

M I C H I G A N
GRAPE & WINE NEWSLETTER

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Pinot Noir on OMP

News you can use

Vineyard management. This is a good time for calculating yields, canopy management and cluster thinning - see page 9.

SW Viticulture Field Day. The 22nd Annual Viticulture Field Day will be held at SWMREC on July 27. The trade show begins at 9am and workshops begin at 10am. Early registration discount ends July 15th. The registration form is available online at the SWMREC [website](#).

Wine faults workshop in NY. Many of you met Dr. Anna Katharine Mansfield from Cornell a few weeks

ago - this is one of the workshops she spoke about. A bit of a drive, but an excellent opportunity! Wednesday, June 27 in Canandigua, NY. More info [here](#).

GROWING DEGREE DAYS

		Base 50 from April 1					5-yr Avg*
		2011	2010	2009	2007		
<u>Lawton</u>	6/22	865	1019	789	1007	881	
	6/29	975	1168	965	1162	1005	
	forecast 7/6	1140	1317	1058	1299	1104	
<u>Scottdale</u>	6/22	859	1019	788	1022	878	
	6/29	976	1175	965	1181	1025	
	forecast 7/6	1143	1323	1065	1319	1158	
<u>Leelanau</u>	6/22	581	799	512	802	635	
	6/29	672	904	669	927	754	
	forecast 7/6	828	1049	736	1040	865	
<u>Old Mission</u>	6/22	524	747	459	707	585	
	6/29	610	849	606	824	701	
	forecast 7/6	764	988	671	925	808	

*5-yr Avg = 2006 to 2010

See enviroweather.msu.edu for more information.

MICHIGAN STATE
 UNIVERSITY

Extension

NORTHWEST

*Duke Elsner
Grand Traverse County MSU Extension*

Ample soil moisture and relatively warm weather has produced rapid, succulent shoot growth. This has allowed for some shoot breakage on windy days. Bloom on Riesling has reached 25-50%, Chardonnay is at or near full bloom. Early blooming hybrids have been at full bloom or beyond for over a week.

Foliar injury symptoms of potato leafhopper feeding are easy to find on susceptible cultivars, but the shoots are not showing much of the shortening of internodes symptom as of yet. Potato leafhopper populations have been easily managed to safely low levels in most sites. There was a very heavy run of adult rose chafers over the last two weeks. These usually restrict their feeding to the foliage, but a number of cases of rose chafer feeding on flower clusters have been seen this year. No sign yet of the big sphinx moth caterpillars—they should be noticeable soon.

Powdery mildew is our greatest concern at the moment, as we are in bloom on many important cultivars. Well managed vineyards have had very little trouble with powdery mildew on leaves to this point, but this should not be taken as a reason to be lax in protecting the blooming clusters.



Fig 1. Rose chafer adults on flower cluster; *Photo: D. Elsner.*



Fig 2. Rose chafer injury to flower buds; *Photo: D. Elsner.*

SOUTHWEST

*Diane Brown
Berrien County MSU Extension*

*Steve Van Timmeren
MSU Department of Entomology*

Fruit is sizing well; Concord and Niagara fruit are pea-sized. Berries of most wine grape varieties are buckshot sized. We were at 976 GDD base 50 from April 1 for the Scottdale weather station yesterday. We will be at 1200 GDD in about two weeks and grape berries will be about half their final size. With a very heavy grape crop this year and degree day accumulations shaping up for a cool season, it will be hard to fully ripen a heavy crop. Growers should consider estimating their crop at 1200 GDD and thinning the fruit down to manageable levels.

[Grape berry moth](#) trap catch numbers have dropped from last week, indicating the first generation is winding down. Higher pressure vineyards are beginning to show a few infestations showing up again after post-bloom sprays while low pressure sites don't have any infestations yet. Scouting along the woods borders of your vineyards for infestations right now can give you an indication how much pressure you may have. Berries are now large enough that the larvae can hide inside the berries. If you're scouting in Concord vineyards the infested berries will be much easier to spot because the berry prematurely turns red where the larva has damaged it.

If you're planning on using the grape berry moth model for timing your next insecticide spray we are coming up on the predicted start of second generation egg laying. We set biofix for GBM around May 30-31 in Berrien County, June 1-2 in Van Buren County and June 4 in Allegan county. For the Scottdale [Enviroweather](#) weather station we were at 637 GDD after biofix through Wednesday, June 29th and are estimated to be at 812 GDD past biofix by July 6th. 810 GDD base 47 after biofix marks the



Fig 3. GBM infested Concord berry; *Photo: S. Van Timmeren.*

Fig 4. Phomopsis on Concord shoot and rachis; Photo: S. Van Timmeren.



beginning of egg laying for the second generation, and the beginning of the period where control measures should be applied. Longer lasting insecticides that target eggs and larvae should be applied closer to the 810 GDD timing, while shorter lasting compounds that just target larvae are better off applied closer to a 910 GDD timing. Rufus Isaacs has put together a detailed article on using the grape berry moth model to time insecticide applications elsewhere in this newsletter. Check the [grape berry moth model](#) at Enviroweather to determine the correct timing for GBM controls for the weather station closest to your vineyard.

We did not see any Japanese beetles while scouting in the vineyards on Tuesday. However, several adult beetles were found in Fennville on Wednesday. With the warm weather this weekend, there will probably be a significant number of adults emerging. You should watch your young vineyards very closely this weekend as any aggregations of beetles could cause complete defoliation in just a few days. Mature vineyards are much better able to handle leaf feeding so don't be afraid to let the adults feed for a bit. Remember that the adults will be emerging from the ground for all of the month of July and even in to August.

[Grape leafhopper](#) and [potato leafhopper](#) are out and signs of feeding can be found. Remember that wine grapes can handle quite a bit of early feeding damage by potato leafhoppers without negatively affecting the crop, especially if it's a less susceptible variety such as Vignoles.

