CIAB Grower Meeting SW MI Research and Extension Center, 4:30 – 6:30 PM
6/27	CIAB Grower Meeting Oceana Intermediate School District, 8:30 – 10:00 PM
6/28	CIAB Grower Meetings Peninsula Township Hall, 9:00 – 11:00 AM Milton Township Hall, 1:00 – 3:00 PM NWMHRC, 7:00 – 9:00 PM
5/3 – 6/28	Leelanau County IPM Updates, 12PM – 2PM Jim and Jan Bardenhagen's Farm (details below)
5/3 – 6/28	Grand Traverse County IPM Updates, 3PM – 5PM Wunsch Farms (details below)
5/4 – 6/29	Antrim County IPM Updates, 10AM – 12PM Jack White Farms (details below)
5/4 – 6/29	Benzie County IPM Updates, 2PM – 4PM Blaine Christian Church (details below)
8/25	NWMHRC Open House

What's New?

- **Northwest Michigan Fruit Regional Report – June 14, 2016**
- **CIAB Grower Meetings**
- **UPDATED - Managing Spotted Wing Drosophila in Michigan Cherry**

- **Good Fire Blight Advice from Amy Irish-Brown**
- **Mysterious yellow spots on grape leaves are not downy mildew**

Northwest Michigan Fruit Regional Report – June 14, 2016

Fire blight symptoms have appeared in apple orchards and growers are actively protecting trees, fruit, and foliage from diseases prior to a possible thunderstorm on Wednesday.

Emily Pochubay and Nikki Rothwell

GROWING DEGREE DAY ACCUMULATIONS AS OF June 13, 2016 AT THE NWMHRC

Year	2016	2015	2014	2013	2012	2011	26 Yr. Avg.
GDD42	921	886	810	843	1236	805	904.1
GDD50	503	481	445	487	709	428	491.6

2016 Growth Stages as of 6/13/16

- Bartlett Pear – 16 mm fruit
- Potomac Pear – 21 mm fruit
- Mac – 16 mm fruit
- Gala – 17 mm fruit
- Red Delicious – 20 mm fruit
- HoneyCrisp – 19 mm fruit
- Montmorency – 11 mm fruit
- Balaton – 13 mm fruit
- Hedlfingen – 14 mm fruit
- Gold – 11 mm fruit
- Napolean – 12 mm fruit
- Riesling – 10” – 16” shoots

Weather Report

Although the region has been particularly dry so far this season, the weekend kicked off to a hot and humid start. Most of the area received some rainfall on Friday night into Saturday morning (9-10 June) and many Enviro-weather stations in the region recorded almost 0.5" of rain; Eastport recorded over one inch of rain while Northport and the NWMHRC received less than half of an inch. Following the rainstorm on Friday evening, we hit the mid-80s on Saturday, and by Sunday 12 June, temperatures cooled off and the humidity dropped. Temperatures for the coming week are predicted to be in the low to mid-70s, and we will hit the low 80s over the weekend. There is rain in the forecast for Wednesday and Thursday with a potential thunderstorm on Wednesday, 15 June.

Crop Report

Sweet cherries are sizing at the research station, and the fruit is in the 11-14mm range. Some of the fruit in the sweet cherry variety trial is starting to color, and these fruit are straw colored and some are starting to show a pink blush. Tart cherries are also sizing, and the crop size looks quite large across northwest Michigan. The estimates on crop size are variable, but the general opinion is that the crop size is pretty big. The apple crop is also sizing, and growers were challenged with thinning this season. We moved so quickly at the beginning of bloom to the first fruitlets starting to size, so many growers were unable to take advantage of the nibble thinning approach. Additionally, the weather turned cool late last week, which made thinning more challenging, particularly as fruit is upward towards 20mm in size. There will likely be hand thinning taking place in many apple blocks.

Pest Report

Fire blight symptoms began showing up in northwest Michigan orchards last week and this week, symptoms are becoming more apparent in orchards. We have received several reports of fire blight throughout NW MI; we could have more reports in the coming days as symptoms become more visible. MSU Extension is collecting fire blight samples to screen for bactericide resistance and we encourage growers to contact the Northwest Michigan Horticultural Research Center (NWMHRC) if they have fire blight infected trees.

Several consecutive days with warm temperatures in the upper 70s and into the 80s during bloom were optimal conditions for fire blight growth on flowers. Additionally, this bloom-time weather was ideal for pollination meaning that bees also readily spread the high population of fire blight bacteria throughout orchards. Epiphytic Infection Potential values reported on Enviro-weather were very high with some areas at values of 300+ during bloom. Under these conditions, the fire

blight model predicted that retreatment was needed one or two days after a spray in some cases. However, restrictions on reapplication intervals of some materials was a limiting factor that could have contributed to bacteria build up on flowers during bloom. These conditions were the perfect storm for fire blight this season and symptoms are present even in orchards with rigorous fire blight programs. We have observed ooze on terminals which contains fire blight bacteria that can be spread during rain, and this ooze is a concern for possible trauma blight. Damage (hail, high winds, pruning cuts, etc.) to leaves, limbs, and trees that make open wounds are areas where fire blight can enter and infect a tree.

Growers that have fire blight will need to slow its spread until trees reach terminal bud set and growth is inhibited. Copper sprays can kill the bacteria, but there is also the potential for fruit russeting and phytotoxicity on foliage, particularly if it is applied in high temperatures in the 80s and high humidity. Growers on the Fruit Ridge have had fewer fruit finish problems using the copper product Badge; we do not have data to support this observation. Growers who have used Apogee or Kudos this season should continue these programs as these materials will continue to slow terminal growth and thicken cell walls thereby preventing further spread of the fire blight bacteria inside of the tree. If Apogee or Kudos has not been used this season and terminals are 6" or longer, these materials will likely have little impact on fire blight spread at this time. In orchards with low incidence, infected terminals can be removed and orchards that are pruned should be treated before rain to prevent bacteria from being washed into

pruning wounds. Some growers also use low water volumes to allow faster drying time to have quicker activity against the bacteria; however, we do not have scientific data to support this either. Pruning out infected tissue may not be feasible in orchards with severe infections and or on smaller trees where pruning would remove a significant amount of the tree. These orchards should be treated to kill the bacteria to help prevent the spread of bacteria. There is the possibility of heavy rains overnight tonight into Wednesday and

or on Wednesday. Thunderstorms are also predicted with a possibility for additional rain on Thursday. These conditions are a concern for trauma blight and growers with existing fire blight symptoms should take action before this weather to reduce inoculum that could be the source of trauma blight.

