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## Northern Michigan FruitNet 2011 *Special Update* NW Michigan Horticultural Research Station

[Nikki Rothwell](#)

District Horticulturist

[Erin Lizotte](#)

District Fruit IPM/IFP Agent

[Bill Klein](#)

Farm Mgr, NWMHRS

[Duke Elsner](#)

Agricultural &amp; Regional Viticulture Agent

**June 3, 2011**

### CHERRY LEAF SPOT OBSERVED ON 1 JUNE

Nikki Rothwell, George Sundin, and Erin Lizotte

Growers need to tighten intervals and use full cover sprays if CLS has been observed.

This week cherry leaf spot (CLS) has been observed in many Montmorency blocks. In the past, when we have seen symptoms of CLS this early in the year, CLS quickly rises to epidemic levels and causes premature defoliation and reduced fruit ripening. Fruit ripening is of particular concern this season with the big crop of fruit that has set throughout the state. Traditionally, we observe CLS in the tops of trees, and the fungus releases spores that move the infection 'down' through the canopy. This year, the symptoms are throughout the tree canopy, and we hypothesize that this infection is due to fungicide wash-off rather than a coverage issue.

*We are recommending that growers get out and scout their orchards for CLS as soon as possible.*

Although this recommendation is time-consuming, it is imperative that growers determine the levels of infection in their individual blocks. We have received variable rainfall across the region, and in turn, orchards will have varying amounts of fungicide residue as a result of the amount or duration of precipitation and the timing of applications. If a CLS infection is observed in a block, growers should apply a full cover of chlorothalonil (Bravo or generic brands) prior to the onset of shuck split as this material is highly effective against CLS but can only be used at this time and post-harvest. This chlorothalonil application will not eliminate the current infection. Rather, the intent of this spray is to protect tissue from the onset of spores from the existing infections. This protectant strategy will need to be used with other fungicides through harvest and beyond.

If CLS symptoms are present, a half side of a fungicide is NOT recommended at this time. With full cover sprays, we are intending to minimize the impacts of this fungal disease by reducing the potential of a CLS epidemic this season.

Following shuck split, fungicides used for CLS control such as Pristine, Gem, Adament, Syllit should be tank-mixed with Captan. This serves both as a resistance management tool and also will provide more efficacious fungicide to deal with the increased inoculum load of the pathogen.

### HAVE YOU SCOUTED FOR OBLR YET?

Nikki Rothwell, NWMHRS

Due to the high levels of cherry tank infestations last season, growers should be scouting for obliquebanded leaf rollers (OBLR) at this time. The larvae are still small but if populations are relatively high, they can be easily observed in the terminals of both sweet and tart cherries. The first optimal timing for control is now (petal fall). Obliquebanded leafroller overwinter as small larvae (within a hibernaculum) in cracks and crevices of the tree. In spring, when temperatures warm, overwintering larvae move out to feed on buds and emerging leaves, and as leaves expand, larvae web and roll leaves where they remain concealed except when feeding.

Targeting this overwintering generation is an effective strategy, particularly as these larvae are small, hence easier to kill, at this time. At early petal fall, growers should scout their orchards by looking at 20 clusters/tree in five trees per orchard for larvae and/or feeding sites. An insecticide should be applied if they observe 2 + larvae or feeding sites/tree. The materials that target this life stage are Delegate, Belt, Altacor, Voliam flexi, Entrust, and Bts (Table 1). In most cases growers should not expect OP's or pyrethroids (due to OP-cross resistance) to provide effective control because of insecticide resistance. If there is evidence of OP resistance in your area, the insect growth regulator Intrepid may also have some level of cross resistance and will not be effective.

**Table 1. Compound, chemical class, residual activity, pre-harvest interval (PHI) for OBLR control in cherries.**

Compound Trade Name	Chemical Class	Residual Activity	PHI (days)
Dipel*, Deliver*, Crymax	Bt's	5-7 days	0**
Altacor, Belt	Diamide	10-14 days	10 7

Entrust*	Spinosyn	7-10 days	7
Delegate	Spinosyn	10-14 days	7
Voliam flexi	Diamide + Neonicotinoid	10-14 days	14

\* OMRI approved.

## WEBSITES OF INTEREST

**Insect and disease predictive information is available at:**

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

### 60 Hour Forecast

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

**Information on cherries is available at the new cherry website:**

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

### Fruit CAT Alert Reports

<http://www.ipmnews.msu.edu/fruit/>

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

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

[ACTUAL AND PREDICTED DEGREE-DAY](#)

[ACCUMULATIONS SINCE MARCH 1, 2011](#)

**Please send any comments or suggestions regarding this site to:**

Bill Klein, [kleinw@msu.edu](mailto:kleinw@msu.edu)

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## Northern Michigan FruitNet 2011 *Weekly Update* NW Michigan Horticultural Research Station

[Nikki Rothwell](#) District Horticulturist   [Erin Lizotte](#) District Fruit IPM/IFP Agent   [Bill Klein](#) Farm Mgr, NWMHRS  
[Duke Elsner](#) Agricultural & Regional Viticulture Agent

June 7, 2011

### GROWING DEGREE DAY ACCUMULATIONS through June 6th at the NWMHRS

Year	2011	2010	2009	2008	2007	2006	21 yr. Avg.
<b>GDD42</b>	671	1034	644	669	898	933	742.5
<b>GDD50</b>	347	571	297	332	493	509	383.4

### Growth Stages at NWMHRS (June 6 – 4:00 p.m.)

**Apple:** Red Delicious – 8 mm fruit  
Gala – 8 mm fruit  
Yellow Delicious – Late petal fall  
**Pear:** Bartlett: 10.5 mm fruit  
**Sweet Cherry:** Hedelfingen: 9.5 mm fruit  
Napoleon: 10.5 mm fruit  
Gold: 10 mm fruit  
**Montmorency:** 7 mm fruit  
**Balaton:** 9 mm fruit  
**Apricot:** 16.5 mm fruit  
**Plum:** Late shuck split  
**Grapes:** 1-3" shoots

### Weather Report

The weather in northwest Michigan has done a 180 in the past week—we have gone from cool and wet to warm and dry. Daytime temperatures have been climbing into the mid-80's, and the forecast is predicted to hit over 90 degrees tomorrow (6/7). With the warm temperatures, we accumulated quite a few growing degree days in the past week. As of this morning, we have accumulated 671GDD base 42 and 347GDD base 50. Conditions have also been on the dry side this past week. The much anticipated storm of last week did not bring the hail they predicted, but we did have high winds in the region. On 31 May, we had 0.18" of rainfall and another 0.09" on 3 June. However, rainfall has been variable throughout the region, and some farms reported far more rainfall than we received at the NWMHRS.

### Crop Report

With the weather's warm up, cherries are coming out of the shuck and we are able to better estimate the season's crop. There are less sweet cherries than we originally thought, and some varieties are light while others seem to have set a decent size crop. We hypothesize that the lighter than anticipated fruit set is due to poor pollination weather during bloom. The story is a similar one for tart cherries—the crop is not the limb breaker that was predicted two weeks ago. Variability among orchards is relatively high, but the most noticeable pattern is the variability throughout an orchard. Some trees have a large crop while others are extremely light. Tarts are just starting to come out of the shuck, and in the next few weeks, we will have a better idea of the crop load.

Bloom is still hanging on in many later blooming apple blocks throughout the region. However, most blocks are at or approaching petal fall, and the fruit is starting to size. Apple pollination is somewhat in question, and growers are eager to determine their crop load as most will be thinning this week. Our carbohydrate model is predicting normal thinning conditions and temperatures will be warm, and most thinners will go on this week. Growers have been in the orchard quite a bit for all tree fruits, either covering for diseases or gearing up for insect control—there has been no shortage of challenging weather thus far this season.

Strawberries are in bloom, and the pollination window is looking good for bee activity.

### Pest Report

#### Apple

Due to the dry weather, the apple scab model remained quiet over the past week. According to the [apple scab model](#), 90% of overwintering spores have matured and 51% have discharged—this reflects no change in status from last week. We have seen symptoms of scab infection in high pressure and unmanaged orchards at this time. Primary scab infections develop first on spur leaves and the calyx end of the apple. Secondary spores called conidia are produced in the velvety-brown to olive colored lesions currently visible on leaves. The conidia serve as the source of secondary infections and are spread by wind and rain. A preventative scab program is critical. As we move into warmer weather and the risk of fruit scab increases (as apples develop), growers should be considering second generation sterol inhibitors (Indar and Inspire Super) or captan tank mixed with EBDs. As many orchards still contain some bloom, the potential for blossom blight continues and keeping an eye on the weather and the [fire blight model](#) remains important. When the epiphytic infection potential reaches 100 (or is forecast to do so) and the average temperature is greater than or equal to 60 °F, the Enviroweather model will show the corresponding boxes on the chart turning red, which indicates that if rain or trauma (high winds or hail) occur there is a high potential for infection. Based on the weather forecast, the EIP will be extremely high in the coming days with forecasts predicting EIP levels over 300. At this time, streptomycin remains the bactericide of choice for controlling fire blight in the northwest. However, if you are located in Grand Traverse County and have streptomycin resistance, Kasumin may be applied during bloom. See George Sundin's article, "[Section 18 Special Exemption Label for Kasumin for Fire Blight Control In 2011](#)", for more information on Kasumin use. The most important next fire blight control measure is to use Apogee (prohexadione calcium) for shoot blight management. Apogee is a growth inhibitor that provides excellent control of shoot blight. The first timing for an Apogee spray is at king bloom petal fall. Apogee is shoot specific, i.e. the effect is only observed if the shoot is covered; thus excellent coverage is essential. The "Apogee effect" on fire blight begins approximately 10 to 14 days after application, and research from Dr. Sundin's lab suggests that it is associated with cell wall thickening in apple shoots. It looks like cooler weather going into the weekend will finally cause the EIP to drop below 100.

[Spotted tentiform leafminer](#) (STLM) trap catches continued to drop this week with an average of 50 moths/trap. [Oriental fruit moth](#) adults were trapped at lower numbers this week with an average of 4 moths/trap. [Codling moth](#) activity continued for the third week in a row—based on trap catch data we are setting the codling moth biofix at the NWMHRS as 31 May. Based on the Station's biofix, codling moth management will begin in the coming 7-10 days depending on insecticide mode of action and temperature. The majority of treatments target egg hatch, a predicted 250 DD50 after sustained catch. Growers looking to use the relatively new method of an ovicide followed by a delayed larvicide application should look to apply ovicidal materials around 100-150GDD following sustained catch. Growers can track their progression using the [codling moth model](#). Keep in mind that codling moth resistance to Guthion is well documented and that moths resistant to Guthion will also be resistant to pyrethroids. Refer to the E154 Fruit Management Guide and the codling moth model for more information on management. [Oblique-banded leafroller](#) (OBLR) larvae continue to develop (1" in some locations) and are prevalent in area apple orchards. Widespread OBLR resistance to Guthion and pyrethroids exists in northwest Michigan, so growers should be applying non-organophosphate materials to control this insect this season. In apple, OBLR populations are likely kept low by lepidopteron materials commonly used to combat organophosphate-resistant codling moth. Adults OBLR moths are easily trapped with pheromone baited delta traps, and larvae are also relatively easy to locate due to their leaf rolling behavior. At this time of the year, look for larvae in the terminals and evidence such as frass and webbing.

## Cherry

[Oblique-banded leafroller](#) (OBLR) activity continues, with larvae quickly increasing in size (1" this week). Targeting this overwintering generation is critical in cherry and should be controlled early when they are small and easier to kill. An insecticide should be applied if 2 or more larvae are observed per tree. The materials that target this life stage are Delegate, Belt, Altacor, Voliam flexi, Entrust and Bts. Growers in northwest Michigan should not expect organophosphates or pyrethroids to provide effective control because of insecticide resistance. OBLR do not feed internally in fruit but are problematic as contaminants in tanks at harvest. No adult flight has been observed. [Plum curculio](#) activity is evident in area orchards with crescent shaped egg laying scars easily visible on green fruit. The 2-3 weeks following shuck split are when peak activity typically occurs and is coinciding with the mild evening temperatures the region has been experiencing. If growers are utilizing insecticides other than the organophosphates (Guthion, Imidan) the traditional treatment timing is petal fall or shuck split depending on the mode of action. Consult the insecticide label and the MSU Extension Bulletin E154 "Michigan Fruit Management Guide" for more information on proper timing. Based on a full bloom biofix of 21 May, we have accumulated 205 DD50 towards the 375 DD50 window for organophosphate application for plum curculio management. First generation [American plum borer](#) activity is waning, but [lesser peach tree borer](#) (LPTB) was caught in Station traps for the first time over the past week. LPTB produce one generation per season with treatment targeting adult flight.

The potential for epidemic levels of [cherry leaf spot](#) (CLS) is a concern this season. Despite some relatively tame leaf spot weather and model predictions, symptoms are present in the orchard at this time. CLS overwinters in fallen leaves on the orchard floor and produces apothecia (sexual spore-bearing structures) in the spring. Following infection, acervuli (asexual spore-bearing structures) develop on the underside of the leaf and produce a visible mass of asexual spores called conidia (these are currently visible). Spores are dispersed from leaf to leaf by wind or rain and this secondary infection cycle can be repeated several times within a season, depending on conditions. In the past, when we have seen symptoms of cherry leaf spot this early in the year, it quickly rises to epidemic levels and causes premature defoliation and reduced fruit ripening. This year, the symptoms are throughout the tree canopy and we hypothesize that this infection is due to fungicide wash-off rather than a coverage issues. Refer to the article "[Cherry Leaf Spot Observed on June 1st](#)" for more information. CLS is resistant to sterol inhibitor fungicides (Indar, Elite, Orbit) in all the major fruit producing areas of Michigan. Full covers of Bravo are recommended where cherry are still in shuck split. As orchards move into first cover, full covers of products that contain strobilurin fungicides (Gem, Pristine, Adament) are recommended as they provide excellent leaf spot and powdery mildew control. Remember to alternate the use of fungicide classes and tank mix with broad spectrum fungicides during the season to manage against resistance development. Spur death caused by European brown rot has been reported, particularly in Balatons but also in Montmorency. Nothing can be done at this time for European brown rot. Bacterial canker symptoms on sweet cherry leaves are visible—particularly in areas with leaf damage caused by high winds. Unfortunately, no control options will work against bacterial canker at this time. Lastly, the early symptoms of powdery mildew are also becoming visible. Before the mildew fungus become visible, leaf margins cup indicating the presence of an infection. The fungus itself will likely become visible over the next week and is most often found on younger leaf tissue.