[Phomopsis](#) is common on leaves and shoots and is beginning to show up on cluster rachises in high pressure vineyards. [Black rot](#) and [downy mildew](#) symptoms have been observed. According to the black rot model on Enviroweather, there have been several black rot infection periods within the last couple of weeks. Black rot has been observed at low levels in treated vineyards, and at higher levels in untreated research plots. Downy mildew has been observed

infecting rachises of Chancellor grape at high levels in the sentinel plot at SWMREC. The species of downy mildew that infects juice grapes is a different species. It has been found at low levels, but weather conditions have been very favorable for the development of this disease. Growers should protect against all these diseases in their next post bloom application. [Powdery mildew](#) symptoms have not been observed yet.

Grape insect update: The start of berry moth's second generation is approaching

With bloom behind us and berries sizing, grape growers in southern Michigan are approaching a key time for making management decisions about controlling the second generation of grape berry moth. In vineyards where berry moth was a significant problem last year, or where recent monitoring or scouting indicates high activity of this pest, protecting clusters from the second generation is a key step towards minimizing the economic impact of this species. The MSU Grape Berry Moth Model can help with identifying the optimal timing of when insecticides should be applied. This model tracks degree days (DD) automatically on the MSU Enviroweather system, and shows when enough DD have accumulated that egg laying by the second and the third generations of berry moth will commence. These are predicted to occur at 810 DD after wild grape bloom (second generation) and 1620 DD after wild grape bloom (third generation). It is important to note that these are the predicted starts of egg laying in these generations, but that increasing egg laying and egg-hatch by larvae will pick up after these key times.

To run the model, you must know when wild grape (*Vitis riparia*) bloomed near your farm. This is the biofix point from which the degree days are counted. If you didn't track this during the spring, approximate dates are shown in the table below. This also shows where we stand this week in Berrien, Van Buren, Allegan, and Grand Traverse counties, and it demonstrates well how variable the season is across the state. Visit other weather stations at the Enviroweather site (www.enviroweather.msu.edu) to check conditions in your own location. Once at the

Enviroweather homepage, access this GBM Model by first clicking on the yellow dot representing the nearest weather station. Then navigate to the model by selecting *Fruit* from the menu bar at the top. Scroll down the menu at the left of the page for *Grape*, and then *Grape Berry Moth*. Clicking on this will bring up a table full of numbers relevant to that specific weather station and its conditions this season.

First, look along the top for the date of wild grape bloom at your site. Then, look down that column for the point at which 810 DD have been accumulated. Once the model reaches 810, and then 1620 DD, the cells in the table turn red to alert you. Based on the current weather conditions this spring we are not quite at the point when the second generation egg laying is starting. Because the model also uses the predicted weather conditions to calculate DD one week ahead, we can see that it looks as if the weeks after July 4th weekend will see the predicted start of the second generation of berry moth in 2011. This will be happening early in the month in SW Michigan and much later into July in NW Michigan.

The 810 DD spray timing is the ideal timing for using the reduced-risk insecticides Intrepid (8-12 oz/acre) or Altacor (4 oz/acre) since these have activity on eggs and young larvae and are best timed for early egg laying. In our recent MSU tests at commercial grape farms using these new insecticides timed at 810 and 1620 DD with the degree day model, growers have consistently achieved better control of GBM compared with sprays on a calendar spray program with conventional broad spectrum insecticide products. Beware that both of these insecticides must be applied in a way to get excellent coverage of the clusters to work well against GBM. Additionally, Altacor reduces the level of Japanese beetle feeding on grape leaves and can therefore provide control of both pests if they are present in July or August (and

Table 1. Current and predicted berry moth phenology in Michigan, as of late June and early July 2011

Weather station	Approximate date of wild grape bloom	Accumulated DD as of June 27	Predicted DD accumulated by July 5
Berrien County			
Scottdale	Tuesday, May 31	596	798
SWMREC	Tuesday, May 31	548	750
Van Buren			
Lawton	Thursday, June 2	556	758
Lawrence/Teapot Dome	Thursday, June 2	540	764
Allegan			
Fennville	Saturday, June 4	457	668
Grand Traverse			
Old Mission	June 14	236	412

we have started to see Japanese beetle for the first time this week).

Growers have many other insecticide options available to them for berry moth control, including organophosphate, carbamate, and pyrethroid insecticides. These are best timed for egg hatch, which is expected to start 100 DD after egg laying starts. So, for the second generation it would be best to make a broad spectrum application at 910 DD, typically a week or more after the predicted start of egg laying. At this time of the season, some important issues to be aware of include 1) *cluster* coverage is critical for GBM control, 2) if using pyrethroid insecticides their residual activity will be shorter in hot and sunny weather, 3) if using a product with only a week of residual control this will be insufficient to cover the second generation completely and reapplication will be needed to cover the second generation.

For high pressure vineyards getting good control of the second generation of GBM is important to minimize later-season berry cracking and diseases. Watching the degree day model for your local site will help refine the timing for protecting your vineyards in July. The third generation of berry moth, when population pressure climbs rapidly is typically starting about one month after the second. So, check back in later in the summer to determine when the 1620 DD timing is reached.

Don't let downy mildew get you down

Downy mildew has gotten a relatively early start this year in southwest Michigan with first sightings from mid to late June, depending on location and cultivar. So far, the most affected cultivar has been Chancellor with anywhere from 1 to over 40 infected clusters per vine in unprotected vineyards. Often, downy mildew will be visible on clusters before leaves in Chancellor. Downy mildew was also noticed on leaves of unsprayed 'Niagara' vines and can be found on wild grapes especially those growing in humid locations, such as near ponds or in ditches.

Downy mildew is caused by the fungal-like organism *Plasmopara viticola* and can seriously damage leaves and clusters of susceptible cultivars. Leaf infections may lead to premature defoliation, which can reduce winter hardiness and sugar accumulation in the fruit in severe cases. Cluster infections usually translate into direct losses, as the infected cluster stems and berries will become necrotic and fail to develop. This is often the case with Chancellor, which is highly susceptible to downy mildew. First symptoms on the leaves may be yellow or light-green spots that may have a greasy appearance (oil spots). On older leaves, lesions are smaller and more angular as they are delimited by leaf veins. White sporulation usually develops on the underside of the leaf after warm nights with high relative humidity. Infected clusters and tendrils may also be covered with a fluffy white growth.