The end of the primary phase of apple scab could be near in orchards that had low inoculum going into the season. Overall apple scab incidence is low, but growers and consultants should continue to check for scab lesions on fruit and leaves. According to the NWMHRC biofix (April 17th), 100% of scab spores are mature and 95% have

Table 1. Apple scab spore discharge

Date Collected	Time Collected	Rod 1	Rod 2	Avg # Spores
4/21/16	1:30 PM	NA	10	10
4/25/16	9:30 AM	37	50	43.5
4/26/16	8:15 AM	9	4	6.5
5/1/16	1:30 PM	0	0	0
5/5/16	8:00 AM	44	77	60.5
5/12/16	3:00 PM	78	5	41.5
5/14/16	12:00 PM	136	112	124
5/16/16	2:00 PM	0	0	0
5/26/16	8:00 AM	46	22	34
5/28/16	10:30 AM	15	9	12
6/2/16	10:30 AM	117	58	87.5
6/5/16	12:00 PM	6	7	6.5
6/6/16	10:00 AM	36	12	24
6/7/16	11:30 AM	21	15	18
6/11/16	11:00 AM	1	2	1.5
6/13/16	11:30 AM	2	0	1

discharged at this time. There have been low levels of spore discharge in recent rain. However, these rains have either been overnight (Friday 9 June) or very light (.01" on 13 June) which could have resulted in a lower discharge. Possible afternoon rain on Wednesday and Thursday will be a better indicator of ongoing spore release.

Cherry leaf spot incidence remains low throughout the region. Symptoms from the long infection period (6/4-6/6) that swept through much of the region could begin appearing this week if infection occurred. Heavy rains on Friday night likely washed fungicides from leaves, and reapplication will be needed prior to the next possible rains to protect foliage from leaf spot. Several growers used a Gem + Captan or an SDHI for their first cover spray to target both leaf spot and powdery mildew. We remind growers to check labels and rotate fungicide groups according to the label. There is some concern among growers of having too few leaf spot materials to rotate in sweet cherry, in particular a material that is not a group 7 or 11 fungicide. Captan alone is rated good/excellent for leaf spot and is not in the fungicide group 7 or 11.

Spotted wing drosophila were not detected in northwest Michigan last week; the first spotted wing drosophila was detected on Friday 3 June in NW MI. Green cherries are not susceptible to spotted wing drosophila egg-laying; growers should wait until fruit begin turning color and spotted wing drosophila are detected on-farm, in an neighboring orchard, or when 5-10% of regional traps catch this pest to begin management. The NWMHRC has deployed traps in strawberry to monitor for this pest and we will continue to provide trap catch updates on Fridays to FruitNet subscribers.

Cherry fruit fly traps are up and we have not detected fruit fly at the station. There has been a lot of attention shifted toward spotted wing drosophila this season; we encourage growers and consultants to begin planning management strategies that will provide efficacy for the complex of late season pests: spotted wing drosophila, cherry fruit fly, and if needed, obliquebanded leafroller. Additionally, mites have typically been a concern after harvest. However, an overall drier season and pyrethroid use for late season pests could contribute to higher than usual mite populations.

According to the Enviro-weather codling moth model, we have accumulated ~261 GDD base 50 degrees F since our biofix (26 May) and codling moth egg hatch is ongoing. In orchards that have reached the codling moth threshold and have accumulated ~250 GDD base 50, treatment may be needed if an ovicide was not applied. In orchards with codling moth captures below threshold and in orchards that treated for eggs, delayed treatment at ~350 GDD base 50 is an option. Peak egg hatch occurs ~500-650 GDD base 50.

American plum borer and lesser peachtree borer catches are down this week and peak catch occurred two weeks ago. Some growers have made or are planning to make trunk spray applications targeting American plum and lesser peachtree borer

this week. We remind growers that Lorsban can be phytotoxic to sweet cherry foliage and fruit. Greater peachtree borer activity has not yet been detected at the station this season.

Wine Grapes

Duke Elsner, MSU Extension

We are approaching the pre-bloom stage for many varieties. I have now seen some *vinifera* that appear to have “stalled” shoot growth, stuck at 6-8 inches in length while nearby plants have shoots twice that length. The canes bearing the short shoots were not severely injured by the 2015 hail storm, but the vines in this location had suffered badly from the cold injuries of the 2014 and 2015 winters.

No symptoms of powdery mildew have been reported, but we are entering the pre-bloom and bloom period which is a critical period for protecting vines from powdery mildew infections. Rose chafers are the only significant insect activity at this time. The numbers are variable but a few hot spots have been reported. At low populations they typically feed on the foliage and their injury can be tolerated (except on 1st & 2nd year vines) but at high populations they sometimes feed on flower clusters and controls may be warranted.

Saskatoons

Duke Elsner, MSU Extension

Berries are starting to show some red coloration. However, if only one or two berries in a fruit cluster are showing a lot of red color, they are likely to be infested with saskatoon sawfly or apple curculio larvae. Apple curculio were still depositing a few eggs during the last week in the unsprayed saskatoons at the research center. The activity of leaf-curling aphids has picked up a bit. Protecting berries from rust infections is the main disease concern now, and growers need to be aware of the long pre-harvest intervals for certain fungicides. It is too late to use Tilt or Quilt Xcel as these have a 30 day PHI.

Saskatoon Grower Education Tour

Duke Elsner, MSU Extension

Michigan State University Extension and the Saskatoon Berry Institute of North America are hosting a tour of three saskatoon berry production sites in the Grand Traverse area on Friday, June 17. This event is free, and pre-registration is not required. Participants need to provide their own transportation to the meeting sites.