## Grapes

A great deal of vine growth over the last warm week has brought shoot development a bit closer to normal for early June.

Some vinifera cultivars have reached a foot of shoot growth and are reaching the first catch wires.

High winds on May 31 resulted in some tattered leaves and in some cases, leaf surfaces that have been abraded with blowing soil. The topsoil is now drying out pretty badly in some vineyards, calling for irrigation.

Powdery mildew has not yet been detected at the Northwest Station vineyard, even on unsprayed vines. Now is a critical time to look closely for the first signs of infection on leaves.

Potato leafhopper adults have been found in the area for the first time this week. No grape berry moth adults were trapped at the station during the last week. Very high numbers of adult June beetles have been reported from several sites in the area.

#### **Saskatoons**

Berry size is approaching 5 mm at the station; fruit and foliage conditions is good. A few leafminers have been found, but the level of incidence is far below concern.

#### **EARLY FIRST GENERATION CODLING MOTH MANAGEMENT OPTIONS FOR 2011**

##### **First generation codling moth egg laying has begun.**

John Wise and Larry Gut, Michigan State University Extension, Department of Entomology

First generation codling moth (CM) adult biofix has been set for most parts of the state. To get the most benefit from a codling moth control measure, growers should treat a block after moth captures have been recorded and the accumulation of growing degree days (GDD) required for a particular action, as indicated in Table 1, has taken place.

**Table 1. Codling moth GDD model and insecticide timings for control**

<b>DD° Base 50 (Post Biofix)</b>	<b>Event</b>	<b>Action</b>
Pink bud	Development of overwintering larvae	Set traps
0 DD° = Biofix (~200 DD° after Jan 1)	1st sustained moth captures	Set DD° = 0
100 DD°	1st generation <b>egg laying (oviposition)</b>	Timing for ovicide materials
250 DD°	Start of 1st generation <b>egg hatch</b>	Timing for larvacide materials
350 DD°	1st generation <b>egg laying &amp; hatch</b>	Delayed timing if pest pressure is low, or for 2nd treatment if an ovicide was applied at 100 DD°)
500-650 DD°	Peak of 1st generation <b>egg hatch</b>	Timing for additional larvacide if monitoring of CM activity indicates a treatment is needed
1000 DD°	Expected end of 1st generation activity	

##### **Early first generation codling moth control**

Although several insecticides have limited ovicidal activity, only Rimon is considered a strong ovicide material, thus codling moth egg laying is the optimal timing for this material. Rimon applied at codling moth biofix plus 100 DD also provides excellent control of obliquebanded leafroller.

Other compounds, like the Altacor and Belt, are known to have ovi-larvicidal activity, which when applied over top of eggs will kill the larvae as they emerge (Table 1). These larvacides, however, are optimally used nearer to codling moth egg hatch timing. In some cases, growers may choose to use neonicotinoids, like Calypso, Belay or Assail, at this time to control aphids or plum curculio. Again, although this timing is early for optimal codling moth activity, some level of control can be expected. Similarly for premixes, like Voliam Flexi, Leverage and Tourismo, secondary target pests (Table 2) can be considered for selecting the best pest management tool.

**Table 2. Relative activity spectrum of compounds against spring and early summer apple pests**

*Dr. Gut's and Dr. Wise's work is funded in*

*part by [MSU's AgBioResearch](#).*

#### **USING GIBBERELIC ACID TO ADJUST CROPPING IN CHERRIES**

N.L. Rothwell, District Horticulturist, NWMHRS

Jim Nugent, Retired District Horticulturist, NWMHRS

Gibberellic acid (GA) is a plant hormone that promotes growth and elongation of cells. In tart and sweet cherries, GA has

Insecticide	Primary pests					Secondary pests				
	CM	OFM	OBLR	PC	AM	STLM	GAA	RAA	LH	SJS
Avaunt	**	**	*	***	*				*	*
Intrepid	**	**	***			**				
Spintor	**	**	***	*		**				*
Delegate	***	***	***	*	**	**				*
Esteem	**	*	*			**		**		***
Rimon	***	***	***			**				
Altacor	***	***	***		*	**			*	
Belt	***	***	***			**				
Proclaim	**	**	***			***				
Actara	*	*		***	***	***	***	***	***	**
Calypso Assail	***	***		***	***	***	***	***	***	**
Clutch	**	**		***	**	***	***	***	***	
Guthion Imidan	***	***		***	***	*				
Pyrethroids	**	**	**	**	**	**	*	*	*	**

CM-codling moth, OFM-oriental fruitmoth, OBLR-obliquebanded leafroller, PC-Plum curculio, STLM-spotted tentiform leafminer, GAA/RAA -green/rosy apple aphid, WALH-white apple and potato leafhoppers, SJS-San Jose scale, TPB-tarnished plant bug  
 \* some activity, \*\* better activity, \*\*\* best activity relative to other insecticides

been used successfully to reduce flowering during the early years of an orchard's life. The reduced flowering and subsequent reduced fruiting helps young trees increase vegetative growth. In addition, minimizing flowering in early years slows the transmission of pollen-borne viruses in young trees. We have also shown that GA used in mature tart cherry orchards can increase fruiting capacity by stimulating the formation of lateral shoots and spurs. This technique can be particularly advantageous on Balaton blocks where trees have a tendency to produce blind wood (branches without leaves or blossoms).

When GA is applied to cherry trees in late spring, a percentage of the flower buds forming for the following season will be converted to vegetative buds. Therefore, GA application in 2011 influences flowering in 2012. The effectiveness of GA is dependent on rate, timing and temperature. Figures 1 and 2 (below) demonstrates the importance of rate for GA applications. Surfactants have also been shown to influence GA applications. As a rule of thumb, high GA rates are required to keep a young tree from fruiting, whereas much lower rates are used to keep bearing trees in a good

balance between vegetative and fruit production. GA applications should be made when daily high temperatures are expected to be above 70° F for two to three days, if possible. We have observed poor results when applications are made when daily high temperatures are below 60° F.

### Non-bearing trees

GA is typically applied to non-bearing cherries with a hand gun, so rates are applied on a dilute basis. The best results are generally achieved with two applications of 50 ppm (20 fl. oz. of 4% formulated product per 100 gallons of water). The first application should occur 3 to 3 ½ weeks after full bloom, followed by a second application 2 ½ to 3 weeks later. An alternative method, though slightly less effective, is to apply a single treatment of 100 ppm (40 fl. oz. per 100) at about 3 to 4 weeks after bloom. GA should not be applied to trees during the year of planting, due to possible phytotoxicity. Vigorously growing trees in their second leaf do not need GA, as these trees naturally produce little fruit the following year. GA application often starts in year three, but may be desirable in year two if trees start off poorly. These high rates should continue until the year prior to first harvest/year of production.

### Early bearing trees

To bring young cherries into bearing following GA treatments with high rates, growers should phase down GA rates rather than discontinuing GA use all at once. A sudden drop of GA from high rates to nothing will result in oversetting of fruit and potential tree stunting. Trees that have been kept vegetative with GA use have a tremendous capacity to set (overset) fruit. The year prior to when growers first desire fruiting, they should apply GA at 30 to 40 ppm if spraying dilute (12-16 fl oz./100 gal.) or 20-24 fl. oz./acre if applied at a concentrated rate. This rate per acre for concentrate spraying already takes into account the average tree size of this age tree, therefore do not reduce the rate further based on tree row volume. The next year, decrease this rate to 15 to 20 ppm applied dilute (6-8 fl. oz./100 gal.) or 10-12 fl. oz./acre concentrate. The following year, 10 ppm is optional but often not required. In orchards where growth is weak, growers should continue annual GA applications at 10-15 ppm as described for bearing trees.

### Bearing trees

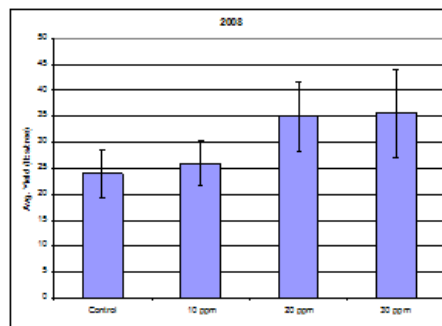
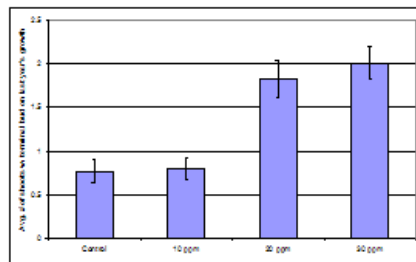
Growers should apply GA 3 to 4 weeks after bloom or when trees have 5 to 7 leaves (3 to 5 fully expanded) on terminal growth. GA should be used at rates of 10 to 20 ppm or 4 to 8 oz/100 gallons of ProGibb 4% (or equivalent) when applied dilute. For concentrate application to full-sized tart cherries, use 6 oz/acre of product to achieve a 10 ppm response or 12 oz/a for a 20 ppm response. Lower rates are typically used on more vigorous orchards or those with previous successful use of GA. Adding surfactants has caused varied responses—everything from increased phytotoxicity to no GA-related effects. Therefore, adding a surfactant is not suggested unless a grower has enough experience with a product to have confidence in the response.

### GA Use on Balaton

Balaton appears to have less need for GA during non-bearing years to maintain good tree growth, but as it matures, the variety produces a lot of blind wood. Therefore, using GA is strongly encouraged on bearing Balaton trees. Figure 1 shows the successful use of GA to increase lateral shoots and spurs in a Balaton orchard at the NWMHRS. However, we cannot conclude that GA applications improve Balaton yields based on 2007 and 2008 data (Figures 3 and 4), although GA does appear to help with yield. We will continue this trial this season.

**Figure 1.** Average number of shoots with terminal buds in a Balaton orchard

(2008).



**Figure 2.** Average yield of Balatons with different rates of GA (2008)

## CHEMICAL APPLE THINNING

Nikki Rothwell, District MSU-E Educator  
Phil Schwallier, District MSU-E Educator

Chemical thinning of fruitlets can reduce the crop load, promote return bloom and consistent annual production, eliminate small fruit, improve fruit size and improve uniformity of ripening. The following products can be used in thinning: naphthaleneacetic acid (NAA), naphthaleneacetamide (NAD), benzyladenine (BA), and carbaryl (Sevin).

### NAA

Varieties differ in their response to NAA thinning sprays and are divided into three groups: 1) easy to thin, 2) intermediate to thin, and 3) difficult to thin. NAA should be applied 5 to 7 days after petal fall. The time of application relative to bloom or fruit development influences the response to the thinning application. Applications promote fruitlet abscission most effectively when developing king fruit are ~9 to 12mm in diameter. If the first application of NAA does not result in enough thinning, increase the concentration 2 to 5ppm and follow the second applications 7 to 10 days after the first. Very late applications can result in very small sized fruit.

*Easy to Thin:* Delicious (non-spur type), Empire, Honeycrisp, Idared, Jersey mac, Jonagold, Jonathan, McIntosh, Northern Spy, and Rhode Island Greening: 4g of actual NAA per 100 gal (10ppm)

*Intermediate to Thin:* Cortland, Delicious (spur-type), Gala, Paulared: 6 gram of NAA per 100 gallons (15ppm). Spur-type Delicious are harder to thin than regular Delicious and require 3 to 5 more ppm. NAA applied to spur-type Delicious after application of Promalin or Accel can result in the formation of pygmy fruit.

*Hard to Thin:* Fuji, Golden Delicious, Rome Beauty, and Weather: 8 grams of actual NAA per 100 gallons (20ppm)

### NAD

Amid-Thin (NAD) is suggested for use on apples at 50ppm applied at petal fall. Concentrations lower than this have not given adequate thinning. NAD is suggested especially for early varieties that ripen before McIntosh and for varieties likely to be injured by NAA applications (early Macs, Northern Spy, Oldenburg (Duchess), Yellow Transparent, and Wealthy). NAD can be used on other varieties though it may not adequately thin these other varieties.

### Carbaryl

Sevin applied between petal fall and second cover can reduce yield. Applications at other times in the growing season have no adverse effect on crop yield. It is a mild thinning agent but has not always produced consistent and adequate results. Unlike most PGRs, thinning with carbaryl does not appear to be concentration-dependent and rates of ½ to 2lb of Sevin 50WP/100 gal will result in similar thinning responses. Apply at first cover; warm temperatures following application (>70 degrees) are required for thinning activity. Carbaryl used at second cover following NAA applications can cause overthinning and increase mite problems. Sevin XLR Plus and Sevin 80S can also be used for thinning. Carbaryl is toxic to bees!

### BA

This product is marketed at Maxcel or Exilis or with the addition of GA4+7 as Accel. BA is a mild thinning agent, and when using the BA-only formulations, higher rates can be used than with previous formulations. BA is dose-dependent, so higher rates will cause more thinning. The best time to use BA is during the fruit set window—from petal fall to 2 weeks after petal fall. Because BA must come in direct contact with the spur leaves of the target fruit cluster, uniform coverage is important to achieve a good thinning response. Warm temperatures just after a BA application is necessary for effective thinning. A concentration of 100ppm (dilute basis) is the standard mild to moderate rate to use alone. Aggressive thinning will occur when BA is combined with carbaryl. BA combined with or followed by NAA applications can result in pygmy fruit and seedless apples, especially on Red Delicious and Fuji. Use of BA in a thinning program can also enhance fruit size by increasing cell division in addition to thinning. When surfactants or oil are applied just before or with BA, additional thinning can occur.

### Thinning Combinations

Combinations of NAA and carbaryl provide thinning with lower rates of NAA. Combine NAA (at ½-1/2 the rate when used alone) with ½ to 1lb Sevin. Apply at 10-12mm.

Combinations of BA and carbaryl can provide aggressive thinning. On difficult-to-thin varieties, use 100 to 150ppm BA with carbaryl. On intermediate varieties, use 75-100ppm with carbaryl. On easy-to-thin varieties, use low rate combinations for moderate thinning. BA in combination with carbaryl can be useful in thinning small-fruited varieties such as Empire or Gala. When combining BA with carbaryl, higher rates of BA will give more thinning.

### Factors to Consider:

*Crop from last year.* Light crop last year results in increased flowering in present year.

*Frost damage.* So far this season, we have had little frost damage reported. With little to no frost, thinning decisions are much more straightforward.