Biology of the pathogen. The pathogen overwinters as thick-walled spores (oospores) in fallen infected leaves on the ground. Oospore germination is favored by moist soils and temperatures over 50°F, and typically starts several weeks before bloom in this region. Oospores develop a second spore type, sporangia, which are splashed by rain or carried by wind to young leaf and shoot tissues. The sporangia release zoospores (swimming spores) that need a film of water (rain or dew) to infect plant tissues. Infection by zoospores is relatively rapid and a wetting period of 2-3 hours is often sufficient. Zoospores infect the plant exclusively through the stomates (breathing pores on the leaf), which are mostly located on the lower leaf surface. Young leaves and berries are particularly susceptible, but become resistant to infection as they age.

Lesions appear within 5-17 days after infection, depending on the temperature. The fungus then sporulates on infected tissues under warm,

humid conditions (>98% humidity and >55°F) at night. The optimal temperature for sporulation is 65-72°F. On leaves, sporulation typically occurs on the underside of the leaf or rarely along veins on the upper leaf surface (this in contrast to powdery mildew, where sporulation mostly occurs on the upper surface). Lesions typically sporulate three times before turn brown and die. Rain is the principal factor driving epidemics. Temperature plays a less important role by retarding or accelerating the development of the disease. The most serious epidemics occur when a wet winter is followed by a wet spring and a warm summer with cloudy days and intermittent rainstorms every 8-15 days. Since the generation time of the fungus can be as short as 5 days under optimal conditions, this can lead to "explosive" disease development. Once the weather turns warm and dry, the downy mildew fungus goes "on vacation" and may not be very active until favorable conditions return in late summer and early fall. Often, in late summer, heavy dews at night promote disease development

Disease monitoring. Since downy mildew can develop explosively under conducive conditions, frequent disease monitoring is important even when fungicide sprays have been applied. Scout several rows in various places in a vineyard. Visually scan leaves and clusters, and also look for symptoms on tendrils and shoots. Early in the season, lesions may be most visible on leaves and shoots close to the ground, but later on, they may appear higher in the canopy. If you see yellow lesions, turn the leaf over to look for white sporulation on the lower leaf surface. If no sporulation is present, it may be that the lesions are still young and conditions have not been right yet for sporulation. Occasionally, low-level paraquat herbicide injury may resemble downy mildew lesions but these spots do not show sporulation. Also, in the case of herbicide injury you'll see typical necrotic lesions associated with paraquat injury on the same or nearby leaves. If you are not sure of the cause, remove symptomatic leaves and place them in a plastic bag with a moist paper towel at room temperature (68-75°F) overnight. If it is downy mildew, white sporulation should become visible on the underside of the leaf within 1 or 2 days.

Control options. Fungicide sprays for downy mildew are recommended for susceptible varieties, especially in vineyards where the disease has been found. Be careful with young vines as downy mildew can defoliate and greatly decrease winter survival. Be extra careful with young vines in grow tubes as the tubes

provide excellent conditions for disease development. Keeping the disease from defoliating vines may also be important after harvest to allow the vines to build up maximum reserves for the winter. In general, juice grapes are able to withstand more disease than wine grapes, especially if the crop is light. If the crop is heavy, the vines will be more stressed and brix and cane cold-hardiness may be reduced by downy mildew destroying part of the leaf area. If downy mildew has been found in your vineyard, don't allow the disease to develop to epidemic proportions before taking action. Listed below are some characteristics of fungicides that may help you decide which ones are most appropriate. At this point, it may be too late to use fungicides with extended pre-harvest intervals.

- **Abound** (azoxystrobin), **Pristine** (pyraclostrobin + boscalid), **Sovran** (kresoxim-methyl) (strobilurins/Quinone outside inhibitors; systemic or locally systemic; 14-day PHI). Very good to excellent preventive activity (~14 days), limited post-infection activity so would be better applied on a preventative basis. Strobilurins will reduce sporulation in existing lesions, thus slowing the epidemic. Abound is phytotoxic to apples, Pristine is phytotoxic to 'Concord' and some other Labrusca-type grapes; Sovran is phytotoxic to some sweet cherry varieties.
- **Aliette, ProPhyt, Phostrol, Agri-Fos** (salts of phosphorous acid) (phosphites; highly systemic; 0-day PHI; Aliette: 15-day PHI), good to excellent preventive and curative activity. systemic and highly mobile within the plant. They have at least 4 days of curative activity and 7-10 days of protective activity. These products do not eradicate active lesions, but can reduce spore production. Use higher rate if applying after an infection period. Research in New York has shown good to excellent disease control on a 14-day schedule, except on highly susceptible varieties, which may require more frequent sprays. When using after infection, applying a booster spray 5 days after the first spray improves efficacy. There is a risk of phytotoxicity when applied to plants under stress or at high temperatures. Do not tank-mix with copper products, Quintec, surfactants or foliar fertilizers. There are many other generic versions available – compare by looking at the phosphorous acid equivalent).
- **Captan** (captan) (phthalimides; protectant; 0-day PHI): good preventive activity; not allowed on juice grapes after bloom by some processors; suspected carcinogen.
- **Copper** (copper) (inorganics; protectant; 0-day PHI; 24-day REI): good preventive activity, some grape varieties are sensitive to copper, especially under cool, slow-drying conditions. Specific formulations can be used in organic vineyards.
- **Dithane, Penncozeb, Manzate** (mancozeb) (EBDC's; protectant; 66-day PHI): good preventive activity; however, the long PHI precludes their use late in the season. Also, EBDCs are not allowed on juice grapes after bloom by some processors; suspected carcinogens.
- **Forum** (dimethomorph) (carboxylic acid amines; systemic, 28-day PHI): new fungicide for control of downy mildew in grapes. Use Forum as a preventive application before infection occurs. The minimum application interval is 7 days. Performance may be improved by using Forum as a tank mix with another fungicide. The addition of a spreading/penetrating adjuvant is prohibited. Do not make more than 5 applications per year, and no more than one application before switching to a fungicide with a different mode of action. Forum has not been evaluated for disease control in Michigan but is used widely in Europe for control of downy mildew.
- **Gavel** (zoxamide + mancozeb) (benzamides and EBDC's; protectant; 66-day PHI): broad-spectrum protectant fungicide. Addition of an agricultural surfactant will improve fungicide performance. Do not make more than 8 applications per acre per season. Consider Gavel and all other EBDC fungicides in observing the maximum seasonal use rate recommendations for mancozeb. Gavel was effective against downy mildew in grape trials in Michigan but its use is limited later in the season because of the 66-day pre-harvest interval.
- **Presidio** (fluopicolide) (acylpicolides; systemic, 21-day PHI) is a new fungicide which very good protective, curative, eradicated, and antispore properties. Presidio is compatible with many fungicides and insecticides and is rainfast in 2 hours. No more than two sequential applications are allowed. A tankmix with another fungicide with a different mode of action must be used with Presidio for fungicide resistance management.
- **Ranman** (cyazofamid) (Quinone outside inhibitors; locally systemic, 30-day PHI) is a new fungicide for control of downy mildew in grapes. Ranman has limited systemic activity, so it should be applied in a preventive mode. Apply on a 10-14 day schedule when conditions are favorable for disease development.
- **Reason** (fenamidone) (Quinone outside inhibitors; systemic, 30-day PHI) is a new broad-spectrum fungicide related to the strobilurins, which may result in cross resistance. Reason has not been evaluated in Michigan yet, but has shown good control of downy mildew in other states.

