

Northern Michigan FruitNet 2016 Northwest Michigan Horticultural Research Center

Weekly Update

FruitNet Report – June 17, 2016

CALENDAR OF EVENTS

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|-------------------|---|
| 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) |
| 7/13 | Income Taxes for Foreign Agricultural Workers (H-2A)
NWMHRC, 8AM – 4:30PM |
| 8/25 | NWMHRC Open House |
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[What's New?](#)

- **Disease activity picking up in grapes**
 - **Michigan spotted wing Drosophila report for June 15, 2016**
 - **Spotted Wing Drosophila Update**
 - **To Manage or Not Manage SWD in Young Tart Blocks?**
 - **Income Taxes for Foreign Agricultural Workers (H-2A) - Meeting**
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To Manage or Not Manage SWD in Young Tart Blocks?

N. Rothwell and E. Pochubay

Across Michigan, we have many young tart cherry blocks that have a substantial fruit load. In many cases, this situation is a result of cool weather in 2015 that contributed to a poor response of Pro-Gibb applications last season. In cool conditions, plant growth regulator activity decreases, and many Pro-Gibb applications were made in cooler temperatures in 2015. As a result, there is more fruit in orchards with young trees (3-5 years old) than is typical. With the concerns about spotted wing drosophila (SWD), growers will need to decide if they will manage these young blocks for SWD.

Observations from previous research suggested that keeping the overall SWD population low improves management outcomes. In the case of the efficacy trial at the Northwest Michigan Horticultural Research Center (NWMHRC), we found larvae in all of the treatments, even treatments with efficacious insecticides and tight intervals. For this experiment treatments were applied to single tree replicates, and the trees between the replicates were unsprayed. We hypothesize that SWD reproduced in the unsprayed trees between the treated trees thereby building the overall SWD population in the block. Consequently, larvae were detected in all of the treatments including those with the most efficacious SWD insecticides and spray intervals. This study and other anecdotal evidence suggest that it is necessary to prevent the build up of a high SWD population that can overwhelm even the best spray programs. Hence, growers need to decide whether or not to manage SWD in blocks of young trees with a higher than usual fruit load that will not be harvested. These blocks could serve as a breeding ground for SWD, and female flies will emigrate from these young orchards into adjacent commercial blocks intended for harvest.

Several considerations influence the decision to manage SWD in young blocks. First, what is the proximity of the young block to a block that will be harvested in 2016? If the young block is isolated (3+ miles from commercial block), growers could opt to not manage for SWD in that block. However, growers should consider applying insecticides to young blocks that are adjacent to commercial plantings. Second, what is the cost of

the materials used in a block that will not be harvested? This scenario uses the most economical sprays. Some pyrethroids are inexpensive options, but pyrethroid residuals are typically shorter in the orchard than other insecticides and multiple pyrethroid applications may be needed. Repeated sprays of the same insecticide mode of action and/or those with the potential for cross-resistance exacerbate the likelihood of SWD insecticide resistance. Because SWD reproduce and develop quickly, the potential SWD insecticide resistance is high. Therefore, growers should adequately rotate materials to prevent resistance development. Lastly, SWD presence and fruit susceptibility dictate when to begin management programs. MSU Extension has over 300 SWD traps across Michigan, and we provide traps catch numbers weekly through local newsletters and MSU News for Ag. If growers will manage SWD in young blocks, they should begin spray programs when 5% of the traps in a region (i.e. county) are catching flies or if a single SWD is caught on that particular farm. Additionally, fruit does not become susceptible to SWD until it loses its green color; management should begin when fruit are susceptible and SWD are detected either on farm or at a threshold of 5% of traps in the region.

If growers decide to manage SWD in young blocks, we have developed some guidelines to assist with this management strategy. First, growers should not spray insecticides until the fruit is straw colored; SWD females do not lay eggs in green fruit. Although we have been recommending every row applications for SWD control, in small trees, alternate row spraying will likely be adequate. This strategy will help keep costs down. Growers should make their first applications when SWD are present and fruit are no longer green. Imidan is likely the best insecticide option as it is both efficacious against SWD and has a longer residual time in the orchard compared with pyrethroids. When fruit are susceptible, two half sides of Imidan at a 10-D interval should be applied within one week of SWD detection; this strategy will help to prevent the SWD population from increasing in the young block and moving into the harvestable orchard. If populations do not appear to be increasing rapidly, these two half sides of Imidan may be adequate for the remainder of the season, if spray programs are impeccable in adjacent harvestable blocks. A third half side to full cover of a second material may be warranted if SWD populations in the region explode; we will be sure to alert growers if this sudden rise in population is the case. This additional application could be another Imidan or a pyrethroid, but there is a risk of cross-resistance with these two classes of insecticides. Moreover, the harvestable crop next to the young block should be harvested as soon as possible. Growers do not want to let these fruit hang in the orchard if they have an adjacent young block with little to no residues left on the fruit.