*Pollination and bee activity.* Growers have reported decent hive quality this season, but we have had extremely windy and cold conditions. Honeybees like to fly on sunny, calm days with the temperatures above 50 degrees F. We have not had many of those this season, but some growers have noticed excellent bee activity on those surprise warm and calm days. Pollination will play a major role in this season's apple crop.

*Weather conditions during thinning.* Cold temperatures and sunny weather increase fruit set. Cloudy conditions increase thinning (See Table 1).

*Tree vigor and growth.* Trees that are growing vigorously with lots of leaves and lush growth present are harder to thin than

less vigorous trees. Weak wood in the lower portion of the tree thins more readily than vigorous wood in the top. As a general rule, *apply NAA under fast drying conditions* when temperatures are between 70 and 75 degrees. Trees thinned annually have a more predictable response to NAA thinning sprays. Thinning with NAA and NAD is greater when weather conditions during bloom do not favor good pollination and fruitset.

Table 1. Abiotic factors that affect thinning.

Factor	Condition	Fruitset effect	Thinning sensitivity
High night temperature	>65oF	Greater drop	Sensitive
High day time temperatures	>85oF	Greater drop	Sensitive
Excessively cloudy conditions	Cloudy	Greater drop	Sensitive
Cold day temperatures	<65oF	Greater set	Resistant

#### Carbohydrate Model for Thinning Decisions

We just received the latest Carb Model from Phil Schwallier and the apple thinning window looks good for northwest Michigan after today. Follow this [link](#)

#### WEBSITES OF INTEREST

Insect and disease predictive information is available at:

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

#### 60 Hour Forecast

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

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[ACTUAL AND PREDICTED DEGREE-DAY  
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Bill Klein, [kleinw@msu.edu](mailto:kleinw@msu.edu)

Last Revised: 6-7-11







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## Northern Michigan FruitNet 2011 *Special Update* NW Michigan Horticultural Research Station

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District Horticulturist

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[Bill Klein](#)

Farm Mgr, NWMHRS

[Duke Elsner](#)

Agricultural & Regional Viticulture Agent

June 10, 2011

### CONTROLLING CHERRY LEAF SPOT IN ORCHARDS WITH EXISTING SYMPTOMS

George W. Sundin, Dept of Plant Pathology, MSU

Nikki Rothwell, District Horticulturist, MSU-E

Erin Lizotte, Pesticide & Pest Management Educator, MSU-E

Cherry leaf spot symptoms at this time of the season are a cause for major concern, particularly as harvest still a long way away in much of Michigan. The occurrence of symptoms in orchards right now indicates that leaf spot will be exceedingly difficult to control this year. At the start of infection, leaf spot can be difficult to see on the leaves. The typical symptoms of cherry leaf spot are small (1-3 mm) red to purple spots on the upper leaf surface (looking at leaves with back-lighting is helpful) and there is often a visible dot of white spore growth in the middle of the lesion; These spore masses are a sign of the pathogen and represent inoculum for new infections. It does take a few days after leaf spot is visible for spores masses to become evident. Eventually the lesions will turn brown (Fig. 1) and fall out of the leaf. In heavy infections, spots can overlap producing larger areas of dead leaf tissue. Leaves that are accumulating lesions will soon begin to turn yellow. With a lot of bacterial canker visible in orchards, growers should look for the growth of white spores to identify leaf spot as well as smaller purple lesions. Bacterial canker symptoms on the leaves are dark brown, circular to angular and often have a yellow halo; canker lesions are also larger in size than leaf spot lesions.

Cherry leaf spot is usually effectively controlled early in the season with proper fungicide application timing. In years with extended dry weather, leaf spot symptoms are not visible in most orchards until August-September. However, in years when we receive significant rainfall in May with extended wetting periods, early infections of leaf spot can occur. These early season infections begin on bract leaves (Fig. 2) and spread throughout the canopy from these small leaves. Growers should be scouting their orchards for such infections now. If leaf spot symptoms are evident, they are an indication that spore loads in orchards will soon be very high.

Tart cherry leaves will need effective fungicide protection from now until after harvest. Because of the extremely high disease pressure conditions, it is critical to use the maximum label rates of fungicides and also to cover entire orchard blocks; i.e., do not use an alternate middle row spray plan. We have also become more and more concerned about the potential for the development of fungicide resistance in the leaf spot fungus. Thus, tank mixes of at-risk fungicides with Captan are suggested.

The best fungicides for cover sprays for leaf spot are:

Pristine (+ Captan)

Syllit + Captan

Coppers – 1.2 lbs metallic per acre

Gem (+ Captan)

Adament (+ Captan)

For growers that have been hesitant to use copper due to phytotoxicity issues, this season may be a good opportunity to try these formulations in the orchard. Copper has shown to be an effective leaf spot material, but in a season with potentially many sprays, copper fungicides have a different mode of action and would be an excellent rotational fungicide to minimize resistance issues. Do not apply copper in orchards if dry weather and temperatures in the 80's are predicted in upcoming days.

Leaves currently exhibiting a number of lesions at this time are almost sure to defoliate. The amount of leaves remaining on trees is a critical factor for fruit ripening. A rule of thumb is that trees need at least two healthy (non-yellow) leaves per fruit to properly mature the fruit. If the ratio is <2 leaves per fruit, maturity may be delayed and trees with ratios of <1 leaf per fruit will not likely ripen fruit adequately. The goal of this season's management plan is to limit the amount of infection of currently healthy foliage through protection against subsequent infections. The cherry leaf spot spore load will probably be high in most orchards for the remainder of the season. These blocks must be intensively managed for the next several months.

Fig. 1. Symptoms of cherry leaf spot on Montmorency tart cherry leaves. Shown are a range of diseased leaves from early infections (leaves still green) to later infected yellow leaves that will soon defoliate.



Fig. 2. Early season cherry leaf spot infection on bract leaf (white arrow) of Montmorency tart cherry.



#### POWDERY MILDEW CONTROL IN TART CHERRY ORCHARDS

George W. Sundin, Dept of Plant Pathology, MSU  
Nikki Rothwell, District Horticulturist, MSU-E

Powdery mildew (PM) can be a problem in tart cherry orchards, particularly in young orchards. This fungal pathogen can also cause defoliation during mechanical harvesting, if the infection is severe. PM infection tends to occur on the most actively-growing tissue.

The biggest issue for PM control is the prevention of initial fungal infection. We currently do not have fungicides that will eradicate powdery mildew, so growers need to control this disease before they see it by using protectant products. Thus, by the time you see the white mycelium on the leaves at or before harvest-time, it is too late for control.

The most important spray timing for PM control is the first cover timing, i.e. the first spray application after shuck split. Prior to shuck split, chlorothalonil (Bravo and other generics) is the fungicide of choice in tart cherry orchards due to its excellent activity in cherry leaf spot control. At these timings, the PM fungus is generally not active. The first cover timing represents the first chance to protect the orchard from the initial PM infection. *This spray is critically important.* We've shown in our previous research that if this timing is missed, the amount of PM-infected leaves can increase by at least threefold at harvest. We've also found that if fungicides targeting PM are only applied closer to harvest, PM infection can get completely out of hand by mid-August (~ 70% incidence of leaf infection).

The best fungicides currently available for PM control are Pristine and Gem. Other fungicides including sterol-inhibitors and sulfur provide some PM control but are not nearly as effective as Pristine or Gem. While the combination of Syllit + Captan is excellent for control of cherry leaf spot, it is weak against PM.

There is a new fungicide available in 2011 called Quintec (quinoxifen). This fungicide has a new mode of action that is different from the strobilurin in Gem. The strobilurin + boscalid in Pristine works well against PM, so this new fungicide is a good choice for resistance management. Quintec at 7 fl oz per acre has performed very well in PM trials on cherry in Washington state. However, Quintec has no activity against cherry leaf spot, and growers must add another product to the tank for leaf spot.

#### TART CHERRY ESTIMATES – 2011

Millions of #'s

	Michigan Cherry Committee	CherrCo
NW	110	130
WC	52	60
SW	19	19
NY	8	9
WA	12	12
WI	10	8

UT	<u>24</u>	<u>28</u>
<b>Regulated</b>	<b>235</b>	<b>266</b>
<b>Unregulated</b>		
PA	3.0	2.0
Others	<u>1.0</u>	<u>2.0</u>
<b>Total</b>	<b>239</b>	<b>270</b>

Ontario 10.0

USDA estimates to be released on **June 23**

June 9, 2011

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## Northern Michigan FruitNet 2011 Weekly Update NW Michigan Horticultural Research Station

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[Duke Elsner](#)

Agricultural &amp; Regional Viticulture Agent

June 14, 2011

### GROWING DEGREE DAY ACCUMULATIONS through June 13th at the NWMHRS

Year	2011	2010	2009	2008	2007	2006	21 yr. Avg.
<b>GDD42</b>	803	1170	742	840	1090	1043	892.6
<b>GDD50</b>	426	652	343	448	630	567	481.3

### Growth Stages at NWMHRS (June 13 – 4 p.m.)

**Apple:** Red Delicious – 15 mm fruit

Gala – 13.5 mm fruit

Yellow Delicious – 13 mm fruit

**Pear:** Bartlett: 14.5 mm fruit**Sweet Cherry:** Hedelfingen: 11 mm fruit

Napoleon: 13 mm fruit

Gold: 11.5 mm fruit

**Montmorency:** 11.5 mm fruit**Balaton:** 11 mm fruit**Apricot:** 24 mm fruit**Plum:** 11 mm fruit**Grapes:** 10-16" shoots

### Weather Report

Our temperatures have made a pretty big swing in the past week. We hit daytime temperatures of 94 and 87 degrees on Tuesday and Wednesday last week, but on Thursday, temperatures dropped into the 60's. By Saturday, 11 June, the daytime high was 54 degrees. The degree day accumulations are still lagging behind our average: 803GDD base 42 and 426 base 50. The strange temperatures also brought some precipitation and unfortunately some hail to the region. On Wednesday as temperatures started to drop, some places had a hard but short rain while others had a fair amount of hail. We received 0.78" of rainfall on Saturday, 11 June.

### Crop Report

The size of the tart cherry crop is currently under estimation. The Michigan Cherry Committee estimates the crop in northwest to be 110 million pounds while CherrCo estimates the crop size at a slightly higher number of 125 million pounds. MCC estimates the crop in west central to be

52 million pounds, and CherrCo estimates that same crop to be approximately 60 million pounds. Both organizations estimate the southwest crop to be 19 million pounds. The national average estimate for the regulated states is between 235-266 million pounds. The sweet cherry crop is lighter than we originally estimated, and we have sustained some hail damage in sweets in blocks around the region. Pro-gibb is going on cherries at this time.

The weather has presented challenges for growers with the extreme hot temperatures followed by the unseasonably cold temperatures. Growers were hesitant to thin in the hot weather, but many did put on some thinners at this time. Other growers that chose not to thin with high temperatures have put on thinner on Sunday evening and into the morning of Monday (13 June) to take advantage of the 70 degree weather predicted for Monday, Tuesday, and Wednesday. Raspberries are approaching bloom. Strawberries are still blooming but we also have fruit sizing in early varieties.

### Pest Report

#### Apple

The apple scab model predicted an infection period in conjunction with the rain on 11-12 June. According to the [apple scab model](#), 100% of overwintering spores have matured and 89% have discharged. Many areas of the state have called an

end to primary scab, but based on the model, limited rainfall, and continued spore trap catches we are not calling an end of primary scab in the north quite yet. We have seen symptoms of scab infection in high pressure and unmanaged orchards at this time. As we move into warmer weather and the risk of fruit scab increases (as apples develop), growers should be considering second generation sterol inhibitors (Indar and Inspire Super) or captan tank mixed with EBDs. With the epiphytic infection potential (EIP) over 400 and extreme weather, hail, and tag bloom all present over the past week, fire blight potential was extremely high. Many growers went into the storms with a streptomycin cover, but the few that had isolated hail applied a strep spray directly after the storm. At this time, streptomycin remains the bactericide of choice for controlling fire blight in the northwest.

[Spotted tentiform leafminer](#) (STLM) trap catches continued to drop this week with an average of 52 moths per trap; larvae are present at this time and feeding on leaves. [Oriental fruit moth](#) trap catch rebounded this week with 12 moths per trap. [Codling moth](#) activity continued for the fourth week in a row with an average of 12 moths per trap (a cumulative trap catch of 5 moths in one trap location warrants first generation management). Based on trap catch data from the Research Station, we have set the codling moth biofix at the NWMHRS as 31 May and have accumulated 184 DD50 since. The majority of treatments target egg hatch, a predicted 250 DD50 after sustained catch, growers can track their progression using the [codling moth model](#). Keep in mind that codling moth resistance to Guthion is well documented and that moths resistant to Guthion will also be resistant to pyrethroids. Refer to the E154 Fruit Management Guide and the codling moth model for more information on management. [Oblique-banded leafroller](#) (OBLR) larvae continue to develop (up to 1" in some locations but variable sizes are present) and are prevalent in area apple orchards. Widespread OBLR resistance to Guthion and pyrethroids exists in northwest Michigan, so growers should NOT be applying organophosphate materials or pyrethroids to control this insect this season. In apple, Adults OBLR moths are easily trapped with pheromone baited delta traps, and larvae are also relatively easy to locate due to their leaf rolling behavior. At this time of the year, growers should look for larvae in the terminals and evidence such as frass and webbing. Adult OBLR will likely begin flight in the next two weeks. Minimal [rosy apple aphid](#) activity has been reported. Forest tent caterpillar is present in area orchards, but populations are more moderate than in previous years. Beneficial lady bug larvae and crane flies are out and active.

### Cherry

[Oblique-banded leafroller](#) (OBLR) activity continues, with larvae quickly increasing in size (1" this week, although multiple sizes are present and some have begun to pupate). Targeting this overwintering generation is critical in cherry and should be controlled early when they are small and easier to kill; this window is shrinking as the larvae continue to increase in size. An insecticide should be applied if 2 or more larvae are observed per tree. The materials that target this life stage are Delegate, Belt, Altacor, Voliam flexi, Entrust and Bts. Growers in northwest Michigan should not expect organophosphates or pyrethroids to provide effective control because of insecticide resistance. OBLR do not feed internally in fruit but are problematic as contaminants in tanks at harvest. No adult flight has been observed yet but will likely begin in the next two weeks. Those missing this first larvicide application window will have second management window, though the second larval generation often coincides with harvest and is not ideal for management. Green fruitworm larvae are also present (1" when observed this week). [Plum curculio](#) activity is evident in area orchards with crescent shaped egg laying scars easily visible on green fruit. If growers are utilizing insecticides other than the organophosphates (Guthion, Imidan) the traditional treatment timing is petal fall or shuck split depending on the mode of action. Consult the insecticide label and the MSU Extension Bulletin E154 "Michigan Fruit Management Guide" for more information on proper timing. Based on a full bloom biofix of 21 May in Montmorency, we have accumulated 281 DD50 towards the 375 DD50 window for organophosphate application for plum curculio management. First generation [American plum borer](#) emergence continues at low levels. [Lesser peach tree borer](#) (LPTB) was caught in Station traps for the second week in a row with an average of 5/trap. Based on historical trap catch data, we would expect peak trap catches to reach closer to 20+ moths/trap and will reserve trunk sprays for that time. LPTB produce one generation per season with treatment targeting adult flight. Minimal [black cherry aphid](#) activity has been reported.