- **Regalia** (extract of *Reynoutria sachalinensis* = giant knotweed) (plant extract; protectant, 0-day PHI) is a biofungicide that is OMRI approved for organic production. It is labeled for broad-spectrum disease control in grapes. The proposed mode of action is by increasing the plant's natural defenses. This induced resistance is not systemic throughout the plant but limited to the leaf it is applied to. The resistance reaction takes 1 to 2 days to develop. Regalia should therefore be used as a preventative treatment. In past trials in grapes with a different formulation, Regalia showed moderate control of downy mildew.
- **Revus** (mandipropamid) (carboxylic acid amines; systemic, 14-day PHI) is a fungicide which is active against diseases caused by downy mildew. Revus Top is a pre-mix of mandipropamid and difenoconazole, a powdery mildew fungicide. It has preventative and limited curative properties. A maximum of four sprays and two sequential sprays is allowed. The addition of a spreading/penetrating type adjuvant such as a non-ionic based surfactant or crop oil concentrate is recommended. Do not apply Revus Top to Concord, Thomcord or Noiret grapes due to phytotoxicity concerns.
- **Ridomil Gold Cu** (mefenoxam + copper) (phenylamides and inorganics; systemic + protectant; 42-day PHI), **Ridomil Gold MZ** (mefenoxam + mancozeb) (phenylamides and EBDs; systemic + protectant; 66-day PHI). Ridomil Gold has excellent preventive and curative activity (i.e., it will stop development of lesions before and after symptoms start to show). It also stops or reduces sporulation in developing and existing lesions. It has up to 21 days of protective activity. However, the pre-harvest interval may preclude their use at this time of the season. Consider your earliest estimated harvest date to decide if these are still an option.
- **Serenade Max** (*Bacillus subtilis*: biocontrol agent; protectant; 0-day PHI): moderate to good preventive activity, especially when applied with Nu-Film-P or similar spreader-sticker. Good coverage is important for control. Serenade has no maximum seasonal application rate. Approved for use in organic vineyards.
- **Tanos** (famoxadone and cymoxanil) (strobilurins and cyanoacetamide-oximes; systemic, 30-day PHI) has curative and locally systemic properties against downy mildews. Tanos rapidly penetrates into plant tissues and is rainfast within 1 hour of application. It must be tank-mixed with a contact fungicide labeled for that crop (e.g., mancozeb, captan or copper). A maximum of 9 applications of Tanos including other group 11 (strobilurin).
- **Ziram** (ziram) (dithiocarbamates; protectant; 21-day PHI): good preventive activity. Apply on a preventive basis. Susceptible to wash-off by rain.

Timely vine canopy management: Early summer vineyard tasks

After a cool and cloudy spring that brought an abundance of moisture to all parts of the state, summer is slowly kicking in. Signs of fruit-set in the NW part of the state are gradually appearing while SW Concord and Niagara vines are at pea-sized berries and wine grapes are at fruit set. At the South West Michigan Research and Extension Center (SWMREC) in Benton Harbor, we are (06/27/11) at 808 GDD base 50 from April 1 (Table 2). We will probably be at 1200 GDD in about 2-3 weeks (2nd, 3rd week of July) and grape berries in Concord will be at 50% of their final berry size (Figure 5).

As reported in the last newsletter, this year we have a very heavy grape crop in Concord and the season is developing as a cool season (Figure 5). As discussed, it will be hard to fully ripen a heavy crop to industry standards and growers should consider a crop estimation practice (at 1200 GDD) and a thinning program to target yield levels that will assure fruit quality.

Table 2 reports the GDD accumulated at the end of the seasons (October 31st) and on June 27th at SWMREC (calculated from April 1st, with base 50F), over the last 10 years. 2011 and 2003 are the years that show the lowest values (\approx 800 GDD). A correlation analysis (Figure 6) between GDD accumulated on June 28th and at the end of the season, shows a positive trend ($r^2=0.75$), projecting 2011 (the white dot in the graph) to 2636 GDD (10-yr mean 2920 GDD), just 89 GDD higher than 2009, the coolest season of the last 30 years in Michigan.

A potential excess crop in 2011 coupled with a poor growing season could make a considerable amount of this year's crop unsalable for juice grape growers and potentially low quality fruit in wine varieties, especially late ripening reds. Under these conditions, it will be crucial to achieve a physiological balance between vine growth and reproduction to obtain maximum fruit maturity and quality. In order to achieve such balance, vine canopy management will play a central role during this summer. Considerable research has been done and continues today, to provide growers with timely management protocols that are easy to use.