The tour will begin at 8:15 am at Jacob's Corn Maze, 7100 East Traverse Hwy. (M-72 West), Traverse City, MI 49684. This stop will feature discussions and demonstrations on cultural practices for older plants, pruning methods, pest insects and comparisons of

varieties led by Dr. Duke Elsner, Small Fruit Extension Educator for Michigan State University.

At 10:00 am the tour will arrive at the farm of Jim Dixon in Williamsburg, where the care of young bearing plants and fruit marketing opportunities will be discussed. The final stop will be at the Saskatoon Michigan Farm & Nursery, also in Williamsburg, at 11:00 am. Owner Steve DuCheney will lead a discussion on tips for planting new stock and caring for young plants.

Participants are invited to meet at Mr. C's Pub & Grill, 9009 M-72 in Williamsburg to continue their conversations about saskatoon berries over lunch at 12:30 pm. For further details on the tour contact Steve Ducheney at 231-360-0311, or Duke Elsner at elsner@msu.edu.

Good Fire Blight Advice from Amy Irish-Brown

Fire Blight is showing up in various locations across northwest Michigan. If growers have never had blocks tested for streptomycin resistance, please let your local extension educator know and they can collect samples to get tested. Samples must be very fresh and with fresh oozing. If the ooze is dried up, it is very difficult to get good results. If you know how to use your mobile device to drop a pin with coordinates, please do so and send the information to your local extension agent, along with your contact information. If you need instructions on how to drop a pin, find a teenager to help you (or you can call your local Extension educator).

To slow down fire blight if you have it, coppers are the best materials to use to slow its spread until we get to terminal bud set. Weekly cover sprays should help until growth slows in July. Copper can russet fruit and scar up foliage, but it will kill the bacteria and save trees in many cases. There are many new formulations of copper available that seem to be less damaging to fruits and leaves – your spray rep can help you with products and rates. Be careful applying all sprays in temperatures over 85°F, but especially mineral based materials like copper. Phytotoxicity is enhanced with warm temps and high humidity and tank mixes. A few have asked about using Apogee at high rates – If you haven't applied Apogee or Kudos yet this year, using it now would have limited, if any, results to slow shoot growth and fire blight. It would take two or three weeks to have any effect and fire blight will have spread anyway by then. If you started with Apogee at the proper timing back at King Bloom petal fall, continue with at least one more application if you have active blight.

To cut or not to cut.....I hear both recommendations from different people. Cutting does create a wound and a wound will allow bacteria in, perhaps leading to further infection. If the blight you have is minimal, and it's feasible to cut it out, you should. Then follow

immediately with a copper spray or streptomycin if you don't have resistance to it. You can throw the infected shoots on the ground – they will dry up quickly and no longer be a viable source of bacteria (fire blight bacteria only survives in living tissue). Be sure to cut back at least 12 inches below visible blight. If the infection is too severe or on semi dwarf trees, it's probably best to not prune it out. Larger trees will come back just fine next year and you can prune out cankers in the dormant season.

Mysterious yellow spots on grape leaves are not downy mildew

Yellow spots recently noticed on grape leaves are not downy mildew, but continued scouting is advised as downy mildew could occur in the near future.

Posted by **Annemiek Schilder**, and Tarlochan Thind, Michigan State University Extension, Department of Plant, Soil and Microbial Sciences, MSUE News

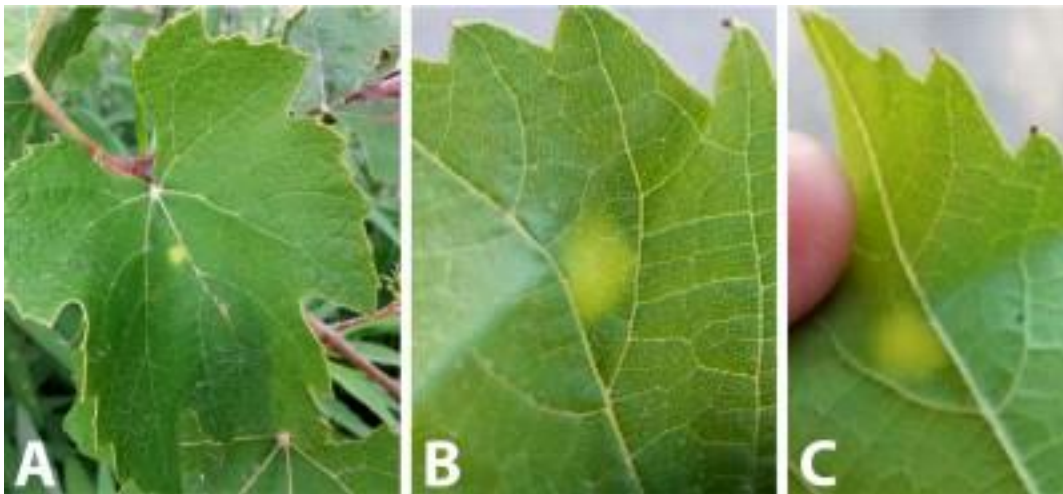


Photo 1. A) Yellow spot on Niagara leaf, B) yellow spot on Chancellor upper leaf surface and C) lower leaf surface.

In late May, small, yellow spots on grape leaves were noticed by growers and vineyard scouts in multiple vineyards in southwest Michigan. Usually a single spot per leaf was seen on a range of grape cultivars. The spots were small with a diffuse margin (Photo 1). No sporulation was visible on the lower leaf surface. Similar spotting on grape leaves has occurred around this time of the season in previous years. However, there is no cause for alarm since the spots are not downy mildew. The cause of the yellow spotting is unclear, but it may be related to drift of certain herbicides such as paraquat. Very small droplets may cause yellow spots on leaves whereas larger droplets may cause necrotic spotting. There is also a possibility that the spots are weather-related, such as freezing temperatures during early leaf development.