The potential for epidemic levels of [cherry leaf spot](#) (CLS) is a concern this season. Despite some relatively tame leaf spot weather and model predictions as well as standard management practices, symptoms are present in the orchard at this time. CLS overwinters in fallen leaves on the orchard floor and produces apothecia (sexual spore-bearing structures) in the spring. Following infection, acervuli (asexual spore-bearing structures) develop on the underside of the leaf and produce a visible mass of asexual spores called conidia (these are currently visible). Spores are dispersed from leaf to leaf by wind or rain and this secondary infection cycle can be repeated several times within a season, depending on conditions. In the past, when we have seen symptoms of cherry leaf spot this early in the year, it quickly rises to epidemic levels and causes premature defoliation and reduced fruit ripening. This year, the symptoms are throughout the tree canopy and we hypothesize that this infection is due to fungicide wash-off rather than a coverage issues. Refer to the article "[Cherry Leaf Spot Observed on June 1st](#)" for more information. CLS is resistant to sterol inhibitor fungicides (Indar, Elite, Orbit) in all the major fruit producing areas of Michigan. As orchards move into first cover, full covers of products that contain strobilurin fungicides (Gem, Pristine, Adament) are recommended as they provide excellent leaf spot and powdery mildew control. Remember to alternate the use of fungicide classes and tank mix with broad spectrum fungicides during the season to manage against resistance development. With the isolated hail damage in the area, [American brown rot](#) is a concern (particularly in sweet cherries), and mummies are sporulating at this time providing inoculum. Hopefully damaged cherries will drop off over the next days. Growers should be cognizant about controlling ABR with damaged fruit in the orchard. Spur death caused by [European brown rot](#) and [bacterial canker](#) has been reported, canker symptoms are also present on sweet cherry leaves—particularly in areas with leaf damage caused by high winds. Unfortunately, no control options will work against bacterial canker or European brown rot at this time. Lastly, the early symptoms of [powdery mildew](#) are also becoming visible. Before the mildew fungus become visible, leaf margins cup indicating the presence of an infection. The fungus itself will likely become visible over the next week and is most often found on new leaf tissue.

Forest tent caterpillar is arriving in area orchards, but populations appear to be more moderate than in previous years. Beneficial lady bug larvae and crane flies are out and active.

### Wine Grapes

Recent weather conditions favored rapid shoot growth. Suckering needs to be finished soon or it will get quite difficult to break off shoots and pull them from the canopy. The crop looks good overall, with many three cluster shoots in Riesling vines at the Northwest Station.

There have been reports of significant grape berry moth trap catch on Old Mission Peninsula. Potato leafhopper, although present in the area for some time, has not been much of a concern in vineyards to this time. Rose chafer adults appeared in the area over the weekend and will likely be found in all vineyards soon. It is too soon to speculate on the level of rose chafer populations; they can often be tolerated at low to medium numbers. A sample of grape plume moth larvae was

brought in last week. These are small bright green caterpillars with a few long hairs. They fold leaves slightly with silk and feed in irregular patterns on the leaf surface. In every case of this insect I have personally seen the level of injury is very minor. I have seen just a few galls of the grape tumid gallmaker fly this spring- another uncommon and usually insignificant insect.

There was still no sign of powdery mildew on sprayed vines at the NW Station as of June 10. Even if vineyards look clean at this point, care should be taken to protect from infection during the critical pre-bloom and bloom stages ahead.

#### **IPM AND MATING DISRUPTION IN THE AGE OF BROWN MARMORATED STINK BUG**

**While tracking continues for the brown marmorated stink bug, fruit growers are asked not to abandon their integrated pest management programs and to avoid using extreme control measures.**

Anne Nielsen, Matt Grieshop, and Larry Gut, Michigan State University Extension, Department of Entomology

Currently, only four confirmed specimens of the brown marmorated stink bug have been found in Michigan. Researchers at MSU and cooperating universities are currently tracking the distribution and spread of brown marmorated stink bug in Michigan and surrounding states. This effort is to establish an understanding of the areas at highest risk for population growth. Once locations are identified, we can employ appropriate management tactics. We are working on management tactics suitable for the growing conditions in Michigan, work that is strengthened by research conducted on the East Coast. Fruit growers **should not** abandon IPM programs, including mating disruption for codling moth and oriental fruit moth in anticipation of brown marmorated stink bug problems. We do not know the extent of the population in Michigan and extreme control measures such as organophosphate insecticide applications should not be considered at this point. If populations are detected, growers should continue with current IPM programs and we will make suggestions regarding brown marmorated stink bug control. We will update the MSU IPM webpage at <http://www.ipm.msu.edu/bmsb.htm> with information about population locations and densities throughout the growing season as well as report to the MSUE News for Agriculture site at [news.msue.msu.edu](http://news.msue.msu.edu).

If you suspect or see brown marmorated stink bug on your farm or house, please collect specimens and send them to [MSU Diagnostic Services](http://MSUDiagnosticServices):

MSU Diagnostic Services  
101 Integrated Plant Systems  
East Lansing, MI 48824-1311

Be sure to include a note with your contact information including your email address or phone. Digital photos may be sent to: [bugman@msu.edu](mailto:bugman@msu.edu). Please save the specimen after you take the photo for potential further identification.

Related topic:

[Tips on submitting insects of identification](#) to MSU Diagnostic Services

[How to identify a brown marmorated stink bug](#)

*Dr. Grieshop's and Dr. Gut's work is funded in part by [MSU's AgBioResearch](#)*

#### **APPLE THINNING CARB MODEL**

Phil Schwallier, District Educator

For Hart, the thinning window is closing, but may have 3 or so days left. The model predicts a normal thinning response to thinners now.

For Northwest, same as Hart but may have 7 to 10 days left.

Click here for the [Carb Model](#).

#### **CIAB GROWER MEETINGS**

The CIAB will hold grower meetings to discuss the outcomes with growers and prospects for this harvest.

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

Monday, June 27 844 Griswold Street Hart, MI	8:30 p.m. – 10:00 p.m.	Oceana Intermediate School District
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Tuesday, June 28 13235 Center Road Traverse City, MI	9:00 a.m. – 11:00 a.m.	Peninsula Township Hall
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Tuesday, June 28 Kewadin, MI	1:00 p.m. – 3:00 p.m.	Milton Township Hall
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Tuesday, June 28 6686 S. Center Highway Traverse City, MI	7:00 p.m.- 9:00 p.m.	NW MI Hort Res Station
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Bill Klein, [kleinw@msu.edu](mailto:kleinw@msu.edu)

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Agricultural &amp; Regional Viticulture Agent

June 17, 2011

### FIRST GENERATION CODLING MOTH MANAGEMENT OPTIONS

**Consider these larvicide options for controlling first generation codling moth larvae.**

John Wise and Larry Gut, Michigan State University Extension, Department of Entomology

First generation codling moth biofix occurred between May 22 and June 1 for most parts of the State. Therefore, egg hatch has already begun or will happen soon. Control strategies based on ovicide materials were covered in [First generation codling moth emergence begins](#), but there are many larvicide options listed below that can now be considered.

### Larval control

The vast majority of insecticides used for codling moth control are aimed at killing larvae (Table 1).

**Table 1. Chemical class, activity and timing of insecticides used for codling moth control.**

Compound Trade Name	Chemical Class	Life-stage Activity	Optimal Spray Timing for CM	Mite Flaring Potential
Guthion, Imidan	Organophosphates	Eggs, Larvae, Adults	Biofix + 250 DD	L - M
Asana, Warrior, Danitol, Decis, Baythroid XL	Pyrethroids	Eggs, Larvae, Adults	Biofix + 250 DD	H
Rimon	IGR (chitin inhibitor)	Eggs, Larvae	Biofix + 100 DD Residue under eggs	
Delegate	Spinosyn	Larvae	Biofix + 250 DD	
Altacor, Belt	Diamide	Eggs, Larvae	Biofix + 200-250 DD	
Assail, Calypso, Clutch, Belay	Neonicotinoid	Larvae, Eggs & Adults (limited)	Biofix + 200-250 DD Residue over eggs	M*
Proclaim	Avermectin	Larvae	Biofix + 200-250 DD	L
Granulovirus	Biopesticide	Eggs, Larvae	Biofix + 250 DD Residue over eggs	L
Voliam flexi	Diamide + Neonic.	Eggs, Larvae	Biofix + 200-250 DD Residue over eggs	
Tourismo	Diamide + IGR	Eggs, Larvae	Biofix + 200-250 DD	
Leverage	Pyrethroid + Neonic.	Eggs, Larvae, Adults	Biofix + 200-250 DD	

**\* May cause mite flaring in combination with carbaryl or pyrethroids that kill predacious mites.**

Delegate (spinetoram) is a new compound in the same insecticide class as SpinTor (spinosad). The active ingredients of both Spinosyn compounds are similar in that they are waste metabolites produced during the growth of bacteria. A major difference between the two AI's, however, is that spinetoram is much more lethal to codling moth larvae. In small-plot and on-farm trials, Delegate has provided excellent control of both first and second generation codling moth. It kills larvae as they hatch and begin feeding.

Altacor (rynaxypyr) and Belt (flubendiamide) belong to a new class of Diamide insecticides that work on the insect by activating ryanodine receptors, thus depleting internal calcium and preventing muscle contraction. In small-plot and on-farm trials, Altacor and Belt have provided excellent control of both first and second generation codling moth.



The neonicotinoids, Assail and Calypso, will provide very good control of codling moth with a residual action of 10 to 14 days. Proper timing and coverage is required to achieve control. These compounds are primarily larvicidal, but also have some ovicidal activity when applied over the top of the egg. Clutch and Belay, neonicotinoids containing clothianidin, are registered for use in pome fruits and are broad-spectrum materials for targeting codling moth, but research trials have indicated that Clutch and Belay are not as effective as Assail or Calypso for second generation codling moth.

Proclaim is a codling moth control material in the Avermectin class of insecticides. It has provided good control of first generation codling moth in trials.

There are several new pre-mix insecticides labeled for codling moth control, including Voliam flexi (thiamethoxam + chlorantraniliprole), Tourismo (flubendiamide/buprofezin), and Leverage (imidacloprid + cyfluthrin) that combine two active ingredients as pre-mix formulated compounds. When these are used for codling moth control, care must be taken **not** to use a product in the following generation that is in the same insecticide class as either of the pre-mix active ingredients.

#### **Codling moth granulosis virus**

Growers should not overlook granulosis virus in their codling moth management program. This is a naturally occurring virus that goes by the scientific name of *Cydia pomonella* granulovirus (CpGV). Both of the two commercially available products, Cyd-X and Carpovirusine, are effective. Optimal use of the virus is against young larvae before they penetrate the fruit. The best way to target young larvae is to have the virus present on the surface of the eggs when they begin to hatch (biofix + 250 GDD). Hatching codling moth larvae will ingest the virus as they consume their eggshells.

*The work of Dr. Gut and Dr. Wise is funded in part by [MSU's AgBioResearch](#).*

#### **MANAGING BLACK ROT ON GRAPES**

##### **Check for black rot and focus on protecting the clusters from infection.**

Annemiek Schilder, Michigan State University Extension, Department of Plant Pathology

Black rot lesions have been seen on grape leaves in various locations and range from 1 to 5 mm in size. They can be recognized by the tiny black pimples (pycnidia) in a ring along the inner edge of the lesion. Temperatures in the high 70s and low 80s are perfect for black rot. At these temperatures, only six to seven hours of wetness are needed for infection. Black rot is a tricky disease because infections can remain latent, or invisible, for a long period of time, so you won't know that you have the disease until it is too late to do anything about it. However, one can scout for the small, round leaf spots – a lot of black rot leaf lesions indicate high disease pressure from ascospore inoculum and also contribute to fruit infections. In a field with a history of black rot, old fruit cluster remnants left hanging in the trellis are major contributors to infection. Fruit infections can take place anytime from bloom onwards, but only become apparent sometime between bunch closure and veraison. The period from immediate pre-bloom through early fruit development is crucial to protect grapes against black rot infection.

The approach to black rot control now focuses primarily on protecting the clusters from infection. EBDC sprays applied earlier in the season for Phomopsis will also control black rot leaf infections, and therefore no sprays are recommended specifically for black rot on the foliage early in the season. In five years of trials in New York, good black rot control was achieved with one immediate pre-bloom and one to two post-bloom fungicide sprays. A second post-bloom application is strongly advised if black rot has been a problem in the vineyard the previous year, and should be considered prudent if wet weather is anticipated. During three years of fungicide trials in a 'Concord' vineyard in Fennville, just two post-bloom applications of SI fungicides (Rally, Elite) have provided very good control under high black rot pressure.

Sterol-inhibitor fungicides, such as Nova and Elite, continue to provide outstanding control of black rot and provide several days of post-infection activity. Currently there are various "generic" tebuconazole products on the market, like Orius and Tebuzol, that may be more cost-effective. When using SI fungicides on a post-infection schedule, use the highest label rates because post-infection activity is strongly rate-dependent, particularly when extended "kickback" activity is required. The strobilurin fungicides (Abound, Flint, Sovran, Pristine) and Revus Top are also excellent protectants, but provide only limited post-infection activity. Flint, Pristine, and Revus Top should not be used on Concord grapes because of potential phytotoxicity.



##### **Black rot lesions on grape leaf.**

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

#### **ANTHRACNOSE: HOW TO RECOGNIZE AND CONTROL THIS FUNGAL DISEASE OF GRAPEVINES**

##### **Know what symptoms to look for when scouting for Anthracnose and implement a management plan in controlling this fungal disease.**

Annemiek Schilder, Michigan State University Extension, Department of Plant Pathology

Anthracnose is most common in southern grape-growing areas, but also sporadically occurs in Michigan. Lesions are now visible on leaves, shoot internodes, and clusters. Some table grape varieties are particularly

susceptible, including Marquis and Mars. In addition, wine grapes varieties like Frontenac, Vidal and Marquette can be affected. The disease also sometimes occurs on Concord and Niagara vines. The disease is caused by a fungus called *Elsinoe ampelina*. Anthracnose reduces the quality and quantity of the fruit and weakens the vine.