Canopy management is a term used to describe the modification of a grapevine's natural canopy growth. It is directly related to row and vine

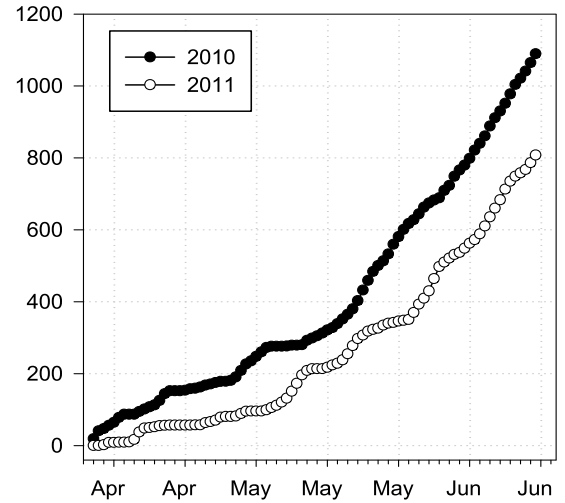


Fig. 5. Growing degree days (GDD) on June 27th in 2010 and 2011. In 2010, 1200 GDD were reached at the beginning of July, while in 2011 will be reached probably in second or third week of July.

spacing, rootstock choice, training and pruning practices, irrigation, fertilization, and summer activities (shoot hedging, shoot thinning, and leaf removal). Grapevine canopies are determined by the training system (single-canopy system, divided canopy system) and can be described by several physiological parameters: height, width, exposed leaf surface area, number of leaf layers, and shoot density (the number of shoots per unit length of canopy). In general, dense grapevine canopies can create an unfavorable microclimate, evidenced by temperature, humidity, wind speed, and amount of sunlight. In Michigan a

Table 2. GDD (Growing Degree Days at SWMREC) accumulated on June 27th and at the end of the season (October 31st). The value for 2011 at 10/31 is calculated from the regression equation in Figure 6.

YEAR	GDD on 06/27	GDD on 10/31
2000	938	2871
2001	952	2931
2002	939	3146
2003	777	2725
2004	933	2765
2005	1047	3275
2006	887	2767
2007	1097	3268
2008	850	2756
2009	891	2547
2010	1090	3243
2011	808	<u>2636</u>

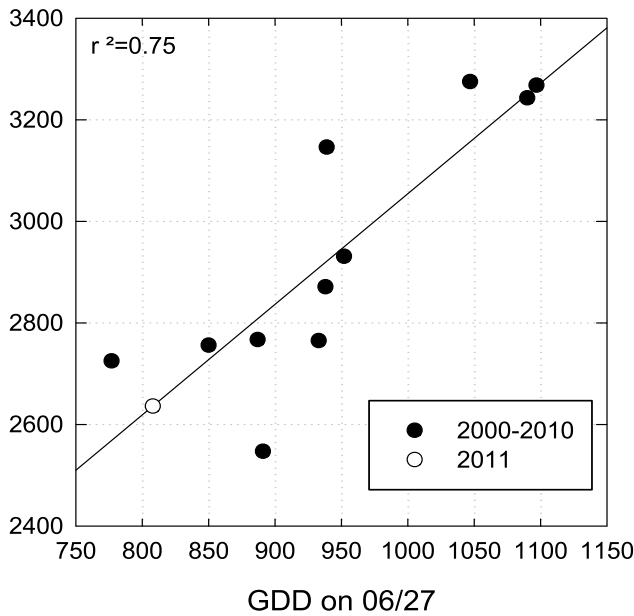


Fig 6. Correlation between GDD on 06/03 and GDD at 10/31. The white dot is 2011. The value for 2011 at 10/31 is calculated from the regression equation.

classical shoot positioning trellis (VSP) with 20-35 buds in red varieties and 35-45 buds in white varieties left at winter pruning, will produce an optimal shoot density of 3-5 shoots per foot of canopy (Figure 7).

Grapevine leaves absorb approximately 90 percent of incident sunlight, and use it for photosynthesis (sugar production). The exterior leaves of the canopy absorb large amounts of sunlight but transmit very little to the leaves deeper within the canopy. Shaded leaves are using more carbohydrates (for cellular respiration) than they produce through photosynthesis. Unfortunately, shade also reduces the fruitfulness of developing buds (at the base of the growing shoots). Thus, yields from vines with dense canopies can be significantly lower the following year, than those from vines having a good shoot distribution along the cordon. In a vine with a uniform and equilibrated shoot density, clusters receive ample sunlight. Fully exposed fruit can be heated by solar radiation to a temperature 10-20 degrees F higher than that of the surrounding air. That warming is very useful in cool climate regions in reducing fruit acidity and accelerating sugar accumulation.

Richard Smart is a pioneer in research on vine canopy characteristics and their impact on fruit and wine quality. He formalized a series of principles for understanding canopy management, which are always useful to remember:

Principle 1: Vines should be spaced and trained to maximize the amount of leaf area exposed to sunlight and to facilitate a rapid development of canopy leaf area in the spring. Vineyard productivity increases when the percentage of available sunlight intercepted by vine leaves (rather than by the vineyard floor) increases.



Fig. 7. MSU Viticulture students at SWMREC working on Pinot noir vines trained with a VSP system. At fruit set, shoot removal (short and sterile shoots) are removed, shoot positioning is performed timely to avoid canopy congestion. Suckering and leaf pulling is also performed. In red varieties we are leaving 1 cluster per shoot, to optimize ripening and flavor development, especially in this cool season. Vines were pruned to 45 buds and they will be crop adjusted 30 days after fruit set (end of Stage I in berry growth; cell division phase), to minimize the effect of yield reduction on berry size compensation and cluster compactness.

Canopies need to be trained vertically to tall, thin walls of foliage. Rapid leaf area development is promoted by retaining a relatively large number of short shoots on each vine, as opposed to a relatively few long shoots. In Michigan, this principle involves a lot of attention to spur spacing, position and renewals. For VSP vines 20-40 buds per vine is suggested (in relation to the variety, or for Pendelbogen - cane pruned - 15-25 buds per vine) and removing of clusters from week shoots that are less than 10 inches long after fruit set is essential. Also, cordon suckering and removal of non-count shoots, to avoid canopy congestion is important before the end of June.