Just to be sure, the leaves were incubated on wet paper towels in a plastic box for several days. No white sporulation was observed on the underside of the lesions (Photo 2). This is a simple test growers can also use with fresh leaves – it will not work on wilted or dry leaves as the downy mildew pathogen dies when the leaf dies. The leaves, with the lower surface facing up, are incubated overnight in the dark. If the spot is caused by downy mildew, white spores will become visible the next day. Downy mildew spores are easier to observe on non-hairy grape leaves, but even on hairy leaves there should be a distinct raised patch of white fluffy spores.



Photo 2. To determine if yellow spots are caused by downy mildew, place leaves with the lower side up on a moist paper towel in a plastic container. Close and place in the dark overnight. In 24-28 hours, white, fluffy sporulation should become visible if downy mildew is present.

When you compare the appearance of the yellow spots with young downy mildew lesions (Photo 3), downy mildew lesions tend to be larger and have more distinct margins; they are also called “oil spots” due to their somewhat greasy appearance. There usually is white sporulation on the lower leaf surface, but the fungus does need high relative humidity and moderate temperatures to sporulate. Thus, cold or dry weather may slow down sporulation.

Also, certain fungicides may halt or reduce spore production. That said, we have started seeing the first downy mildew “oil spots” on leaves of wild grapes (riverbank grape or *Vitis riparia*) this week. Often, downy mildew is first seen in wild grapes because they tend to grow low to the ground amidst higher humidity and close proximity to overwintering oospores. I use the first detection in wild grapes as a warning system for downy mildew activity in cultivated grapes. So keep calm and keep scouting!

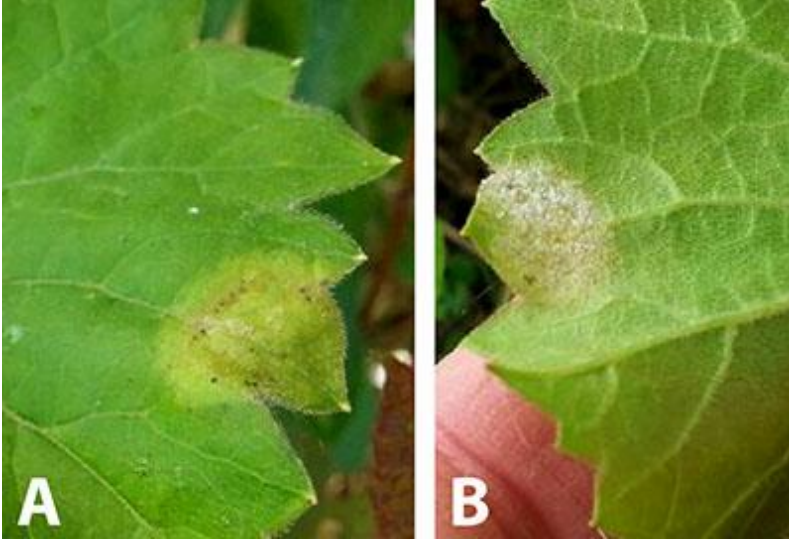


Photo 3. For comparison, a young downy mildew lesion or “oil spot” on wild grape upper (A) and lower (B) leaf surface.

Dr. Schilder’s work is funded in part by [MSU’s AgBioResearch](#).

UPDATED - Managing Spotted Wing Drosophila in Michigan Cherry

Julianna Wilson¹, Larry Gut¹, Nikki Rothwell³, Michael Haas², Emily Pochubay³, Karen Powers³, Mark Whalon¹, and John Wise^{1,2}

Department of Entomology, 2. Trevor Nichols Research Center, 3. Northwest Michigan Horticulture Research Center MICHIGAN STATE UNIVERSITY Last updated 10 June 2015

Key Points:

- SWD is well established in all cherry-producing counties.
- Each SWD female is capable of laying 300+ eggs, developing into adults in as little as 8 days.
- SWD produce multiple overlapping generations within a single season.
- SWD populations typically surge in July, often coinciding with cherry harvest.
- Cherries are at risk of infestation when they first start to color all the way through harvest.
- Use on-farm monitoring to assess SWD adult populations and to determine when to begin management.
- Protect ripening cherries through harvest using effective, registered insecticides.
- Use high spray volumes and apply full covers.

- Tighten spray intervals and follow up with another insecticide after rainfall.
- Use the salt test to determine whether your management program is effective.
- Do not delay harvesting ripe fruit – the longer fruit stays on trees, the more likely it is to be infested.

BIOLOGY, DISTRIBUTION, KEY CHARACTERISTICS

Distribution of SWD in Michigan. Spotted wing drosophila (SWD), *Drosophila suzukii*, was first detected in the U.S. mainland in California

sweet cherries in 2008. From the west coast, this invasive pest rapidly spread to the rest of the U.S. with the first Michigan detection in 2010. SWD is now well established in Michigan and has become a major pest of thin-skinned fruit crops that ripen in mid- to late summer including berries, grapes, cherries, and some softer pome fruit. Based on four years of the MSU SWD monitoring network, we now know that SWD flies are found in all cherry producing counties. As populations have continued to increase, cherries have become vulnerable to infestation close to harvest, particularly in seasons where harvest overlaps with the summer surge in SWD populations. Recent observations indicate that non-crop hosts may be used as a predictor of heightened activity in adjacent cherry orchards. A list of recorded non-crop host plants is posted online at: <http://www.ipm.msu.edu/uploads/files/SWD/em9113.pdf>

Pest biology as it relates to cherry infestation. Female SWD will lay eggs in a wide range of thin-skinned fruit, both cultivated and wild. Unlike other drosophila species (e.g. the common vinegar or fruit fly), SWD can infest fruit that is just beginning to turn color and ripen. In the past two years, the initial surge of SWD trap captures in cherry orchards occurred in mid-July. In many parts of Michigan cherry harvest can be completed prior to the exponential increase in SWD populations. However in 2015, growers experienced SWD-infested fruit in the northwest, and as a result of these infestations, orchards were not harvested or loads of fruit were rejected at the processor. When the risk of infestation is high, and the pest is not controlled, fruit may be harvested with the white larvae inside, potentially leading to load rejections. Controlling this rapidly reproducing pest is especially difficult and will require implementing an excellent pest management program. Because larvae feed inside the fruit, adults must be controlled before eggs are laid. Excellent coverage is required when adults are active. Post-infestation treatments will not eradicate larvae.