#### **Symptoms**

On leaves, more or less circular, chocolate brown spots (1 to 5 mm in diameter) develop. The centers eventually become bleached and fall out, giving a "shot hole" appearance. Lesions along the veins may cause curling and distortion of the

leaves as they expand. On shoots, spots are roughly oval, sunken and purplish-brown with gray centers and raised edges. Shoot tips may be killed and look burned. On older canes, lesions may extend into the pith and have thick raised edges and may be confused with hail injury. On berries, spots 2 to 7 mm in diameter are purplish-brown with a lighter center, giving them a "bird's-eye" appearance. The lesions may eventually turn whitish gray surrounded by a narrow dark ring. Lesions may cause cracking of berries and render grapes unmarketable. Berries eventually shrivel up and mummify. Start monitoring for symptoms about two weeks from budburst.



**Anthrachnose lesions on grape leaf.**

#### **Biology of the pathogen**

The fungus survives the winter in infected canes and berries in the vine and on the vineyard floor. In the spring, two types of spores (conidia and ascospores) are released that are spread by rain splash and by wind. Both can cause new infections on green plant parts. Spores produced in these primary lesions are spread by rainsplash. Young leaves and shoots are most susceptible to infection. Berries are susceptible from bloom until veraison (ripening), although the younger the fruit, the more susceptible it is. Anthracnose is especially severe during wet seasons. The optimum temperature for infection is 75 to 79°F, although the fungus is active from 36 to 90°F. Symptoms appear 4 to 13 days after infection.

#### **Management**

Purchase disease-free planting material from a reputable nursery. This is especially important when obtaining plants from areas where the disease is endemic. Choose resistant or less susceptible cultivars. Prune out diseased canes and fruit mummies. Remove infected plant material from the vineyard and destroy it. Dormant applications of lime sulfur or Bordeaux mixture are effective against the fungus, as are foliar applications of registered fungicides on two-week intervals during the growing season.

There is not much information available on fungicide efficacy, but the fungicides we have found most effective are Sovran, Abound, Endura, Pristine and Topsin M. Good activity is provided by Elite, Rubigan/Vintage, Penncozeb and Dithane.

For organic growers, sulfur and Serenade (+ spreader-sticker) are moderately effective options. Start sprays when shoots are 1 to 3 inches long to protect shoots and leaves and before bloom to protect fruit.

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

#### **PROTECT GRAPE CLUSTERS FROM POWDERY MILDEW AND DOWNY MILDEW**

**No symptoms have been seen yet, but keep scouting for powdery and downy mildew.**

Annemiek Schilder, Michigan State University Extension, Department of Plant Pathology

No symptoms of powdery and downy mildew have been seen yet, but may manifest themselves any time from now. It is advised to keep scouting carefully on at least a weekly basis. In 2009, we first observed downy mildew in Chancellor in Fennville during the first week of June and in 2010 during the second week of June. It is safe to assume that these pathogens will be active during the warm, humid weather that is forecast for the coming weeks. Growers are therefore strongly advised to protect flower and fruit clusters from infection using effective fungicides as soon as possible if the vines are not already protected. Also, continue to monitor vineyards for signs of infection.

At this stage, the young clusters are highly susceptible to all major diseases, including downy mildew, powdery mildew, black rot and Phomopsis. Black rot and Phomopsis lesions have been seen for several weeks and indicate that the pathogens are active. Grape anthracnose symptoms are also visible on shoots and leaves and on cluster stems. The risk of infection is especially high if we have multiple or big rain events and moderate to warm temperatures during this time. Prolonged wet conditions during bloom can also allow Botrytis to get a foothold in the clusters of susceptible varieties by promoting growth on senescing flower parts.

If active infections are found, use fungicides with post-infection activity at the highest labeled rate. For downy mildew, Ridomil Gold MZ or Ridomil Gold Copper are the strongest fungicides, followed by phosphorous acid fungicides like Phostrol and ProPhyt. If using phosphorous acids, it is beneficial to apply a "booster spray" five days after the first spray. Strobilurin fungicides have limited post-infection activity and should preferentially be used in a preventive mode. Newer fungicides for downy mildew control are Presidio, Revus and Revus Top (don't apply Revus Top to Concord or Noiret vines due to phytotoxicity concerns), Gavel (contains mancozeb), Forum and Tanos. While some of these new fungicides have post-infection (curative) activity, they are best applied on a preventative basis. They are excellent for integration into a fungicide resistance management program as they represent new and different chemistries.

It will be especially critical to protect clusters of susceptible varieties from powdery mildew at this time. Sterol inhibitor, like Elite and Rally, and strobilurin, like Sovran and Flint, fungicides have the ability to cure early infections, but will not eliminate already established colonies. JMS Stylet Oil and potassium bicarbonate fungicides (Kaligreen, Armicarb, MilStop) can be used to eradicate visible powdery mildew colonies. Make sure that coverage is thorough (use sufficient spray volume), as only those colonies contacted by the fungicide will be killed. Since strobilurin-resistant powdery mildew isolates have been found in Michigan vineyards – mostly MSU experimental vineyards and wine grape vineyards with a history of strobilurin use – and we have circumstantial evidence for sterol inhibitor resistance, we recommend adding a protectant fungicide like Sulfur or Ziram to the tank-mix when using either type of fungicide.

Sulfur is the most cost-effective option for non-sulfur sensitive grape cultivars. Over the past two years, we have noticed that Ziram as a tank-mix partner did improve control of powdery mildew in a spray program. Also, alternate with fungicides with different modes of action, for example Quintec, Vivando, Endura, Serenade, Sonata and Regalia. Revus Top is a new fungicide for powdery and downy mildew and black rot control in grapes. However, the ingredient that is active against powdery mildew is difenoconazole which belongs to the sterol inhibitor class. This fungicide may be phytotoxic on Concord grapes, so do not use on Concord.

Protect clusters for at least four to five weeks after bloom. As the berries develop, they become naturally resistant to black rot, downy mildew and powdery mildew, and the need for protection diminishes after the susceptible period ends. This happens quite rapidly for downy mildew (two to three weeks after bloom), whereas for powdery mildew it is about four weeks after bloom. Concord grapes become resistant to black rot four to five weeks after bloom, but some wine grape varieties may remain susceptible to black rot for up to eight weeks postbloom. However, be aware that the cluster stem (rachis) and berry stems can remain susceptible longer than the berries in most cases. The only disease to which berries remain susceptible throughout their development is Phomopsis, but the risk of infection diminishes after bunch closure because inoculum levels drop off then. Botrytis is just the opposite in that berries actually become more susceptible as they get closer to harvest, especially in tight-clustered varieties. In general, aim to protect the clusters from the major diseases from immediate pre-bloom until four to five weeks after bloom.

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

## **PREVENTING GRAPE PHOMOPSIS INFECTION OF RACHIS AND FRUIT**

### **Susceptible varieties of grapes are showing cane and leaf lesions.**

Annemiek Schilder, Michigan State University Extension, Department of Plant Pathology

Cane and leaf lesions have been showing up in high numbers in susceptible varieties. Each rainfall event will lead to spore dispersal and can also lead to successful infection if the tissue remains wet for a sufficient amount of time. The optimum temperature for infection is 59 to 68°F, at which time about 6 to 10 hours of wetness are needed for infection. The longer the tissue stays wet, the more severe the symptoms will be. At this time we should be concerned with preventing Phomopsis infection of the rachis and fruit, especially in mechanically pruned vineyards and vineyards with a history of the disease. Rachis infections are most closely correlated with yield losses due to berry drop at harvest in Niagara vines, whereas fruit infections are more of a problem in wine grapes.

If at this time you find a lot of lesions on the leaves and canes, infection pressure will be high for the fruit also. It is not too late to apply fungicides for cluster protection from Phomopsis. The best fungicide options for control of Phomopsis during and after bloom are Abound, Sovran, Flint, or Pristine (do not use Pristine on Concord grapes). Phosphorous acid fungicides such as ProPhyt and Phostrol are also good and cost-effective alternatives. These are systemic and will likely provide some kick-back activity. In trials done in Michigan, ProPhyt provided very good control of Phomopsis when sprayed on a 14-day schedule. Tighten the schedule and increase the rate if disease pressure is high. Ziram is a moderate to good protectant against Phomopsis and can be a tank-mix partner with any of the phosphorous acid fungicides. EBDC fungicides and Captan are good protectants but cannot be applied after bloom has started in grapes grown for the National Grape Cooperative. EBDC's have a 66-day pre-harvest interval.



**Phomopsis lesions on grape leaf.**

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

## **JUNE BEETLE NUMBERS HIGH IN 2011**

**With the large flight of adult June beetles this year, watch for a high white grub population and increased root injury the next two growing seasons.**

Duke Elsner, Michigan State University Extension

The 2011 flight of adult June beetles is possibly the biggest I have seen in my 21 years in the Grand Traverse Bay area. These relatively large, brown to blackish beetles are fairly common every year. We notice them as they bounce off our windows at night as they fly toward sources of

light.

There are about a dozen closely related species of June beetles (also called May beetles) that are very difficult to tell apart. They live for one to three years as a grub in the soil, feeding on plant roots. The grubs are soft-bodied and mostly white with six legs and a prominent brown head. When disturbed, they curl into a "C" shape. When full grown, they pupate and transform into adult beetles which leave the ground in the spring. The grubs can be serious pests of lawn grasses, ornamental plants and agricultural crops. The adults feed very little, typically causing inconsequential injury to plants. The high population of adults this year has resulted in some noticeable feeding injury to the foliage of tender-leaved plants, especially if they are located near the lights attracting the adults.

The great number of adults may result in a significantly larger than normal deposition of eggs in the soil over the next few weeks. If conditions favor egg survival, there will be a large number of tiny grubs by early July, ready to eat the roots of plants and potentially harm lawns, landscapes and crops. Most of the harm will not come this year, but as we get into the 2012 growing season, the damage potential will increase as this generation of grubs – now larger – begins a second year of root feeding. The adults of the eggs being laid right now will not appear until the spring of 2013.

Be watchful for high white grub populations and increased root injury for the next two growing seasons. It will be important to watch out for grub injury in turf grasses, small grains, hay fields and on woody plants recently planted into sites that had grass cover crops. If you need information on grub identification and control options, feel free to contact your [local MSU Extension office](#).



Come learn more about the Michigan Agriculture Environmental Stewardship Program and the Farm Bill programs offered by the USDA Natural Resources Conservation Service. Educational session will include and update by the local MDARD Staff, information about MAEAP and Farm Bill programs from your local Conservation District and NRCS staff and an update on Farm Bureau activities.

These educational sessions are sponsored by a grant made available by the Michigan Farm Bureau and the Northwest County Farm Bureau. A FREE meal (lunch or dinner) will be provided after the normal IPM update provided by MSU Extension and will be followed by the MAEAP Farm Bill sessions. For more information, please call Dan Busby at [dbusby@gtcd.org](mailto:dbusby@gtcd.org) or call at 231.883.9962

Session will take place as part of the last scheduled IPM meetings for each county:

**Tuesday, June 21** in Antrim County at Jack White Farm from 10-12

**Tuesday, June 21** in Benzie County at Loy Putney farm from 2-4

**Wednesday June 29** in Leelanau County at Jim Bardenhagen Farm from 12-2

**Wednesday June 29** in Grand Traverse County at Josh Wunsch Farm from 3-5

#### WEBSITES OF INTEREST

Insect and disease predictive information is available at:

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

60 Hour Forecast

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

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Fruit CAT Alert Reports

<http://www.ipmnews.msu.edu/fruit/>

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Please send any comments or suggestions regarding this site to:

Bill Klein, [kleinw@msu.edu](mailto:kleinw@msu.edu)

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## Northern Michigan FruitNet 2011 Weekly Update NW Michigan Horticultural Research Station

[Nikki Rothwell](#)

District Horticulturist

[Erin Lizotte](#)

District Fruit IPM/IFP Agent

[Bill Klein](#)

Farm Mgr, NWMHRS

[Duke Elsner](#)

Agricultural &amp; Regional Viticulture Agent

**June 21, 2011****GROWING DEGREE DAY ACCUMULATIONS through June 20th at the NWMHRS**

Year	2011	2010	2009	2008	2007	2006	21 yr. Avg.
<b>GDD42</b>	977	1346	923	970	1309	1245	1071.2
<b>GDD50</b>	541	772	468	522	793	713	602.1

**Growth Stages at NWMHRS (June 21 – 8:30 a.m.)****Apple:** Red Delicious – 24.5 mm fruit

Gala – 21 mm fruit

Yellow Delicious – 21 mm fruit

**Pear:** Bartlett: 19 mm fruit**Sweet Cherry:** Hedelfingen: 13.5 mm fruit

Napoleon: 15.5 mm fruit

Gold: 13 mm fruit

**Montmorency:** 12.5 mm fruit**Balaton:** 12 mm fruit**Apricot:** 26 mm fruit**Plum:** 18 mm fruit**Grapes:** 10-16 "shoots**Weather Report**

Temperatures have been more summerlike over the past week. However, with the warm up, we have had increased rainfall and isolated thunderstorms. Daytime temperatures over the last week were in the mid- to upper 70s, and winds were down compared the previous week. We have accumulated 977 GDD base 42 and 541 GDD base 50; these accumulations are catching up to our 21-year average, which are 1071 GDD base 42 and 602 GDD base 50. We had rainfall in the region, and it was variable by weather station. The NWMHRS received 0.20" of rainfall on 16 June and another 0.24" on 20 June. More rain is forecasted for the remainder of the week. Humidity levels are extremely high at this time, and growers will be concerned about disease development under these conditions.

**Crop Report**

The crop continues to develop here in the northwest. Cherries are sizing with the rainfall over the past week, and June drop is underway. Again, the crop size in sweet cherries is smaller than we originally estimated. The tart cherry crop is variable about the region, and the consensus is larger crop loads on younger trees while older trees have a lighter crop. The USDA crop estimate is tomorrow in Grand Rapids, and we will have a better idea of the crop for the state at that time. The apple crop is still looking very good at this time. Growers are nearing the end of the thinning window, and with the variable temperatures during the optimal thinning time, many growers are still unsure of the crop size. However, all varieties had good return bloom from our light year in 2010, and pollination was adequate.