Principle 2: Rows and canopies should not be so closely spaced that one canopy shades the renewal region of adjacent canopies. The ratio of canopy height to alley width should not exceed 1 to 1. The renewal zone (the current season's fruit zone) should be under the light to favor bud development.

Principle 3: Canopy shade has to be avoided, especially in the fruit and renewal zone. Leaves and fruit should be exposed to as uniform a microclimate as possible. Canopy shade can significantly reduce fruit and wine quality. The negative effects of shade on fruit composition include elevated levels of potassium, pH, and titratable acidity, reduced pigmentation, reduced concentrations of phenolic and soluble solids. Shade retards the development of varietal character and imparts vegetal characters to the fruit and wine. This means that in Michigan we should perform leaf pulling when the berries are no bigger than pea size and our

cluster thinning by veraison to fine tune the vine crop level (and green drop post-veraison). Leaf removal from the area around fruit clusters is fundamental in cool climate viticulture. Leaves are removed between fruit set and véraison; early leaf removal must be repeated to keep fruit clusters open, however, post-veraison leaf pulling can result in sunburn. Generally, only 3-4 leaves per shoot are removed.

Principle 4: Shoot growth and fruit development should be balanced to avoid either too much or too little leaf area in relation to the weight of fruit. Excessively vigorous vines produce large shoots “bull-canes” (relatively large in diameter, with long internodes, large leaves, and a tendency to develop several lateral shoots), resulting in dense canopies. Insufficient vigor typically results in stunted shoots that have insufficient leaf area to ripen the crop. Balanced *vinifera* vines have a ratio of crop weight to cane pruning weight of 10-12. Summer pruning is one of the tools to achieve the principles described by Dr Smart and one of the most important to overcome ripening challenges in our cool climate. Therefore, during this early summer will be pivotal to observe your vineyard carefully and implement timely several tasks:

1. Always walk in the vineyard monitoring for insect and diseases (see Dr Schilder and Dr Isaacs contributions in this newsletter). *The difference between a good grape growers and mediocre grape grower is in the number of boot footprints in the vineyard* (Dr. Howell, 2007 and several other times....)
2. The season is wet and cloudy. This exacerbates vine growth (long internodes, big leaves), be careful with your N fertilization. If the vines show specific nutrient deficiencies, evaluate a foliar spray program. Berries will start to grow rapidly in the next few weeks, try to avoid weeds that will compete with the vines for water and nutrients.
3. Canopy management = good leaf and cluster exposure! The season is cool, leaves and clusters need to be as warm as possible; the goal for the canopy is to turn the light energy into chemical energy (carbohydrates) during leaf photosynthesis. Work on shoot positioning or combing, leaf pulling, tying and anything will help to maximize light interception. *The difference between a good grape growers and mediocre grape growers is a week* (Dr. Howell, 2007 and several times more....)

4. Evaluate the potential yield level of your vineyard. You need to achieve the crop load (ratio between fruit and leaf area) optimal for our climate as described above.

References

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- Smart, R. E., and M. Robinson. 1991. *Sunlight into Wine: A Handbook for Wine Grape Canopy Management*. Winetitles, Adelaide, Australia.

Exploring the potential and promise of Michigan as a fine wine growing state

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The grape and wine industry in Michigan is still very young, and, much like a youngster, is still trying to figure out what it wants to be when it grows up. Since the planting of its first commercial European *vinifera* wine grape vineyard in the '70s, Michigan has begun to realize its potential as a fine white wine growing region. In the early '90s, red wine production with *vinifera* grapes was initiated, opening the potential for a new era in the Michigan wine and grape industry.

Viticulture and enology researchers at Michigan State University (MSU) are expounding on that potential, experimenting with numerous grape cultivars that may grow well in the state's cool climate viticulture regions as well as make outstanding wines. A wine tasting workshop was held June 1st at the campus' Spartan Cellars, using wines made with experimental wine grape varieties being grown in the state. A capacity crowd of Michigan grape growers and winemakers from the four Michigan appellations filled the production floor of the winery. Twenty experimental wines were produced in 2010 at Spartan Cellars from the promising European grape varieties. The event was organized and coordinated by Paul Jenkins, MSU grape and wine integrator and the wines were produced by Bill MacDonald, MSU winemaker, using standard micro-vinification techniques.

"As part of the National NE 1020 Project, wine grape variety trials were established in southwestern and northwestern Michigan in 2008 to evaluate their potential for commercial production," says Paolo Sabbatini, assistant professor of viticulture at MSU, and lead investigator of the project. "More than 20 experimental wines were made from these new varieties at the Spartan Cellars, a research facility in the Department of Horticulture, and this was the first opportunity to critically

examine their potential for commercial production in Michigan".

"Living in a competitive and globalized grape and wine trade, the market is the driving force for quality/cost ratio of our vineyard operations and wine production," he notes. "This is challenging for Michigan vineyard operators, grape growers and winemakers. The choice of grape variety and clones are, and will continue to be, pivotal factors to reconcile these difficult challenges and to build a national recognition as fine wine growing region in U.S."

During the workshop, Sabbatini notes that "the successful expansion of wine grape production in Michigan will depend on the possibility of growing appropriate varieties that fit site characteristic that produce consistently high quality wine." He believes grape variety recommendations are crucial, based on specific performance tested in the variety trials.

The variety trial project in Michigan is in association with the national project NE 1020, which involves more than 20 states in eastern U.S. and the West Coast. Entitled "Coordinated Wine Grape Variety Evaluations in the Eastern USA," the project's objectives are to (1) evaluate the viticultural characteristics and wine quality potential of grape cultivars and clones of economic significance throughout the eastern USA, and, (2) characterize the viticultural and wine quality potential of emerging cultivars based on regional needs.