SWD lifecycle.

SWD development is largely driven by temperature and day length (Fig. 1). Under warm weather conditions (77°F), SWD will develop from egg to adult rapidly – in as little as 8 days – with multiple overlapping generations typical. Under cooler conditions (~59°F), development will be slower. Adults are active for 3-9 weeks, and each female is capable of laying as many as 300 eggs. Eggs hatch into larvae between 2 hours to 3 days after they are deposited under the fruit skin. Three larval instars feed on the fruit for 3-13

days, pupate within the same fruit, and emerge as adults 3-15 days later. In fall with shorter day length and cooler temperatures, the last adults, enter overwintering and are slightly larger and darker in color; these insects are known as the “winter morphs”.

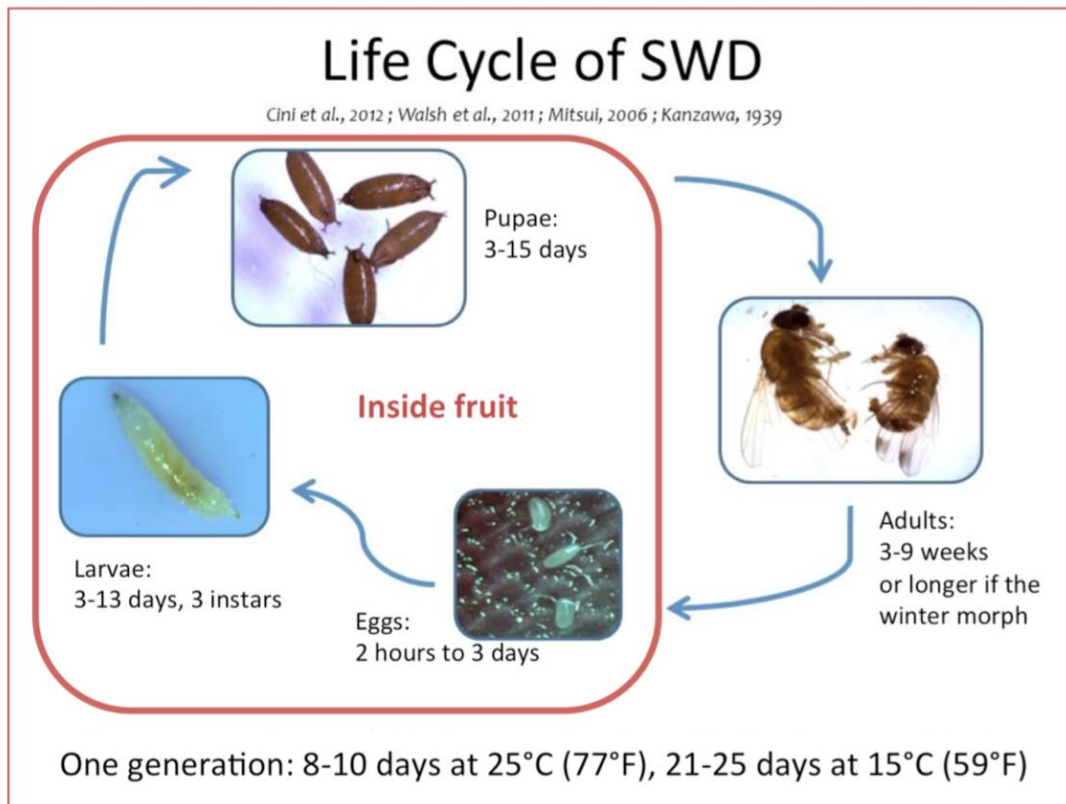


Fig. 1. Life cycle and development times for spotted wing drosophila associated different temperatures. Generation time is 8-10 days at 25°C (77°F) and 21-25 days as 15°C (59°F). Eggs develop into first instars in 2 hours to 3 days. There are three larval stages lasting a total of 3-13 days. The pupal stage lasts between 3-15 days. Adults last 3-9 weeks or longer if it is the winter morph.

Key characteristics for identification.

Adult SWD have several key features to help distinguish them: females have a darkened, serrated (toothed) ovipositor that allows them to saw into intact, ripening fruit; mature males have a dark spot on each wing near the margin, and a dark ring of bristles on each foreleg (Fig. 2). For detailed fact sheets, identification guides and weekly reports on this pest during the growing season, see the online resource page at:

www.ipm.msu.edu/SWD.htm

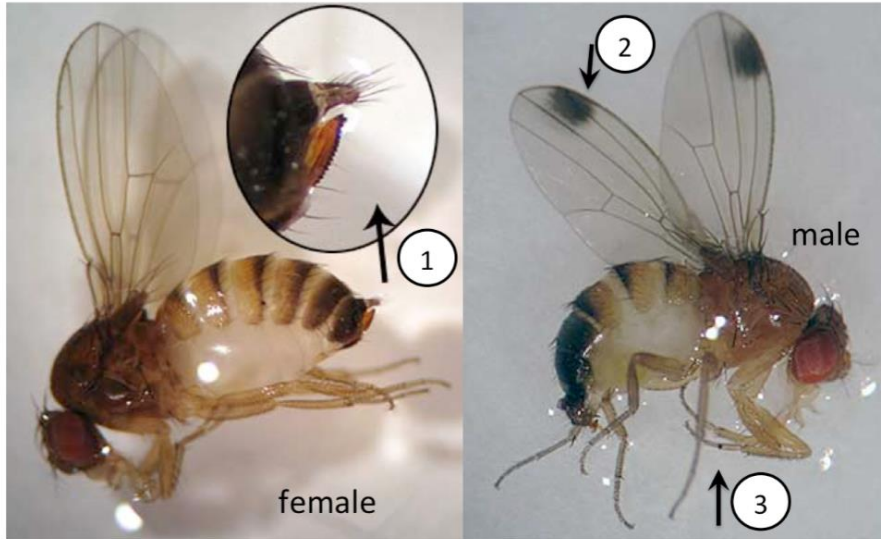


Fig. 2. Key identifying features of female and male spotted wing drosophila. Female SWD (image on the left) have a darkened, serrated ovipositor (labeled as 1); male SWD (image on the right) have a dark spot on the margin of each wing (labeled as 2) and a dark ring of bristles on each foreleg (labeled as 3).