Wild grape is in bloom, and some of the early hybrids in our variety trial are also in bloom. Vinifera vines are growing well with the adequate rainfall; growers are spraying for powdery and downy mildew, and nutrient applications are going on at this time. Rose chafers have been found in high numbers and are present in most regional vineyards. Early strawberry harvest has begun, and the berries are sizing well, but this wet weather is a concern for the remainder of the season.

**Pest Report****Apple**

Based on the apple scab spore trap catch of zero during the last two rain events, and the [apple scab model](#) estimating that 100% of overwintering spores have matured and 97% have discharged, we are calling an end to primary scab in the north! We have seen leaf symptoms of scab infection in high pressure and unmanaged orchards at this time, but many



area growers came through [primary scab](#) with little or no infection. As apples continue to develop, growers should continue to scout for scab lesions to help gauge the risk of fruit scab. Growers managing to protect against fruit scab should be considering second generation sterol inhibitors (Indar and Inspire Super) or captan, all of which should be tank mixed with EBDCs; EBDCs have a 77-day PHI, so growers should be aware of their harvest dates to use these products. At last week's IPM Updates, growers reported the first symptoms of [fire blight](#) shoot infections. Infected shoots turn brown to black from the tip and bend near the tip to resemble a shepherd's crook. We will be collecting fire blight samples with Dr. Sundin on Monday, 27 June, so if you have symptoms and want your orchard tested for step-resistance, please call the NWMHRS.

[Spotted tentiform leafminer](#) (STLM) trap catches were extremely low this week with just 3 per trap; larvae are present at this time and feeding on leaves and preparing to pupate. [Oriental fruit moth](#) trap emergence continued this week with 4 moths per trap. [Codling moth](#) activity continued heating up during this fifth week of emergence with an average of 7 moths per trap (a cumulative trap catch of 5 moths in one trap location warrants first generation management). Based on trap catch data from the Research Station, we set the codling moth biofix (sustained catch) at the NWMHRS as 31 May and have accumulated 283 DD50 since. The majority of treatments target egg hatch, a predicted 250 DD50 after sustained catch, growers can track their site-specific progression using the [codling moth model](#) on Enviroweather. Keep in mind that codling moth resistance to Guthion is well documented and that moths resistant to Guthion will also be resistant to pyrethroids. Refer to the E154 Fruit Management Guide and the codling moth model for more information on management. [Oblique-banded leafroller](#) (OBLR) larvae (up to 1" in some locations but variable sizes are present) are prevalent in area apple orchards and have begun to pupate; adult moth trap catches averaging 3 moths per trap this week. Widespread OBLR resistance to Guthion and pyrethroids exists in northwest Michigan, so growers should NOT be applying organophosphate materials or pyrethroids to control this insect this season. Growers can scout for multiple life stages of OBLR; adults moths are easily trapped with pheromone baited delta traps, and larvae are also relatively easy to locate due to their leaf rolling behavior. Reports of plum curculio egg laying scars in apple have been reported. [Lacewing](#) adults have also been observed this week--lacewing larvae are beneficial predators.

### Cherry

[Oblique-banded leafroller](#) (OBLR) activity continues, and larvae, pupae and adults are present in area orchards. Targeting the overwintering generation is preferable in cherry and more effective when larvae are small and easier to kill. Based on scouting, the ideal window for first generation OBLR management at the Research station has closed with large larvae, pupa, and adult moths present at this time. For growers that were not able to make an application targeting overwintering larvae, a second management window will be available at harvest.. [Green fruitworm](#) larvae are also present (1" when observed this week) and feeding damage to fruit is browning and relatively easy to spot. [Plum curculio](#) activity is evident in area orchards with crescent shaped egg laying scars easily visible on green fruit and some infested fruit beginning to drop from the trees. If growers are utilizing insecticides other than the organophosphates (Guthion, Imidan) the traditional treatment timing is petal fall or shuck split depending on the mode of action. Consult the insecticide label and the MSU Extension Bulletin E154 "Michigan Fruit Management Guide" for more information on proper timing. Based on a full bloom biofix of 21 May in Montmorency, we have accumulated 380 DD50 towards the ideal 375 DD50 window for organophosphate application for plum curculio management, making this the critical time for management at the Research Station. Growers can track their own progress on farm using the [plum curculio model](#). First generation [American plum borer](#) emergence continues at low levels, a second generation emergence is expected around tart cherry harvest. [Lesser peach tree borer](#) (LPTB) was caught in Station traps for the third week in a row with an average of 2 moths per trap. Based on historical trap catch data, we would expect peak trap catches to reach closer to 20+ moths per trap and will reserve trunk sprays for that time. LPTB produce one generation per season with treatment targeting adult flight. No peach tree borer has been trapped.

The potential for epidemic levels of [cherry leaf spot](#) (CLS) is a concern this season. Despite some relatively tame leaf spot weather and model predictions as well as standard management practices, symptoms have been present since late May. Growers are reminded that CLS is resistant to sterol inhibitor fungicides (Indar, Elite, Orbit) in all the major fruit producing areas of Michigan. As growers apply cover sprays, they should remember to alternate the use of fungicide classes and tank mix dodine and strobilurin fungicides with a full rate of captan to manage against resistance development. Under cool conditions, copper is an excellent CLS material and a good strategy for resistance management; copper applications needs to be at 1.2lb metallic copper. Lime is also recommended as a safener, but Imidan cannot be used in this tank mix due to pH. Spur death caused by [European brown rot](#) and [bacterial canker](#) has been reported and is easily visible around the region as tissue turns brown. Canker symptoms are also present on sweet cherry leaves—particularly in areas with leaf damage caused by high winds. Unfortunately, no control options will work against bacterial canker or European brown rot at this time.

Lastly, green lacewing adults are out in large numbers this week, the larvae of lacewings are beneficial predators.

### Wine Grapes

Bloom is fast approaching in NW Michigan. Foliage condition still looks great for the most part. Rainy weather in recent days has created a greater than normal chance for downy mildew to be an issue this year. This is not a common disease in our area, but we should not ignore looking for it. Powdery mildew still has not appeared at our scouted locations. Injury symptoms from potato leafhopper feeding has appeared on many cultivars over the last week. The populations of adult rose chafers are fairly high this year, resulting in both foliar and flower bud feeding injury.



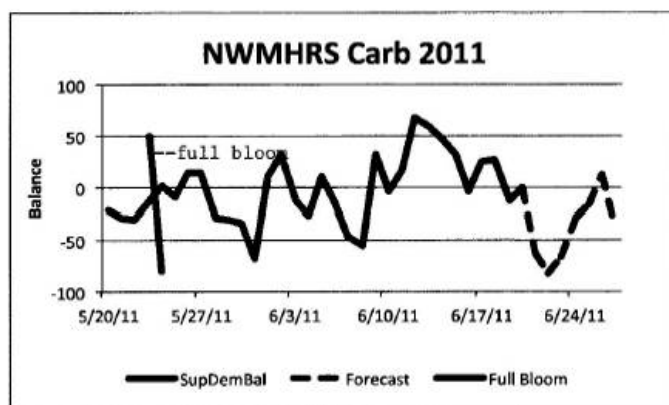
### **Saskatoons**

The fruit of earlier varieties is starting to color. Fruit injured by insects sometimes colors rapidly, so inspect any fruit clusters that seem to have some fruits that are way ahead.

Entomosporium leaf and berry spot, an important fungal disease, was quite prevalent in some nursery beds last week. This should be less of a

problem in field settings where there is greater air circulation and faster drying of foliage. If rainy conditions persist this could be a big problem over the rest of the season. Rose chafers have been a huge problem in some fields, especially in Benzie and Manistee Counties.

#### Apple Thinning Carbohydrate Model for 6/21/11



#### WEBSITES OF INTEREST

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District Horticulturist

[Erin Lizotte](#)

District Fruit IPM/IFP Agent

[Bill Klein](#)

Farm Mgr, NWMHRS

[Duke Elsner](#)

Agricultural & Regional Viticulture Agent

June 22, 2011

### CONTROL OF AMERICAN BROWN ROT

George W. Sundin, Plant Pathology, MSU

Nikki Rothwell, NWMHRS

Erin Lizotte, NWMHRS

The market for sweet cherries for the 2011 season is better than it has been in recent years. With the potential for good returns, growers should be diligent about American brown rot (ABR) control. Although we made it through the spring without frost incidents, growers have had other weather challenges that could predispose cherries to ABR infection. First, we have had perfect conditions for bacterial canker with our cool and wet spring, and canker is present in the majority of sweet cherry orchards across the state. Fruit with bacterial canker is now turning brown, and much of it looks like it will not drop off during June drop—these fruits are particularly vulnerable to the ABR fungus. Secondly, some blocks of sweet cherries received hail, and we have observed sweet cherry fruit with varying degrees of damage from the hail. These fruits are also susceptible to ABR infection. Lastly, growers that had high levels of ABR in 2010 have a high inoculum load in the orchard and the potential for the fungus to reach epidemic levels this season. For instance, in ABR trials at the NWMHRS where we had high levels of inoculum, we have mummies that are currently sporulating. Because of the aforementioned challenges this spring, we are recommending growers to take precautionary measures to control ABR for the remainder of the season.



American brown rot is caused by the fungus *Monilinia fructicola*. This fast-growing fungus is an important pathogen on cherry (sweet cherry in particular), peach, apricot, nectarine, and plum. The fungus attacks fruit, blossoms, spurs, and shoots; under ideal infection conditions, the fungus can rot individual cherry fruit within 24 hr (see figure).

The fungus sporulates from infected fruit, continually increasing inoculum for further infections. Under ideal conditions, sporulation can be initiated within three days after infection. ABR causes fruit rot before and after harvest, greatly reducing the quality and quantity of the yield, particularly in heavily bunching sweet cherry varieties.

Factors that contribute to ABR infection before harvest include warm, wet conditions as the fruit begin to ripen and increase in sugar content. The optimal temperature for infection is between 67 and 77°F, and spore production is greatest between 59 and 74°F. Although fruit injury may lead to increased infection, the ABR fungus can cause infections when no wounds are present. Other factors influencing increased infection are fruit-to-fruit or fruit-to-branch contact on trees.

We have been experiencing warm and wet conditions this season—optimal for ABR infection and spread. These weather conditions are following 2010, where we observed significant ABR infection in many orchards throughout the state. Hence, there is a lot of fungal inoculum in many stone fruit blocks. One thing to remember about diseases like ABR is that when environmental conditions favor diseases, it is almost impossible to keep fruit from becoming infected. Also, the high susceptibility of sweet cherry cultivars to ABR infection is also an important factor.

The ABR fungus is a prolific sporulator; each infected fruit is a ready source of large numbers of new spores. As stated above, fruit infection to sporulation can occur in as little as 3 days; thus, it is critical to keep fruit surfaces covered when conditions are optimal for infection. Also, if growers are scouting and observe fruit infected with ABR, it is likely that there are many other fruit that are infected but not showing symptoms yet. It is not possible to stop brown rot infections on fruit, once they are initiated by the fungus.

*The two most important issues in ABR control of fruit infection are use of an effective fungicide and fungicide coverage of fruit surfaces.*

**Fungicides.** Fungicides with effectiveness against ABR fruit infection include the sterol inhibitor (SI) fungicides Indar, Elite, Orbit, and Quash, the strobilurin fungicide Gem, and two fungicides containing two modes of action, Pristine (strobilurin and boscalid) and Adament (strobilurin and SI).

Of the SI fungicides, Indar has the highest efficacy against brown rot. The typical rate of Indar 2F used is 6 fl oz per acre. SI fungicides act in a quantitative manner, meaning that increased fungicide doses are more effective in control, and may also control fungal isolates that are developing reduced sensitivity. We are starting to observe a few ABR isolates in

Michigan that are reduced in sensitivity to SI's (see accompanying article).

We have obtained a Section 24(c) label for Indar allowing the use of increased fungicide rates of up to 12 fl. oz per acre per application. Again, the normal field label rate is 6 fl. oz per acre. Note, there is a maximum seasonal allowance of 48 fl. oz per acre. The 6 fl. oz per acre rate should provide excellent ABR control, provided fruit are effectively covered during the current and upcoming warm, wet ABR-conducive weather. However, growers that are concerned with possible population shifts, could increase the rate of Indar used to 8 fl. oz per acre. This is a 33% increase in fungicide rate, should be effective in controlling any fungal isolates with reduced SI sensitivity.

Of the other fungicides, Pristine is one that has been utilized in the southeastern U.S. where SI resistance in brown rot is prevalent. While not as effective as Indar, Pristine still has very good activity against brown rot. The highest label rate (14.7 oz per acre) should be used.

Growers should take the time to scout their orchards for ABR. If the orchard has this disease present, it should not be difficult to locate fruit with the typical gray-brown fungus on the fruit. Blocks with bacterial canker, hail damage, or problematic orchards should be the first stop in scouting. If ABR is detected, growers should move to an every row spray regime for fungicide applications, particularly if the trees are large. Growers should also slow down the tractor speed to obtain adequate coverage. Efforts should be made to apply fungicide applications with ample water to ensure that the entire tree is properly covered. Controlling obliquebanded leafroller (OBLR) is also of utmost importance as we approach harvest. These larvae web cherry clusters together and prevent fungicide penetration inside the cluster. If growers know that they have had a problem in the past with OBLR and did not control them at the overwintering generation timing, they will decidedly need to apply an insecticide for the summer generation as these insects could ultimately impact ABR control at or near harvest.

#### **CURRENT STATUS OF STEROL INHIBITOR FUNGICIDES FOR CONTROL OF AMERICAN BROWN ROT IN MICHIGAN**

George W. Sundin, Plant Pathology, MSU

Kim Lesniak, Plant Pathology, MSU

Tyre Proffer, Plant Pathology, MSU

Nikki Rothwell, NWMHRS

The sterol inhibitor (SI) class of fungicides is the most effective fungicide group used to control American brown rot (ABR), caused by the fungus *Monilinia fructicola*. However, there has been increasing concern in Michigan of the possibility of development of strains of the ABR fungus with resistance to SI fungicides. To gain a better understanding of the status of *M. fructicola* isolates in Michigan, a total of 71 cherry and peach orchards were sampled in 2008-2010.

In 2008, a survey of 21 sweet and 9 tart cherry orchards (566 total isolates) throughout Michigan detected no SI-resistant strains, although results indicated that some of these orchard populations may be shifting toward reduced SI-sensitivity.