Of the 32 varieties grown in northwestern Michigan at the Northwest Michigan Horticulture Research Station (NWMHRS) in Traverse City, and 25 varieties grown in the southwestern Michigan at the Southwest Michigan Research and Extension Center (SWMREC) in Benton Harbor (60% *vinifera* and 40% hybrids, 50% reds and 50% whites), nine – common in the two plots – were featured at the event tasting. These wines were compared by region (appellations) in the state, and to a commercial example of that varietal available on the U.S. market. Two keynote speakers – Chad Thomas, partner at U.S. Wine Imports of Ann Arbor, and Steve Scheffel, president and wine manager at Goodrich's Market of East Lansing – gave their perspective on the potential for new Michigan wine varieties for Michigan from an importer and a retailer point of view, respectively. The workshop was opened with a welcome from Vance Baird, MSU Department of Horticulture chairperson, and Tom Fernandez, associate professor and coordinator for the Horticulture Teaching and Research Center at MSU.

Table 3. List of the varieties grown at the NWMHRS (Northwest Michigan Horticulture Research Station in Traverse City) and at SWMREC (Southwest Michigan Research and Extension Center in Benton Harbor). *Vinifera* vines are grafted on 101-14 rootstock, and hybrids are own-rooted. *Vinifera* is trained as VSP (vertical shoot positioning) and hybrids as high cordon, planted 6 – 8 feet apart, in rows 10 feet apart, respectively.

NWMHRS	SWMREC
Albariño	Albariño
Brianna	Barbera
Cab Franc	Brianna
Chambourcin	Cabernet Sauvignon
Cinsault	Dolcetto
Corot Noir	GM 311
Dornfelder	GM 318
Frontenac	GR 7
Gruener Veltliner	Gruener Veltliner
La Crescent	Lagrein
Lagrein	Marquette
Madeline Angevine	Marsanne
Moscato Canelli	Merlot
Moscato giallo	Muscat Blanc a Petits Grain
Muscadella du Bordelais	NY76.0844.24
Muscat Ottonel	Petite Syrah
Noiret	Rousanne
NY76.0844.24	Sauvignon blanc
NY81.0313.17	Sauvignon blanc musque
Orange muscat	Sauvignon Gris
Pinot Noir	Semillon
Rkatsiteli	Tempranillo
Semillon	Teroldego
Siegerrebe	Tocai Friulano
St. Croix	Valvin Muscat
Teroldego	
Tocai Friulano	
Touriga National	
Vidal	
Zweigelt	
Fiano	
Feher Szagos	

Viticulture performance (vine size, yield, cluster size, and basic fruit chemistry) and wines tasted came from the grape varieties Rkatsiteli, Sauvignon blanc musque, Muscat blanc, Tocai Friuliano and Gruener Veltliner (whites) and Teroldego, Zweigelt and Lagrein (reds).

The varieties included in the tasting were selected by Sabbatini based on their history in internationally European renowned cool-climate growing regions and potential for success in Michigan’s climate. “I chose these varieties for the workshop because I believe they fill two important gaps for our industry: more aromatic

whites, and more reds with better color, structure and mouth-feel,” Sabbatini says.

The wines received several positive comments from several winemakers and industry leaders in the state. G. Stanley Howell, MSU professor emeritus of viticulture and enology and one of the pioneering wine grape researchers in the state, noted that “This was the best event of its kind since the first one I did in the early 1970’s, demonstrating that there were grape varieties other than Labrusca adapted to Michigan and made good wine. I still maintain that, with over 300 publications of which over 100 were in reviewed journals, I did nothing for the Michigan wine industry of greater importance than variety trials”.

Based on several comments during the meeting, Sabbatini and Jenkins believe that this variety trial effort is of major importance to the future of Michigan’s wine and grape industry, especially for red wines. All three reds presented – Zweigelt, Teroldego and Lagrein – have a huge potential to add complexity to the red wines currently most important to Michigan – Pinot Noir and Cabernet Franc.

Sabbatini and his viticulture team at MSU hope that the trials will provide Michigan growers and winemakers with higher quality grape varieties from which to choose in planting, resulting in the production of higher quality wines which will enhance the competitiveness for Michigan appellation wines, regionally and nationally. Sabbatini believes that unknown varieties in Michigan will have the chance to stand on their own as a varietal wine in the near future if they produce outstanding cool-climate wines. Not too long ago, Petite Syrah, Syrah and Pinot Grigio were quite mysterious, and these varietals are increasing significantly in production and consumption in the U.S.

This year, the viticulture team at MSU will continue to collect data from the 2008 planting. Data collected on selected varieties will include yield at harvest, cluster weight, number of clusters per vine, clusters per vine with rot, and pruning weights. At harvest, measurements will be taken for basic fruit chemistry. Spartan Cellars will again produce wines from 8 to 10 varieties, following the NE1020 protocol for experimental micro-vinification. Winemaking data will be available and another tasting will be held in 2012. Sabbatini hopes to connect this event with surrounding states involved in the NE1020 project.

“The MSU viticulture team is aware that, as Shunryu Suzuki said ‘in the beginner’s mind there are many possibilities, in the expert’s mind there are few’, but as a research group they believe that to be successful and help a young growing industry, they need to ‘skate where the puck is going, not where it has been (Wayne Gretzky)’, says Sabbatini. “Grape variety trials not only are pointing out positive grape cultivar choices, but they

are taking the risk of evaluating cultivars not currently adapted for Michigan's climate or seem to be lacking in sufficient wine quality characteristics, which can save growers money and time."

Sabbatini says several people at MSU were pivotal in making this project happen. They include Nikki Rothwell and Tom Zabadal, the staff at NWMHRS and SWMREC Experiment stations, Craig Cunningham and Dennis Kotsekon of Cunningham Viticultural Services for plot maintenance at NWMHRS, the students and staff in the MSU Viticulture Research and Extension Program in the Department of Horticulture: Pat Murad (viticulture research technician) for plot maintenance and data collection; Bill MacDonald (winemaker) for producing the experimental wines; and graduate (Letizia Tozzini, Shijian Zhuang and Dana Acimovic) and undergraduate (Jake Emling, Lillian Franklin and Amanda Feighner) students for their passion for new varieties and for their help pouring wines at the workshop. This project would not have been possible without the financial support of the AgBioResearch (formerly Michigan Agricultural Experiment Station) and the Viticulture Consortium-East, as well as the challenge from several industry leaders, such as Charlie Edson of Bel Lago Winery and Lee Lutes of Black Star Farms to "find high-quality varieties for Michigan's cool-cold climate!"