TRAPPING FOR ADULTS

The first step to controlling SWD is to determine whether they are present in the orchard. Monitoring for SWD from fruit set until the end of harvest will help identify the start of fly activity and determine when populations are increasing. Traps provide valuable information, particularly when the crop is most vulnerable to infestation. Traps and lures can be made at home or they can be purchased from commercial suppliers.

The most commonly used trap.

A simple monitoring trap consists of a plastic

32oz cup perforated with ten 3/16"-3/8" holes near the lip of the cup, containing an inch of liquid bait or a lure hung above a soapy water

drowning solution to attract flies (Fig. 3). The small holes allow access to vinegar flies, but keep out larger insects. A small yellow sticky card can be placed inside, hung on a paper clip, to facilitate the capture of flies.

Making the yeast-sugar bait.

The best homemade bait is a yeast-sugar mix, which ferments and attracts the flies. The mixture is made by combining 1 tablespoon of active dry yeast, 4 tablespoons of sugar, and 12 oz of water. If using the yeast-sugar bait, the solution needs to be changed at least weekly, and the fermented liquid should be disposed of away from the trapping

area.

Effective commercial lures.

Several commercial lures are available, but in our 2015 trials, only two were as effective as the yeast-sugar mix. These are the Scentry gel packet lure and the Alpha Scents lure. Each lure has its own requirement as far as when it needs to be changed, generally on a 3-4 week interval. The lure is hung over an inch of soapy water, and the liquid can be checked each week for SWD adults. As mentioned above, a sticky insert can be used to facilitate fly capture and checking.

Trap density and placement.

Traps should be hung in a shaded area of the tree near fruit using a wire attached to the top of the trap. At least one trap should be placed per orchard block along the perimeter near a wooded edge. However, our recent experience suggests that SWD traps are fairly inefficient and trapping area may only cover a few acres. Therefore, we encourage deploying more than a single trap per block. Place some traps along the edge and some within the orchard block. Traps should be checked at a minimum of once per week and the number of males and females recorded.

SAMPLING FRUIT FOR LARVAE

In addition to trapping for SWD adults at a particular site, a salt test is an excellent back-up method to determine if fruit is infested. If cherries are suspected of SWD infestation, fruit can be sampled using the following technique:

- Place about 1-2 cups of fruit in a one gallon Ziplock (or similar) bag and very lightly crush the fruit, just enough to break the skins.
- Mix up a saltwater solution that is 1 part



Fig. 3. Examples of SWD traps baited with yeast-sugar solution (left) or with a commercial lure suspended above a soapy water drowning solution (right).



Fig. 4. Contents of an SWD trap, strained over a mesh screen (left); examining the sample with a dissecting microscope (right).



Fig. 5. SWD larva emerging from a lightly crushed cherry.

salt to 16 parts water (e.g. 1 cup salt in 1 gallon of water) and add enough saltwater solution to the bag to cover the cherries.

- Seal the bag, removing as much air from the bag as possible.
- Let the bag sit for at least 30 minutes, then place the bag against a dark surface in good lighting to look for larvae that may have emerged from the fruit.
- Detection of small larvae may require the use of a hand lens.

SWD CONTROL

Given the potential for rapid SWD population increase, ripening cherries require targeted management of adult flies to prevent fruit infestation from the time the fruit loses its green color until the end of harvest. Pesticide

registrations and recommendations will change as we learn how to better manage this pest, and growers can remain informed through the MSU SWD website, local Extension Educators, and the MSU Extension News for Agriculture (www.msue.anr.msu.edu/topic/info/fruit).



Fig. 6. Cherries are susceptible to SWD infestation as soon as they start turn from green to straw color and all the way through harvest.

An effective management program entails: 1) Protecting ripening cherries through harvest using effective, registered insecticides, 2) Using on-farm monitoring to assess fly distribution (via multiple traps throughout the farm for helping to indicate hot spots), 3) Using the salt test to determine whether the current management program is effective, and 4) Not delaying harvest – the longer ripe fruit stay on trees, the more likely they are to be infested.

When to begin your management program.

Because of the mandated zero tolerance for larvae in cherries at harvest, a conservative management approach is currently suggested. If you are trapping on your own farm, management programs should begin when fruit starts to turn color *and* you have captured an SWD adult in one of your traps. In our regional trapping in the past, we have often caught single flies in traps for several weeks prior to the fruit being vulnerable or the summer population surge. If using the regional trapping reports to guide management decisions, some growers may opt to similarly treat vulnerable orchards soon after the first SWD flies are captured. However, our experience suggests

that management can be initiated when 5-10% of the traps in the region are reporting SWD catches without risking infestation.

Chemical Control.

SWD presents a new challenge to our current cherry pest management program. The potential for cherries to be infested begins as soon as the cherries turn yellow or lose that green background until the end of harvest. As SWD populations rise, which they can do quickly under warm summer conditions, management can be challenging, especially with frequent rain events. Many of the insecticides that are effective against cherry fruit fly will also provide good protection against SWD, but only if coverage and timing are excellent. Based on laboratory and field efficacy trials, we have found insecticides in the pyrethroid, organophosphate, diamide, and spinosyn chemical classes to be effective materials for SWD control.



Fig. 7. Good coverage is essential to protecting cherries from SWD infestation. Expect to use high spray volumes, full cover applications, tight spray intervals, and returning with an application of another effective insecticide after a rainfall event.