Results from isolates collected in 2009 from 5 peach orchards in southwest Michigan (50 isolates) and one peach orchard (27 isolates) in northwest Michigan indicated only one SI-resistant isolate in southwest and that all other orchard populations were sensitive to SI fungicides. Although there was an initial concern among growers of chemical efficacy in the field during 2009, our observations show that orchard populations remain SI-sensitive.

During 2010, a more extensive survey of isolates from cherry and peach orchards was performed in southwest (13 orchards), west central (2 orchards), and northwest Michigan (20 orchards); 172 total isolates. **Our results indicated that all isolates examined were sensitive to SI applications in 2010** and that only 2 of these 35 orchard populations were shifted for resistance. Both of these orchards were located in southwest Michigan.

Reduced sensitivity or resistance of a pathogen to SI fungicides is quantitative. This means that a population with decreased sensitivity to SI's can be controlled by applying higher rates of the fungicide. In 2009, Michigan obtained a Section 24(c) label for Indar which allows the application/use of increased fungicide rates of up to 12 fl. oz. per acre/application; the current field label rate is 6 fl. oz. /acre (maximum seasonal allowance of 48 fl. oz. per acre). The current rate of 6 fl. oz. per acre should provide optimal ABR control - if fruit are effectively covered during the current and upcoming warm, wet conditions - conducive for ABR infection and proliferation. Areas concerned with possible population shifts, particularly southwest Michigan, could increase the rate of Indar applied to 8 fl. oz. per acre. This 33% increase in fungicide rate should be effective in controlling any fungal strains exhibiting reduced sensitivity. It is critical that the fungicide be applied in a protective mode, prior to rain events such that fruit are protected when fungal spores arrive.

Additional strategies to reduce the onset of SI resistance include rotation with other modes of action, such as Pristine (shown to be effective in ABR control) and the use of Rovral during bloom. The most important factors to limit further shifting in ABR populations are to effectively eliminate the pathogen by minimizing its chances of growth and initiating new infections; thereby decreasing the chances of pathogen mutations for SI resistance.

Our research in the past three years has shown that Michigan populations of *M. fructicola* remain sensitive to SI fungicides. Although resistance to SI's is quantitative and higher chemical rates of SI's may control less sensitive isolates, this is not a long-term solution - the risk of resistance and complete loss of SI fungicides is too great. We are actively researching the efficacy of other fungicide modes of action but unfortunately, none are commercially available at this time.

#### **WEBSITES OF INTEREST**

**Insect and disease predictive information is available at:**

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

**60 Hour Forecast**

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

**Information on cherries is available at the new cherry website:**

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

**Fruit CAT Alert Reports**

<http://www.ipmnews.msu.edu/fruit/>

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

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

ACTUAL AND PREDICTED DEGREE-DAY  
ACCUMULATIONS SINCE MARCH 1, 2011

**Please send any comments or suggestions regarding this site to:**

Bill Klein, [kleinw@msu.edu](mailto:kleinw@msu.edu)

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## Northern Michigan FruitNet 2011 *Special Update* NW Michigan Horticultural Research Station

[Nikki Rothwell](#)

District Horticulturist

[Erin Lizotte](#)

District Fruit IPM/IFP Agent

[Bill Klein](#)

Farm Mgr, NWMHRS

[Duke Elsner](#)

Agricultural & Regional Viticulture Agent

June 24, 2011

### RAINFEST CHARACTERISTICS OF INSECTICIDES

By John Wise, Michigan State University Trevor Nichols Research Center

The numerous rainfall events experienced in Michigan over the last several weeks has prompted many questions about the relative "rainfastness" of the insecticides used in fruit production. In 2006 AgBioResearch provided funds to purchase and install a state-of-the-art rainfall simulation chamber at the MSU Trevor Nichols Research Center (TNRC), after which we have begun conducting trials (with generous funding support from MI fruit commodity groups) on fruit crops for a range of insecticides.

There are several critical factors that influence impact of precipitation on a pesticide's performance. First, is the plant penetrative characteristic of the various compounds. Some pesticide chemistries, like organophosphates, have limited penetrative potential in plant tissue, and thus are considered as primarily surface materials. Many compounds, such as spinosyns, diamides, carbamates, avermectin, pyrethroids and some Insect Growth Regulators readily penetrate plant cuticles and have limited translaminar movement in leaf tissue. Others, like the neonicotinoid insecticides are systemic and can have translaminar as well as acropetal movement in the plant's vascular. Second is the inherent toxicity of an insecticide on the target pest. A given compound may be highly susceptible to wash-off, but if the target pest is very sensitive to the compound there may be sufficient residue remaining to protect the crop. Related to this is the importance of understanding pest biology and behavior, and the resulting threat to the crop. For an indirect pest that feeds primarily on leaves, the rainfastness of a compound on foliage is the most relevant, and generally tolerance of leaf feeding injury is high compared to that of fruit. For direct pests that threaten a crop, the rainfastness of residues on fruit and leaves are both relevant. We have learned that wash-off potential for a given compound may be different on fruit than on leaves. The fourth factor is the amount of rain received from a precipitation event. Our research suggests that the duration of a precipitation event is relatively unimportant, but the amount of rainfall will significantly impact the insecticide residues remaining on the fruit and leaves of the plant. Thus the decision making process, whether to re-apply or not, must include knowledge of the pest, the precipitation event as well as the compound's rainfastness characteristics and relative toxicity to the target pest.

In general organophosphate insecticides have the highest susceptibility to wash-off from precipitation, although their toxicity level to most insect pests can often overcome the necessity for an immediate re-application. Neonicotinoid insecticides are moderately susceptible to wash-off, although residues that have moved systemically into plant tissue are highly rainfast, and surface residues less so. Pyrethroid, carbamate and IGR insecticides are moderately susceptible to wash-off, and vary in their toxicity to the range of relevant fruit pests. Diamide and spinosyn insecticides have proven to be highly rainfast. There is much more work to be done in this area of research, so we expect to update our findings to you as they develop over the coming years.

Based on the results from the current studies, the following charts have been developed to serve as a guide for general rainfastness characteristics and re-application recommendations for certain insect pests (also printed in the 2011 Michigan Fruit Management Guide E-154). Note that these recommendations should not supersede insecticide label restrictions or farm-level knowledge based on site-specific pest scouting, but rather are meant to complement a comprehensive pest management decision-making process.

#### Rainfastness Rating Chart: General Characteristics for Insecticide Chemical Classes

Insecticide Class	Rainfastness $\leq$ 0.5 inch		Rainfastness $\leq$ 1.0 inch		Rainfastness $\leq$ 2.0 inch	
	Fruit	Leaves	Fruit	Leaves	Fruit	Leaves
Organophosphates	L	M	L	M	L	L
Pyrethroids	M	M	L	M	L	L
Carbamates	M	M	L	M	L	L
IGRs	M	H				
Neonicotinoids	M,S	H,S	L,S	L,S	L,S	L,S
Spinosyns	H	H	H	M	M	L

Diamides	H	H	H	M	M	L
Avermectins	M,S	H,S	L,S	M,S	L	L

\* H – highly rainfast ( $\leq 30\%$  residue wash-off), M – moderately rainfast ( $\leq 50\%$  residue wash-off), L – low rainfast ( $\leq 70\%$  residue wash-off), S-systemic residues remain within plant tissue

**Apple Insecticide Precipitation Wash-off Re-application Decision Chart:** Expected codling moth control in apples, based on each compound's inherent toxicity to CM larvae, maximum residual, and wash-off potential from rainfall.

Insecticides	Rainfall = 0.5 inch		Rainfall = 1.0 inch		Rainfall = 2.0 inches	
	*1 day	*7 days	*1 day	*7 days	*1 day	*7 days
Guthion				X		X
Imidan				X		X
Asana		X	X	X	X	X
Calypso				X	X	X
Assail		X	X	X	X	X
Proclaim		X		X	X	X
Delegate						X
Altacor						X
Belt						X

\* Number of days after insecticide application that the precipitation event occurred.

X – Insufficient insecticide residue remains to provide significant activity on the target pest, and thus re-application is recommended.

- An un-marked cell suggests that there is sufficient insecticide residue remaining to provide significant activity on the target pest, although residual activity may be reduced.

**Grape Insecticide Precipitation Wash-off Re-application Decision Chart:** Expected Japanese beetle control in grapes, based on each compound's inherent toxicity to JB adults, maximum residual, and wash-off potential from rainfall.

Insecticides	Rainfall = 0.5 inch		Rainfall = 1.0 inch		Rainfall = 2.0 inches	
	*1 day	*7 days	*1 day	*7 days	*1 day	*7 days
Imidan		X	X	X	X	X
Sevin			X	X	X	X
Capture		X		X	X	X
Actara		X		X	X	X
Avaunt		X		X	X	X

\* Number of days after insecticide application that the precipitation event occurred.

X – Insufficient insecticide residue remains to provide significant activity on the target pest, and thus re-application is recommended.

- An un-marked cell suggests that there is sufficient insecticide residue remaining to provide significant activity on the target pest, although residual activity may be reduced.

**Blueberry Insecticide Precipitation Wash-off Re-application Decision Chart:** Expected cranberry fruitworm control in blueberries, based on each compound's inherent toxicity to CBFW larvae, maximum residual, and wash-off potential from rainfall.

Insecticides	Rainfall = 0.5 inch		Rainfall = 1.0 inch		Rainfall = 2.0 inches	
	*1 day	*7 days	*1 day	*7 days	*1 day	*7 days
Guthion		X	X	X	X	X
Asana		X	X	X	X	X
Intrepid		X	X	X	X	X
Assail		X		X	X	X
Delegate		X		X	X	X

\* Number of days after insecticide application that the precipitation event occurred.

X – Insufficient insecticide residue remains to provide significant activity on the target pest, and thus re-application is recommended.

- An un-marked cell suggests that there is sufficient insecticide residue remaining to provide significant activity on the target pest, although residual activity may be reduced.

#### MANAGING CHERRY LEAF SPOT IN POOR SPRAYING WEATHER

Erin Lizotte, MSUE

George Sundin, Dept of Plant Pathology, MSU

Nikki Rothwell, MSUE

With an almost constant barrage of rain, getting into the orchards has been difficult to say the least. When managing cherry leaf spot, protectant management strategies that keep leaves covered during infection periods are the most effective. Unfortunately, it has been impossible for growers to get their sprays on when necessary and combined with concern over the early arrival of leaf spot this season, the weather is adding yet another layer of complexity to the situation. Under rainy conditions, concerns arise regarding how well tissue is protected, how often to apply fungicides, and what to apply if an application was missed. Additionally, American brown rot (ABR) is showing up in orchards with hail damage, bacterial canker infections and high inoculum levels. American brown rot is a major concern given the wet and humid conditions we have been experiencing and growers should be scouting regularly for signs of infection, particularly as ABR has the ability to spread quickly.

Pristine (strobilurin and boscalid) is a good fit at this time for growers who need a leaf spot cover and also want to hedge their bets against American brown rot. Pristine is rain fast within 2 hours and moves locally within leaves. This means that if you applied Pristine 2 hours before rainfall then the leaves are protected despite the rain. However, this rainfast systemic effect does not apply to fruit. Because of the amount of rain and risk of ABR, full covers should be applied. In sites with ABR present, Indar should be applied at a 6 fl oz/A rate, and 8 fl oz/A application should only be used if a shift in fungal sensitivity is suspected (only Indar 2F is labeled for increased rates). Surfactants, high water application volumes, full covers and slow speeds are important strategies for ABR management.

If a spray was missed because of high winds or rain, there is little compelling evidence that post infection treatments are effective. The best shot at getting any back action against cherry leaf spot in tart cherry is a full cover of Syllit FL (24-27 fl oz), tank mixed with Captan (3-4 lb). Copper may also be a good option and should be applied at a 1.2lb actual metallic copper rate and mixed with lime as a safener. Neither Syllit nor copper will provide control of ABR infections; once again Indar should be applied if ABR is a concern. Fixed copper formulations, lime, and Syllit may have compatibility issues with pesticides commonly utilized at this time of the season so be sure to carefully review the label for restrictions. The key to controlling cherry leaf spot and ABR is to minimize infection and disease spread now.

### **ROSE CHAFERS PLENTIFUL IN 2011**

Duke Elsner, Small Fruit Educator, MSU Extension

The rose chafer, *Macrodactylus subspinosus*, is now appearing in large numbers in many areas of Michigan. The rose chafer is a member of the same family of beetles as June beetles, commonly known as scarabs. However, the adult rose chafer is quite different in appearance from June beetles. Adults are about ½ inch long, slender, usually a light tan color with long reddish brown legs. They are rather gangly in appearance. They are often found in mating pairs. They fly during daylight hours and are not attracted to lights at night like June beetles. Adults contain a distasteful chemical; few birds can eat them without being sickened. The grub stage is typical of the entire family- a soft bodied, "C"-shaped white grub with six legs and a prominent brown head. There is a single generation per year with the adults showing up in June.

Adult rose chafers sometimes cause significant injury to plants, but their grubs are of almost no concern. Adult rose chafers feed on the foliage, buds, flowers and fruits of hundreds of plants, most notably in our area they are pests of wine grapes, cherries, apples, raspberries, strawberries, roses and peonies. They will also feed on the tender young foliage of many trees, especially sugar maple, chestnut and birch. They have weak jaws, so they typically eat only the most tender portions of leaves, resulting in irregular holes between the tougher leaf veins. They are strongly attracted to white flowers, so they will turn up first on roses or peonies with white blossoms or on the white petals of daisies. The adults are strongly attracted to white flowers, so much so that they can be persuaded to leave gardens alone if there are few white flowers in the garden AND a "diversionary" planting of something that blooms white is planted elsewhere in the vicinity. This works to a degree, of course, and there will be years when it fails.

The period of adult flight lasts only a few weeks. They are good fliers, capable of traveling great distances to find a meal.

The grub stage of the rose chafer feeds on plant roots, but they are typically found only in sandy open areas where wild grasses and weedy plants predominate. The grubs of rose chafers are not pests of lawn grasses and landscape plants like their June beetle cousins.

In most years adult rose chafers are moderately annoying to the home gardener, and they can be dealt with by hand-picking and the occasional use of insecticides. In high population years like 2011 they can be serious pests of ornamental and crop plants, requiring pesticide sprays to protect plants from the voracious adults. Treating lawns or gardens with grub control products will do nothing to reduce the numbers of rose chafers that attack in the adult stage, as their grubs do not reside in landscaped areas. Adults can be attracted and trapped by placing out white buckets filled with a few inches of water- they need to have slippery sides or they can crawl out. Numerous spray products have the ability to control the adults, but slow-acting pesticides may allow for too much injury to occur before the beetles die off in high population years. If you want some sort of reward for your spraying efforts, Carbaryl (the active ingredient in Sevin) is the material of choice.