New wine fundamentals explains wine sensory and the wine market

Ron Perry

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This past spring semester was the third opportunity we had at MSU to offer our HRT 430, "Exploring Wines and Vines" to MSU students. It is a popular wine appreciation course, modeled after one taught at Purdue University where it has drawn some 700 students per year for many years. In the course we cover the full breadth of wine including global history, sensory, production (winery and vineyard), primary wine production regions, including our Michigan industry. The course and its development was one of many recommendations that came from the Michigan Grape and Wine Industry Council's strategic plan in 2004. We have some 60 students each year enrolled in the course from a vast range of majors on the campus. An electronic textbook to support this course and a Hospitality Business course, "Hospitality Beverages" was written and implemented in 2011 (Borchgrevink, Carl and Ron Perry. 2011. Wine and Other Hospitality Beverages, Great Rivers Technology, Dubuque, IA ISBN 978-1-61549-184-1 (Online). In writing the ETextbook, and especially a chapter on wine sensory, we decided to contact Mr. Tim Hanni, Master of Wine and Wine

Educator who had developed a DVD and a series of seminar programs called Wine Fundamentals. Tim Hanni is an internationally renowned flavor expert and a professionally-trained chef, he is one of the first two resident Americans to successfully complete the examination and earn the title Master of Wine. He has been involved with wine and food-related businesses, education and research for over thirty-five years. Hanni is recognized for introducing the concept of the "umami" taste phenomenon to the wine and food community and he has lectured in over 27 countries around the world on the topics of flavor balancing, sensory sciences, wine and culinary history. We asked Mr. Hanni to provide us an update for our "sensory" chapter for the ETextbook. He brings a unique perspective on sensory physiology and anatomy often overlooked when it comes to wine. He discusses aspects of wine preferences which he suggests are primarily dependent on genetics, experiences and upbringing. He led a study conducted in California which reveals a major disparity between expert and industry opinions about wine quality and wine consumers. Having taught over 180 students in our wine course, I can say that his approach is valid and applicable. More importantly, I recommend all of wineries with tasting room businesses have staff review information on Mr. Hanni's web site. His work attracted the interest of Dr. Virginia Utermohlen, MD, Associate Professor at Cornell University, who has worked with him in identifying individual differences in taste and smell sensitivity related to a number of different aspects of personality, personal preferences and behaviors; including wine choices. The results of their collaboration metamorphosed into the segmenting of the human population and the wine market into four basic phenotypes based on physiological and behavioral criteria, **Sweet, Highly Sensitive, Sensitive and Tolerant** (explanation found at Tim Hanni's web site <http://www.timhanni.com/New-Wine-Fundamentals.html> (15 minute voice-over presentation). He further comments that following survey work and tastings, "We have uncovered a glaring error and misunderstandings by the wine industry that has led to the disenfranchisement of millions of consumers and a significant loss of market share to other beverages." To date, the industry message to consumers who prefer light, delicate and sweet wines is that they need to become more 'educated' and 'move up' to 'higher quality wines' such as dry wines. Our study demonstrates that physiological differences in human sensory anatomy are the driving force behind our wine choices and that the people with the greatest taste sensitivity may well indeed be sweeter wine drinkers and not the consumers of highly rated less sweet wines. The industry is guilty of alienating a large segment of consumers who frequently opt for other sweet beverages or even stop drinking wine altogether."

2011 NW Wine Grape 'First Friday' Meetings

Sponsored by Parallel 45 Vines & Wines
Info: Jay Briggs, 231-499-0763; Duke Elsner, 231-357-8353

August 5

3-5PM

2 Lads - Old Mission

Topics: MSU cover crop trials

NW Michigan Horticultural Research Station Annual Open House

August 25

NWMHRS - Traverse City

36th Annual ASEV-Eastern Section Conference

July 11-14

Sheraton Baltimore North Hotel - Baltimore, Maryland

(Symposium on July 12, Pest management: Impacts in the vineyard and winery)

Registration and information: <http://www.asev-es.org/>

Viticulture Field Day

July 27

9AM-5:15PM

\$25 - \$55

SWMREC - Benton Harbor

Sponsored by MSU Extension & Michigan Grape Society

More information: <http://agbioresearch.msu.edu/swmrec/news.html>

Wine Faults Workshop

Sensory analysis of wine flaws.

July 27

10AM-3PM

\$115

New York Wine & Culinary Center, Canandaigua, New York

More information: <http://nywcc.com/classes/know-your-faults-sensory-analysis-wine-flaws-one-d/>

2011 SW Grape Grower Meetings

Sponsored by MSU Extension
Info: Diane Brown, 269-605-6305

August 10

6-9PM

Dongvillo Vineyards - Berrien Springs

Topics: Insect management, sprayer coverage comparisons using UV dye.

Registration includes lunch, and is 15.00 per person/meeting, paid in advance, 20.00 paid the day of the meeting. Please register in advance with Linda Gustafson at the Berrien County MSUE office (269-944-4126). Checks should be made out to Berrien County MSUE and mailed to 1737 Hillandale Rd, Benton Harbor, MI 49022.

Great Lakes Fruit, Vegetable, and Farm Market EXPO

December 6-8

DeVos Place Convention Center & Amway Grand Plaza Hotel - Grand Rapids

More information: <http://www.glexpo.com/>

Midwest Grape & Wine Conference

February 9-12, 2012

St. Charles, Missouri

More information: <http://www.midwestgrapeandwineconference.com/>

Michigan Grape & Wine Conference

February 22-24, 2012

Amway Grand Plaza Hotel - Grand Rapids

More information: [MGWIC website](http://mgwic.org)