Spotted Wing Drosophila Update

One female spotted wing drosophila was detected in a sweet cherry orchard in Leelanau County this week on 16 June. The first spotted wing drosophila (SWD) of the season was

detected on 3 June in the Cedar area of Leelanau County, and this initial detection was also a female fly. We remind growers that SWD will not lay eggs into green fruit. Growers should wait until SWD has been detected on farm and fruit are turning straw colored to begin management programs.

Attention IPM Update Participants and SWD Trap-Swap Cooperators: Please remember to bring your SWD folder and bring your SWD trap to next week's IPM Update. If you cannot make it to the meeting to return your trap, please contact Emily Pochubay 231-946-1510.

Brown Rot

We observed sporulating American brown rot on cherry mummies in some early sweet cherry varieties at the NWMHRC. Clusters have many cherries this season and ensuring that these fruits are protected from brown rot is critical particularly in wet, humid, and warm weather. Additionally, some orchards had high levels of first generation green fruit worm and obliquebanded leafroller larvae and cherries that were damaged by insects and or birds or those that cracked after rainfall are favorable hosts for brown rot to get a foothold. Damaged, poorly pollinated, and June drop fruit have begun falling from trees at this time; however, keeping brown rot in check will be difficult if this fungus sporulates and spreads to good fruit clusters before the damaged fruit drop.

Cherry Leaf Spot

Cherry leaf spot symptoms from the 6-4-6/6 heavy infection period appeared in the last week. Many growers are protecting orchards following this week's rain which also resulted in an infection period; symptoms from this recent infection are predicted to appear late next week. Temperatures are predicted to be in the upper 80s over the weekend in some areas, and we caution growers that copper materials and Syllit could be phytotoxic when temperatures are in the 80s.

Fire Blight

Symptoms of fire blight have continued to appear in the last week and these symptoms are likely a result of infection that occurred during bloom. Trauma blight was also possible following high winds on the evening of 10 June. Trauma blight symptoms typically appear ~10 days after the traumatic event meaning that if trauma blight occurred, symptoms should appear early next week. Thus far, we have had reports of fire blight in Antrim, Grand Traverse, and Benzie Counties with varying levels of infection in these locations. Infected varieties also vary: Gala, Jonathan, Jonagold, and to a lesser extent, Honeycrisp and McIntosh, particularly if these less susceptible varieties are interplanted or adjacent to more susceptible varieties. Growers with fire blight infected orchards that continue to exhibit flagging terminals and ooze production should continue management programs to kill the bacteria and stop the potential spread of fire

blight. Maintaining a low population of fire blight bacteria in the orchard will reduce the likelihood of future infection if the northwest receives conditions conducive for trauma blight.

The NWMHRC has collected several samples from fire blight infected orchards to test for bactericide resistance this season. We encourage growers and consultants to contact the NWMHRC if there is a fire blight infected orchard that they would like screened for resistance.

Apple Scab

A total of three apple scab spores discharged during rain on Wednesday and Thursday this week. The numbers of spores discharged in the last three rain events have been in the single digits. As mentioned in previous FruitNet reports, the NWMHRC is monitoring spore discharge of a McIntosh orchard that had a high level of overwintering inoculum. Most orchards are scab-free at this time, and if an orchard became infected during the long wetting event on 6/4-6/6, symptoms should have appeared this week. A scab program may be needed in orchards that were infected during primary if fruit finish is a concern. We will continue to monitor for spore discharge in upcoming rains. If an orchard has scab, please contact the NWMHRC. We would like to collect samples to screen for fungicide resistance.

Michigan spotted wing *Drosophila* report for June 15, 2016

Traps are up in all major fruit producing counties to monitor for spotted wing *Drosophila* (SWD), and a few are already capturing SWD flies at low levels in several regions. Posted by [Julianna Wilson](#), Rufus Isaacs and Larry Gut, Michigan State University Extension, Department of Entomology, MSUE News



Example of a trap used to attract and capture spotted wing Drosophila adults. A commercially available pouch-style lure is suspended over a soap, borax and water drowning solution. Photo: Rufus Isaacs, MSU Extension.

Michigan State University Extension fruit personnel are or will be monitoring for spotted wing Drosophila (SWD) at more than 150 different locations this season for the 2016 Statewide Monitoring Network. Starting next week, weekly reports will include the total number of male and female SWD captured by region and crop. Regionally-specific graphs will be provided that depict average trap catch and percent traps that captured SWD in a given week.