So, what's next? After the numbers of rose chafers die down, it will be European chafer season! This introduced scarab species has been on the increase in our area for the last few years, and it is a significant lawn grass pest. The nice thing about being an entomologist is that I'll never run out of creatures to write about.



#### USDA TART CHERRY ESTIMATES - 2011

*Reported in Millions of lbs*

8.7	Wisconsin
12	Washington
24	Utah
3.2	Pennsylvania
1.7	Oregon

6.5	New York
210	Michigan
<b>266</b>	<b>National Total</b>

CIAB breaks out MI the following way:

20	SW
55	WC
135	NW

The CIAB used these numbers in the optimum supply formula



Come learn more about the Michigan Agriculture Environmental Stewardship Program and the Farm Bill programs offered by the USDA Natural Resources Conservation Service. Educational session will include and update by the local MDARD Staff, information about MAEAP and Farm Bill programs from your local Conservation District and NRCS staff and an update on Farm Bureau activities.

These educational sessions are sponsored by a grant made available by the Michigan Farm Bureau and the Northwest County Farm Bureau. A FREE meal (lunch or dinner) will be provided after the normal IPM update provided by MSU Extension and will be followed by the MAEAP Farm Bill sessions. For more information, please call Dan Busby at [dbusby@gtcd.org](mailto:dbusby@gtcd.org) or call at 231.883.9962

Session will take place as part of the last scheduled IPM meetings:

**Wednesday June 29** in Leelanau County at Jim Bardenhagen Farm from 12-2

**Wednesday June 29** in Grand Traverse County at Josh Wunsch Farm from 3-5

#### WEBSITES OF INTEREST

Insect and disease predictive information is available at:

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

60 Hour Forecast

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

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ACTUAL AND PREDICTED DEGREE-DAY  
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Please send any comments or suggestions regarding this site to:

Bill Klein, [kleinw@msu.edu](mailto:kleinw@msu.edu)

Last Revised: 6-24-11





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## Northern Michigan FruitNet 2011 Weekly Update NW Michigan Horticultural Research Station

[Nikki Rothwell](#) District Horticulturist  
[Erin Lizotte](#) District Fruit IPM/IFP Agent  
[Bill Klein](#) Farm Mgr, NWMHRS  
[Duke Elsner](#) Agricultural & Regional Viticulture Agent

June 28, 2011

### GROWING DEGREE DAY ACCUMULATIONS through June 27th at the NWMHRS

Year	2011	2010	2009	2008	2007	2006	21 yr. Avg.
<b>GDD42</b>	1138	1533	1153	1152	1504	1406	1257.9
<b>GDD50</b>	649	903	690	648	932	818	735.6

### Growth Stages at NWMHRS (June 27 – 4:00 p.m.)

**Apple:** Red Delicious – 31 mm fruit  
Gala – 26.5 mm fruit  
Yellow Delicious – 27 mm fruit  
**Pear:** Bartlett: 21.5 mm fruit  
**Sweet Cherry:** Hedelfingen: 15 mm fruit  
Napoleon: 18 mm fruit  
Gold: 14.5 mm fruit  
**Montmorency:** 14 mm fruit  
**Balaton:** 13 mm fruit  
**Apricot:** 27.5 mm fruit  
**Plum:** 20 mm fruit  
**Grapes:** 10-16" shoots - prebloom

### Weather

Last week was cool and wet followed by a weekend with ample sunshine. On Tuesday 21 June, we received 0.93" of rain and 1.11" on 22 June. We even received over ¼" of rain on the following Thursday, June 23. The weekend was dry, and we had daytime temperatures up in the mid-70's to low 80's. Monday was nice in the day, but by late afternoon, the rain started and we received <0.1" of rain. Today we are back to windy, cool, and wet. The forecast for the week was expected to be sunny and mild. We have accumulated 1138GDD base 42 and 649GDD base 50—slowly moving close to our 21-year average. We have had more than our share of isolated hail this season.

### Crop Report

Strawberry harvest is in full swing at this time. Growers have had challenges with all the rainfall and harvest—fields are wet and strawberries are not holding up well with all the moisture. Cherries seem to be sizing slowly, despite all the rainfall; we have only gained 1-2mm in the past week. Growers are hoping for warm and sunny conditions to move the fruit along. Brown rot is the primary issue in sweet cherries, and most of this disease has been observed on cherries infected with bacterial canker. Sweet cherry harvest for later varieties is as much as three weeks off. Tart cherry crop loads are variable in the north—younger trees have more fruit than older trees. We also see variability within an orchard, and much of the crop load appears to be associated with honeybee hive placement—the closer to the hive, the higher crop load. Growers and processors have different ideas of the crop in northwest Michigan: 110 million pounds up to 140 million pounds, a distinct spread for the region. Apples have gained some size in the past week, and tree growth has been good with all the rain. Grapes are starting to bloom in the hybrids, and we anticipate the start of vinifera bloom by the weekend if the weather warms. Grape vine growth is also good at this time.

### Pest Report

#### Apple

As apples continue to develop, growers should continue to scout for scab lesions to help gauge the risk of fruit scab. Growers managing to protect against fruit scab should be considering second generation sterol inhibitors (Indar and Inspire Super) or captan, all of which should be tank mixed with EBDCs; EBDCs have a 77-day PHI, so growers should be aware of their harvest dates when using these products. Symptoms of [fire blight](#) shoot infections are visible in the region; however, despite the high EIP's during bloom there is little blossom blight this year. Given the high infection potential this



spring, it looks like growers did a great job keeping blossoms protected. Shoots infected with the fire blight pathogen turn brown to black from the tip and bend near the tip to resemble a shepherd's crook.

[Spotted tentiform leafminer](#) (STLM) trap catches remain low this week with an average of 22 per trap. [Oriental fruit moth](#) trap emergence continued this week with just 1 moth trapped. [Codling moth](#) adult activity has slowed with less than one moth per trap on average. Based on trap catch data from the Research Station, we set the codling moth biofix for first generation (sustained catch) as 31 May and have accumulated 415 DD50 since. The majority of treatments target egg hatch and were applied at 250 DD50 after sustained catch. Growers can track their site-specific progression using the [codling moth model](#); second generation codling moth treatment will not begin until 1200 DD50. [Oblique-banded leafroller](#) (OBLR) larvae continue to pupate and emerge as adults; adult moth trap catches averaged 56 moths per trap this week indicating that the most effective time to manage the current generation of OBLR has passed. As eggs are laid and summer generation larvae hatch, another OBLR treatment window will open as we approach harvest. Growers can scout for multiple life stages of OBLR; adults moths are easily trapped with pheromone baited delta traps, and larvae are also relatively easy to locate due to their leaf rolling behavior. Plum curculio egg laying scars in apple have been reported. Plum curculio can continue laying eggs through June conservatively. Rose chafer has also been reported in high numbers in some area orchards.

### Cherry

[Oblique-banded leafroller](#) (OBLR) activity continues, and larvae, pupae and adults are present in area orchards at this time. Targeting the overwintering generation is preferable in cherry, and this strategy is more effective when larvae are small and easier to kill. Based on adult trap catches of 20 moths on average, the ideal window for first generation OBLR larvae management has closed. For growers that were not able to make an application targeting overwintering larvae, a second management window will be available around harvest. As we near harvest in sweet cherries, larvae will be found webbing clusters together rather than rolling leaves as we saw with the overwintering generation. [Plum curculio](#) activity is evident in area orchards with crescent shaped egg laying scars easily visible. If growers are utilizing insecticides other than the organophosphates (Guthion, Imidan), the traditional treatment timing is petal fall or shuck split (depending on the mode of action) with subsequent applications as necessary. Consult the insecticide label and the MSU Extension Bulletin E154 "Michigan Fruit Management Guide" for more information on proper timing and available materials. Based on a full bloom biofix of 21 May in Montmorency, we have accumulated 512 DD50, well past the 375 DD50 treatment window for organophosphate application for plum curculio management to keep larvae out of the tank. Growers can track their own progress on farm using the [plum curculio model](#). First generation [American plum borer](#) emergence continues at low levels, second generation emergence is expected around tart cherry harvest. [Lesser peach tree borer](#) (LPTB) emergence has slowed with an average of less than 1 per trap. Two peach tree borers were trapped this week. We caught one [black cherry fruit fly](#) in the station trapline this week—NO reports of [cherry fruit fly](#) trapped in the region thus far.

The potential for epidemic levels of [cherry leaf spot](#) (CLS) is a concern this season. Despite some relatively tame leaf spot weather and model predictions as well as standard management practices, symptoms have been present since late May. CLS is resistant to sterol inhibitor fungicides (Indar, Elite, Orbit) in all the major fruit producing areas of Michigan. As cover treatments are applied, remember to alternate the use of fungicide classes and tank mix dodine and strobilurin fungicides with a full rate of captan to manage against resistance development. Under cool conditions, copper is an excellent CLS material and a good strategy for resistance management; copper rates of 1.2lb metallic copper are adequate. Lime is also recommended as a safener for copper applications, but Imidan cannot be used in this tank mix due to pH. Canker symptoms are visible on fruit—particularly Ulster, and are allowing [American brown rot](#) (ABR) infections to become established on green fruit. Hail damage and sites with a history of ABR are also at risk at this time with weather conditions highly favorable for disease development. In sites with ABR present in the orchard at this time, Indar should be applied at a 6 fl oz/A rate, a 8 fl oz/A application rate should only be used if a shift in fungal sensitivity is suspected (only Indar 2F is labeled for increased rates). Surfactants, high water application volumes, full covers, and slow speeds are important strategies for ABR management. Growers looking to treat for CLS and hedge their bets against ABR could utilize Pristine at this time.

Lastly, winter injury is prevalent in tart cherry of 5-7 years of age—trees appeared healthy in the spring, pushed leaves and then collapsed or are beginning to fail at this time. Trees collapsing from winter injury exhibit healthy tissue in the canopy and upper trunk areas as well as the roots, with dead tissue only present 6" above the soil line.

### Wine Grape & Saskatoon Reports

Duke Elsner, Small Fruit Educator, MSUE

Some hybrid cultivars are in full bloom; Chardonnay has about ¼ flowers open and Riesling is just about to bloom. Recent wet growing conditions have resulted in very succulent shoot growth, but foliage conditions look great...no sign of powdery mildew yet at the Station! There is some potato leaf hopper injury on most susceptible varieties and rose chafers continue at greatly reduced levels.

### Saskatoons

Ripening has begun. Predominant problem at this point is *Entomosporium* leaf spot. I have seen one sample that appears to be a rust disease.

### FURTHER THOUGHTS ON MANAGING BROWN ROT IN SWEET CHERRY FOR 2011

George W. Sundin, Dept of Plant Pathology, MSU

Nikki Rothwell, Extension Educator, MSU

Erin Lizotte, Extension Educator, MSU

This article is a follow-up to write ups on American brown rot (ABR) posted last week:

1. Fruit showing bacterial canker infection lesions are highly susceptible to ABR infection. Fruit that has been infected by bacterial canker is the initial site where we have first observed ABR infections this season. Once the diseased fruit is colonized by the brown rot fungus, they quickly become ABR "disease spreaders". Once the ABR fungus begins to sporulate, these fruits are capable of infecting healthy, ripening cherries.

2. At this time, growers cannot control infections of bacterial canker-infected fruit. The *Pseudomonas* bacteria have already infected and weakened the fruit, and as a result, these fruits have increased susceptibility to ABR. This dead tissue in the canker lesion is highly susceptible to colonization by the ABR fungus. There is simply no method available to protect bacterial canker infected fruit from ABR infection besides removal from the tree, which is impractical.

3. All of the other fruit on trees need protection from the relatively small number of cankered fruit infected with ABR. **An intensively active spray program is required from now until harvest.** This program should focus on using Indar with Pristine as an alternative mode of action.

4. Question – when does 8 = 9 = 10 = 12? These numbers are actually equal when we are talking about rates of Indar 2F for ABR control in 2011. Our surveys have shown that over 99% of the ABR isolates we have recovered in the past three years in Michigan are SENSITIVE to sterol inhibitor (SI) fungicides. These SI-sensitive isolates are adequately controlled with Indar at the 6 fl oz / A rate. Increasing the rate (24(c) label for Indar 2F only) is a useful hedge though against the possibility of the presence of SI-resistant strains.

However, for all intents and purposes, use of Indar 2F at 8 fl oz / A should be just as effective as 12 fl oz / A because of the presence of little to no SI-resistant ABR in Michigan sweet cherry orchards. Thus, the amount of control from a spray of 8 fl oz / A would be equivalent to that from a spray of 9, 10, or 12 fl oz / A.

Because the seasonal limit of Indar is 48 fl oz / A, growers should use rates of 8 fl oz / A to be able to increase the number of applications available for the duration of the season. The availability of applications of Indar is important as we approach harvest and fruit increases in sugar content and becomes more susceptible to ABR infection and because we do not know how many periods of brown rot-conducive weather (temps in 70's with rain) we will experience during this 1-3 week time. We suggest that growers keep a spray available if needed. If that spray is not needed in the end, growers will minimize input costs.

Growers should maximize the effect of the 8 fl oz / A application by covering all row middles or keeping a very tight window if using an alternate row strategy (i.e., 2-3 days max). Fruit coverage = fruit protection = ABR control.

Additionally, there may be fruit in orchards that is currently infected but not showing symptoms right now. These symptoms may show up after your next spray, but this does not mean the fungicide application was not effective as the infection was there prior to the spray. The SI fungicides do not have the capability of eradicating ABR infections from fruit. This just means that from now to harvest we must maintain a strategy of intensive, active fruit protection to ultimately control ABR levels in orchards.

## WEBSITES OF INTEREST

**Insect and disease predictive information is available at:**

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

### 60 Hour Forecast

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

**Information on cherries is available at the new cherry website:**

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

### Fruit CAT Alert Reports

<http://www.ipmnews.msu.edu/fruit/>

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

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

[ACTUAL AND PREDICTED DEGREE-DAY  
ACCUMULATIONS SINCE MARCH 1, 2011](#)

**Please send any comments or suggestions regarding this site to:**

Bill Klein, [kleinw@msu.edu](mailto:kleinw@msu.edu)

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Home | Site Map | Contact | Indicia | Logos  
AgBioResearch • 109 Agriculture Hall • East Lansing, MI 48824 • Ph: 517-355-0123

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