Because SWD can complete a single generation in 8-10 days at 77°F, it is crucial to maintain excellent coverage with effective insecticides *and* alternate insecticides with different modes of action to reduce the risk of creating insecticide-resistant SWD populations. Excellent coverage requires tighter spray intervals, particularly in rainy conditions, applying full covers rather than alternate row middles, reducing tractor speeds, accurately calibrating sprayers, and using adequate spray volumes (see Table 1). Growers should **not** stretch spray intervals, even with materials that are rated as excellent against SWD. ***Based on our experiences in Michigan cherries and in other crops, SWD control will likely require a 7-day spray interval under dry conditions, with another application following a rain event.***

A number of registered insecticides have been shown to be effective against SWD in recent MSU trials. These materials include Danitol, Exirel, Delegate, Imidan, Mustang Max, and Warrior (see Table 1 of registered materials for control of SWD in cherry). Always follow the specific label restrictions for cherry. With more frequent spraying, it is also important to understand the seasonal limits for each product and the minimum time between reapplication (minimum days between sprays, Table 1). Growers should also be aware of insecticide pre-harvest interval (PHI) restrictions, re-entry interval (REI) restrictions, other pests that may be present, and potential impacts on existing IPM programs (see the Michigan Fruit Management Guide E-154 for more details).

Another consideration in applying pesticides close to harvest is their potential for leaving residues that exceed the tolerances of export markets. If used according to label,

detectable residues for most of the materials listed in Table 1 should not exceed export tolerances for Michigan cherry markets. However, there are some important exceptions. Exirel has a 3-day PHI, but there is a risk of exceeding the maximum residue limits (MRLs) for China and Taiwan if used within 1 month of harvest. Danitol also has a 3-day PHI, but is likely to exceed the MRL for EU markets if used within a month of harvest. Delegate and Imidan each have a 7-day PHI, but both would exceed the MRLs for China and Israel if used within a month of harvest. For more information, please refer to the most current Tart Cherry MRL Charts available as a separate PDF or consult the free online decision support tool for selecting pesticides close to harvest (<http://mrl.msu.edu/>).

There are only two OMRI approved products that show some activity against SWD, Entrust and Grandevo. Entrust has a 7-day PHI and Grandevo has a 0-day PHI. Both may be used without MRL concerns.

Post-harvest considerations.

Post-harvest treatments against SWD in cherry are limited. However, for other susceptible fruit (e.g. blueberries) refrigeration for 72 hours at 35°F has been found to slow the development of eggs and larvae, and freezing will halt development all together. These techniques are presumed to be effective for cherries with otherwise undetectable infestation at harvest. Processing tart cherries either for juice or dried markets will also effectively halt development.

Table 1. Insecticides registered for use against spotted wing drosophila in Michigan cherries, their properties and restrictions.

Trade Name	Active Ingredient	Class (Group)	PHI (days)	REI (hrs)	Minimum days bet. Sprays	Relative efficacy against SWD	Rate per acre	Season Limit (no. of applications)	Spray Volume (gals/A, ground application only)
Grandevo*	<i>Chromobacterium subtugae</i>	biological	0	4	7 days	fair	3 lbs	n/a	minimum 100
Danitol 2.4 EC	fenpropathrin	pyrethroid (3)	3	24	10 days	good	21.3 fl oz	2	minimum 100
Pounce 25 WP	permethrin	pyrethroid (3)	3	12	10 days	fair	12.8 oz	3	minimum 25 up to 400
Exirel 10SE	cyantranilprole	diamide (28)	3	12	7 days	excellent	13.5-20.5 fl oz	3	minimum 30; best results 100-150
Delegate WG	spinetoram	spinosyn (5)	7	4	7 days	excellent	6-7 oz	4	sufficient to obtain full coverage of the foliage or target area
Entrust SC*	spinosad	spinosyn (5)	7	4	7 days	good	1.25-2.5 oz	3	minimum 300
Imidan 70-W	phosmet	OP (1B)	7	72	7 days	excellent	2.125 lbs	3	minimum 100
Baythroid XL	beta-cyfluthrin	pyrethroid (3)	7	12	14 days	good	2.4-2.8 oz	2	minimum 50
Movento	spirotetramat	lipid biosynthesis inhibitor (23)	7	24	14 days	suppression	6-9 fl oz	1.5	minimum 50
Rimon 0.83EC	novaluron	benzoylurea (15)	8	12	7 days	fair	20-40 fl oz	3	minimum 100
Mustang Max 8EC	zeta-cypermethrin	pyrethroid (3)	14	12	7 days	excellent	4 fl oz	6	minimum 20 for concentrate spray or 100 for dilute spray
Warrior II 2CS	lambda-cyhalothrin	pyrethroid (3)	14	24	5 days	excellent	2.56 fl oz	5	sufficient to obtain full coverage of the foliage or target area
Apta 15SC	tofenpyrad	METI (21A)	14	12	10 days	suppression	21-27 fl oz	2	minimum 50

For more information, please refer to the specimen label for each material (<http://www.cdms.net/Label-Database>). See also the 2016 Michigan Fruit Management Guide E-0154. * OMRI registered product. ** Grandevo requires an even shorter spray interval: no more than 5 days before re-treatment.

For more information:

MSU Integrated Pest Management SWD Resource page:

http://www.ipm.msu.edu/invasive_species/spotted_wing_drosophila

MSU Extension News for Agriculture Fruit & Nut page:

<http://msue.anr.msu.edu/topic/info/fruit>

Michigan Fruit Management Guide: Bulletin E0154

http://shop.msu.edu/product_p/bulletin-e0154.htm

Pesticide Label Database:

<http://www.cdms.net/Label-Database>

Michigan Apple & Cherry MRL Tool:

<http://mrl.msu.edu/>

List of SWD non-crop host plants:

<http://www.ipm.msu.edu/uploads/files/SWD/em9113.pdf>

No Fruit in Bearing-Age Ulster Sweet Cherry Trees

We have recently heard of Ulster sweet cherries that do not have fruit even though these trees are at an age when they should be bearing: 6-8 years old. We are trying to better understand what is happening in these situations. If growers have this situation on the farm, please drop Nikki an email (rothwel3@msu.edu) or give her a call (231-946-1510). We want to see if we might be able to determine a cause as to why these trees are not bearing fruit.