In the meantime, over the past two weeks we have begun detecting the first SWD in traps baited with commercial lures in strawberry (Berrien County), blueberry (Allegan County), and cherry (Kent, Oceana and Leelanau Counties) blocks. In general, the numbers have been low with only one or two SWD flies per trap in less than 10 of the more than 100 traps that were checked. However, ripening fruit – especially strawberries – may be at risk for infestation in these areas.

Counties included in the 2016 trapping network are Allegan, Antrim, Benzie, Berrien, Genesee, Grand Traverse, Ingham, Ionia, Kalamazoo, Kent, Leelanau, Lenawee, Livingston, Macomb, Mecosta, Monroe, Oakland, Oceana, Ottawa and Van Buren. All traps in the network are or will be baited with commercially available lures and placed in susceptible crop fields or orchards – or in a location adjacent to susceptible crops – in areas where SWD infestation has been recorded in the past.

For more information on this pest, including how to identify, monitor and manage this pest in fruit crops, please visit the [MSU spotted wing Drosophila webpage](#).

Disease activity picking up in grapes

Disease symptoms are becoming more apparent. Continued monitoring and preventive fungicide sprays are advised to protect developing fruit after fruit set.

Posted by [Annemiek Schilder](#), and Tarlochan Thind, Michigan State University Extension, Department of Plant, Soil and Microbial Sciences, MSUE News

Symptoms of grape diseases such as Phomopsis cane, leaf spot, black rot and anthracnose have been noticed in Michigan vineyards on susceptible cultivars. Frequent rainy spells in early spring 2016 have helped the grape pathogens to come out of their dormant state and become active leading to infections on young shoots. Downy mildew has only been seen in wild grapes so far, and powdery mildew has not been observed yet. For specific fungicide recommendations, consult the Michigan Fruit Management Guide (E0154).

Phomopsis cane and leaf spot (causal fungus - *Phomopsis viticola*)

Disease symptoms were first noticed in mid-May as elongated, dark brown to black specks or streaks on the first one to three internodes of young shoots. These lesions will not produce spores this year, but will contribute to next year's inoculum. Foliar lesions are also plentiful, primarily on lower leaves of the shoots and appear as small brown spots with or without a yellow halo. The infected leaves may be puckered. Many spots on the leaves and canes indicate high inoculum levels for rachis and berry infection. Rachis infections on flower clusters are visible already. Cool wet conditions favor infection: at least six hours of wetness are needed for infection at the optimum temperature (59-68 degrees Fahrenheit). A combination of cultural and sanitation practices as well as fungicide applications help in keeping the disease in check.



Phomopsis lesions on grape shoot Photo: Tarlochan Thind, MSU Extension.

Black rot (causal fungus - *Guignardia bidwellii*)

Black rot symptoms have started appearing on unsprayed Concord and Niagara vines in Benton Harbor and East Lansing, Michigan, and first infections were noticed during the last week of May. According to the black rot model in Enviro-Weather, several infection periods have occurred during rainy periods. Consult the model for infection risk for fruit protection. The disease symptoms appear as small, light brown, roughly circular spots, particularly near old mummified berries. These can be distinguished from herbicide damage by the presence of a dark border around spots and small black pimple-like fruiting bodies, called pycnidia, in the lesions. Leaf lesions are an indication of disease pressure and may also contribute to fruit infection by rainsplash of spores from the lesions to the fruit. Fruit infection generally occurs around bloom and fruit set but symptoms only become apparent weeks later. The optimum temperature for disease development is 80 F, at which the wetness period required for infection is only six hours. At higher or lower temperatures, the wetness requirement increases. Protective fungicide sprays are very effective in managing this disease. Protect developing fruit for at least four to five weeks after bloom.



Young black rot lesions on Concord grape leaf. Photo: Tarlochan Thind, MSU Extension.

Anthracnose (causal fungus – *Elsinoe ampelina*)

Incidence of grape anthracnose has been observed on young leaves and shoots of some vines, including Marquis table grapes and Marquette wine grapes. Although a relatively minor disease, it can reduce fruit quality and yield, as well as weaken the vine. On leaves, symptoms appear as numerous circular to angular lesions with brown or black margins. The centers of older lesions become brittle and fall out, leaving a “shot hole” appearance. Lesions along the veins may cause curling and distortion as the leaves expand. On young shoots, lesions are oval, sunken, and purplish-brown with gray centers and raised edges, and can blight entire shoot tips. Infections on flower clusters may lead to twisting of the rachis, making the clusters resemble cork screws. The causal fungus overwinters on infected shoots and spores are spread by wind and rainsplash. Anthracnose is especially severe in years with heavy rainfall early in the season. First disease symptoms are generally noticed two to eight weeks from budburst. Pruning out diseased wood and a well-timed spray program helps in managing anthracnose. A dormant application of lime sulfur should be made in early spring, prior to bud break. This can be followed by foliar applications of recommended fungicides from budbreak through early fruit development, when the berries are most susceptible to infection.



Anthracnose lesions on a Marquette leaf. Lesions are grayish or have holes in the center and often found along leaf veins. Photo: Annemiek Schilder, MSU Extension.

Downy mildew (causal fungus – *Plasmopara viticola*)

Downy mildew so far has only been observed on wild grapes growing close to the ground in humid locations. Systemically infected young shoots bearing heavy whitish sporulation on the lower leaf surface and stems appeared two to three weeks ago. Foliar lesions were first observed on wild grapes on June 5, 2016, and are increasing. Downy mildew has not yet been observed in cultivated grapes but is likely to appear any day now. Initial leaf symptoms appear as yellow spots on the upper leaf surface. These are termed “oil spots” because of their greasy appearance. On the underside of the leaf are corresponding areas of whitish, fluffy sporulation. Spores (sporangia) are produced during humid nights and are spread by wind. Rain or dew are needed for infection of leaves. The lesions eventually turn brown as the infected tissue dies. The disease can spread rapidly under warm conditions with frequent rain or dew and may lead to premature defoliation. Downy mildew is well controlled by preventatively applying effective fungicides. Alternating fungicides with different modes of action is extremely important for managing downy mildew, since it is a high-risk pathogen for the development of fungicide resistance.



Downy mildew lesion on wild grape leaf. Photo: Annemiek Schilder, MSU Extension.

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

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.

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”.

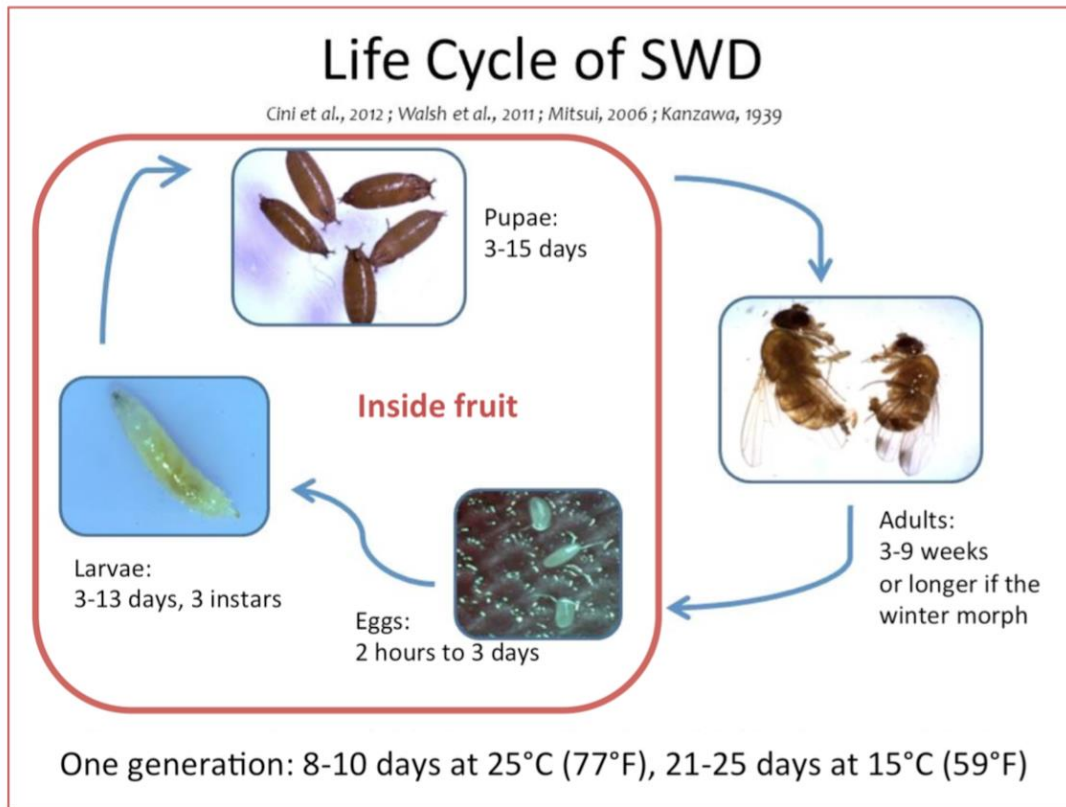


Fig. 1. Life cycle and development times for spotted wing drosophila associated different temperatures. Generation time is 8-10 days at 25°C (77°F) and 21-25 days as 15°C (59°F). Eggs develop into first instars in 2 hours to 3 days. There are three larval stages lasting a total of 3-13 days. The pupal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