CIAB Grower Meetings

The CIAB meets June 23, 2016 at 8:00 AM, at the Amway Grand Plaza, in Grand Rapids, MI to discuss the Optimum Supply Formula and to set restriction percentages, if any. The CIAB will hold grower meetings to discuss the outcomes with growers and the prospects for this harvest.

The meetings will be at the following locations and times. Please attend the one that is more convenient for you.

Friday, June 24	4:30 – 6:30 PM	Southwest Michigan Research and Extension Center 1791 Hillandale, Benton Harbor, MI
Monday, June 27	8:30 – 10:00 PM	Oceana Intermediate School District 844 Griswold Street Hart, MI
Tuesday, June 28	9:00 – 11:00 AM	Peninsula Township Hall 13235 Center Rd. Traverse City, MI

Tuesday, June 28	1:00 – 3:00 PM	Milton Township Hall Kewadin, MI
Tuesday, June 28	7:00 – 9:00 PM	NWMHRC 6686 S. Center Highway Traverse City, MI

GAP training for English/Spanish growers June 17-18, 2016

A second training is offered to prepare bilingual (English/Spanish) berry growers for third party Good Agricultural Practices (GAP) audits under the new Food Safety Modernization Act Produce Safety rule.

Posted by [Carlos Garcia-Salazar](#), Phil Tocco and Anamaría Gómez-Rodas, Michigan State University Extension, MSUE News

[Michigan State University Extension](#) is offering another Good Agricultural Practices (GAP) training June 17-18, 2016, at the [Trevor Nichols Research Center, 6237 124th Avenue, Fennville, MI 49408](#). This workshop will offer GAP training expressed by blueberry growers interested in updating their GAP program to be in compliance with the [FDA Food Safety and Modernization Act](#) (FSMA) Product Safety rule. This training will be bilingual (English/Spanish) with presentations in English and training notes in Spanish and English. Assistance in Spanish will be provided during the training, especially during the hands-on sessions.

On June 3-4, MSU Extension and the [Michigan Food and Farming Systems](#) conducted the first GAP workshop for Latino blueberry growers. It was attended by 20 growers. On the first day, we reviewed the GAP main topics related to blueberry production. On the second day, we reviewed the risk assessment procedures and visited several farms to practice the risk assessment procedures. Participants also received a format to start developing their GAP manual. **For growers that attended this first training**, there will be a follow-up on June 18 to assist with the development of their GAP manuals.

The agenda for the June 17-18 meeting is below, or [view this flier in Spanish](#) for more information.

Friday, June 17, 1-4 p.m. – Classroom session:

- Introduction to GAP to minimize food safety issues
- Blueberry pre- and post-harvest microbial contamination
- Worker health and hygiene
- Field sanitation
- Water quality

Saturday, June 18, 9 a.m. to 4 p.m. – Hands-on training:

- USDA checklist – GAP MDA
- How to develop your own food safety manual
- How to conduct a risk assessment prior to a third party audit

At the hands-on segment, trainees will develop their food safety manuals with information they may bring to the classroom. Also, they will conduct a risk assessment at a nearby farm using their food safety manuals and with the assistance of the MSU Extension instructors. After training, we will follow up with help for growers that may need further assistance to conduct the farm risk assessment and assistance to develop their food safety manuals.

Berry growers in Kent, Ottawa, Allegan, Van Buren and other neighboring counties are encouraged to attend this training. Growers and farmworkers participating in this training will receive a certificate of completion of training. There will be a recuperation fee of **\$30** per participant that will cover materials, refreshments and lunches. For growers attending the follow- up session on June 18, the recuperation fee will be **\$15** per participant.

Pre-registration is required to estimate the number of handouts and lunch. To register, please contact Mary Frein at the MSU Extension Ottawa County office at 616-994-4580 or email frein@anr.msu.edu. You may also contact Filiberto Villa at 269-830-2309 or filibertovilla@sbcglobal.net.

2016 IPM Update Schedule

Emily Pochubay and Nikki Rothwell
Michigan State University Extension

Tree Fruit IPM Updates beginning the first week of May through mid-July (as needed) will highlight management of the seasons current potential pest challenges dictated by weather and pest biology. Attendees are encouraged to bring examples of pests and damage found on the farm to these workshops for identification and discussion. Workshops will be held weekly in Leelanau and Grand Traverse counties and bi-weekly in Antrim and Benzie counties in May. Beginning in mid-June, we will hold weekly meetings in all four locations. Tree fruit growers are welcome to attend meetings at any of the locations and times that are most convenient (see below). These workshops are free and do not require registration. For more information, please contact Emily Pochubay (pochubay@msu.edu), 231-946-1510.

Leelanau County

Location: Jim and Jan Bardenhagen, 7881 Pertner Road, Suttons Bay

Dates: May 3, 10, 17, 24, 31; June 7, 14, 21, 28

Time: 12PM – 2PM

Grand Traverse County

Location: Wunsch Farms, Phelps Road Packing Shed, Old Mission

Dates: May 3, 10, 17, 24, 31; June 7, 14, 21, 28

Time: 3PM – 5PM

Antrim County

Location: Jack White Farms, 10877 US-31, Williamsburg (south of Elk Rapids on the southeast side of US-31)

Dates: May 4, 18; June 1, 15, 22, 29

Time: 10AM – 12PM

Benzie County

Location: Blaine Christian Church, 7018 Putney Rd, Arcadia, MI 49613

Dates: May 4, 18; June 1, 15, 22, 29

Time: 2PM – 4PM

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WEB SITES OF INTEREST:

Insect and disease predictive information is available at:

<http://enviroweather.msu.edu/homeMap.php>

This issue and past issues of the weekly FruitNet report are posted on our website:

<http://agbioresearch.msu.edu/nwmihort/faxnet.htm>

60-Hour Forecast:

<http://www.agweather.geo.msu.edu/agwx/forecasts/fcst.asp?fileid=fous46ktvc>

Information on cherries:

<http://www.cherries.msu.edu/>

Information on apples:

<http://apples.msu.edu/>

Information on grapes:

<http://grapes.msu.edu>

Fruit CAT Alert Reports:

<http://news.msue.msu.edu>