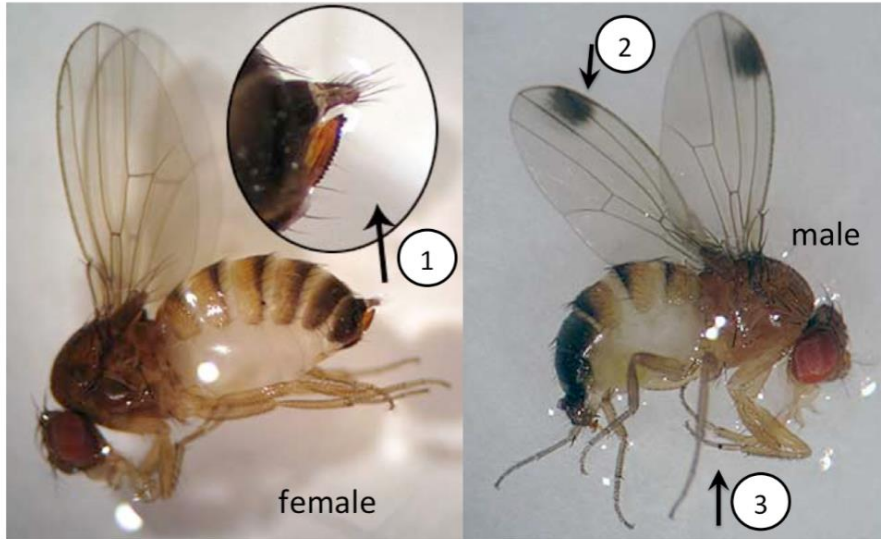


Fig. 2. Key identifying features of female and male spotted wing drosophila. Female SWD (image on the left) have a darkened, serrated ovipositor (labeled as 1); male SWD (image on the right) have a dark spot on the margin of each wing (labeled as 2) and a dark ring of bristles on each foreleg (labeled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

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.***



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.

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.

Income Taxes for Foreign Agricultural Workers (H-2A) – Meeting

Meeting Dates and Times:

Tuesday, July 12, 2016

Ottawa County Fillmore Complex Main Conference Room 12220 Fillmore Street West Olive, MI 49460

Wednesday, July 13, 2016

MSU Northwest Michigan Horticultural Research Center 6686 S. Center Highway Traverse City, MI 49684

Michigan's agricultural industry has been seeing a decline in recent years of the traditional labor resources that have been used in the past. The use of the H-2A Guest Worker Program has seen a significant increase in use recently with continued significant growth in coming years. With this increase there is a need for legal and tax professionals to have an understanding on how to prepare taxes for H-2A guest workers, common pit-falls and challenges.

This Continuing Education Program will provide a four hour presentation with three hours of hands-on workshop to help tax professionals understand how tax law impacts foreign agricultural workers and their employers and give them a better understanding of the challenges faced by tax professionals, employers and the workers themselves as they strive to comply with federal and state tax laws.

The information included also applies to all taxpayers who use ITINs when filing tax returns and/or have spouses and/or dependents living outside the United States.

This program will use IRS Publications 519 and 51 and others as a guide throughout this training. Participants will gain an understanding of tax preparation for H-2A Guest Workers, the appropriate method to fill-out an ITIN documentation/application, how to appropriately calculate the time a guest worker has been "in country" over the past 3-years to determine the correct tax documentation needed to be filed in the present tax year. Participants will also receive an overview of the tax deductions, credits available and not available to H-2A Guest Workers.

This program will also discuss payroll and tax withholding issues and responsibilities of an Employer and H-2A Laborer that all tax and legal professionals should be aware of when working with their clients.

Registration fee is \$125.00 per person which includes lunch, refreshments, handouts and materials. **Register online** by July 8, 2016 at <http://events.anr.msu.edu/H2ATaxPrepWorkshop/> . Online registration offers payment by credit card or check. Or to register by mail, mail completed registration form at right with check payment no later than July 5. Please indicate the location you would like to attend.

More information can be found in the attached PDF flyer.

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

MSU Extension programs and material are open to all without regard to race, color, national origin, gender, gender identity, religion, age, height, weight, disability, political beliefs, sexual orientation, marital status, family status, or veteran status. Michigan State University is committed to providing equal opportunity for participation in all programs, services and activities.

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>