News you can use

New look, new format
This newsletter, formerly the Weekly IPM Scouting Report published by Steve Van Timmeren, has changed significantly for 2010. The Michigan Grape & Wine Newsletter will be published on Friday each week throughout the season. Look for the next issue on May 7th.

Disease management
When fruit clusters become visible, protect them from Phomopsis with a fungicide application.

Insect management
Scout for cutworms and grape flea beetle. Also set up your monitoring traps for grape berry moth if you use these in your management.

Grower meetings
Mark your calendars for upcoming grower meetings. See Page 14 for full details.

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<th>Event</th>
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<td>SW Juice Grape Pre-bloom Twilight Meeting</td>
<td>May 20</td>
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<td>SW Wine Grape Meeting</td>
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GROWING DEGREE DAYS
Base 50 from March 1

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See enviroweather.msu.edu for more information.
Southwest

Scouting in southwest Michigan this year will take place in the same four vineyards as in previous years. One of the sites is a Chardonnay vineyard located near Fennville. We have two Concord vineyards, one near Lawton and another near Berrien Springs. Our final vineyard is a Vignoles vineyard near Berrien Springs.

This week in the vineyards everything is still very quiet. No flea beetle adults were seen at any of the sites, although one bud was found with feeding damage at the Berrien Vignoles site. In past years the Berrien and Van Buren Concord sites have had quite a few adult beetles feeding on buds at the borders of the vineyards, so the lack of adults this year is noteworthy. Given the fact that many of the buds will be growing past the danger point soon, it doesn’t seem likely flea beetles will be much of a problem this year. However, make sure you check your own vineyards, especially along borders near the woods, to make sure you don’t have any hot spots.

As far as other insects are concerned, no cutworms or their associated damage were found at any of the sites scouted. Also, grape berry moth traps were set up in the vineyards last week and so far no adults have been caught.

Buds at the Berrien Vignoles site are at early to late bud swell depending on the vine and location within the vineyard. The Fennville Chardonnay site is mostly at mid to late bud well, although some buds on younger vines are beginning to burst. Buds at the Concord sites are at late bud burst with some secondary buds beginning to swell as well.

Regional Reports

Northwest

In Northwest Michigan, winegrapes are at bud swell and there is concern about frost and cold damage as the coming weeks have historically provided unpredictable weather, including potentially damaging cold snaps. On April 21st, temperatures dipped as low as 27°F with most of the region dropping to the low 30’s. As of April 21st we have accumulated 140 DD50 at the Northwest Michigan Horticultural Research Station (NWMHRS), compared to the 5-year average of 113 DD50. The NWMHRS weather station has recorded just over 2” of rain in April. No significant rainfall has occurred since 8 April, but rain is in the forecast for this coming weekend.

Bud swell provides a potential time for delayed dormant fungicide applications that can kill fungi and insects that have overwintered on the plant. Refer to the E-154 MSU Bulletin 2010 Michigan Fruit Management Guide for recommendations. Additionally, growers should be on the lookout for grape flea beetle (link to grapes.msu.edu article) and climbing cutworm (link to grapes.msu.edu article), both of these insects feed on and damage buds.
Hail and frost reduce crop in Van Buren and Berrien Counties

Mark Longstroth
MSU Extension, Southwest

Even though we are moving quickly into spring with a very warm April that has bud development moving quickly Mother Nature has already dealt Southwest Michigan Grape growers some significant setbacks. A hail storm moved through the area about midnight Monday night (April 5). Damage started in central Berrien County and moved east along the Cass, Van Buren county line into Kalamazoo and St. Joseph counties. There was lots of damage due to high winds. Large trees, especially conifers, which caught the wind were blown down. There were many reports of hail. There was severe hail damage in Porter Township, in Van Buren County. This hail punched holes in vinyl siding, and striped buds, shoot tips and young bark off trees and shrubs. Grape buds were at early swell. There are probably 1-2,000 acres of grapes south of Lawton affected by Monday’s storm. A lot of buds were knocked of the plants. Damage varies quite a bit from light damage to almost a complete wipeout.

Areas in that escaped the hail were caught by a freeze on the morning of Monday, April 19. Many grape buds were past early swell and at bud burst to one inch shoots. At this stage temperatures of 28F or below will freeze the young green shoots. Damage was widespread throughout Berrien and Van Buren counties but it appears that most of the losses were in lower sites or flat areas where cold air accumulated early Monday morning. The automated weather stations of the Enviroweather network are generally located at the tops and slopes of hills so they do not report the coldest sites during a freeze, but the warmest. Last year we added a station near Tea Pot Dome between Lawrence and Paw Paw. This station was deliberately sited in a large flat area located low in the topography to give us an idea of the lowest temperatures in the region. This site went to almost 25F indicting that the coldest temperatures in the Paw Paw region were as low as 25F and damage to grapes could be very significant. Damage to grapes in Berrien County followed a similar pattern. The lower areas suffered significant losses and also the flat areas west and south of Scottdale and Baroda. Apparently there was no off shore breeze from the west of Lake Michigan, but a slight breeze from the northeast that allowed cold air to collect on the flats.

We are still a long way from the end of the spring frost season which runs into mid May.
Insect management outlook for 2010: new tools for grape growers

Introduction
This article provides information for grape growers to consider for their insect management programs for 2010. There are some new tools available to help growers make informed management decisions, a few new insecticides have been registered in the past year, and some of our recent research points to improved/alternative methods for control of key pests of eastern US vineyards. I’ll try to capture the highlights in the article below.

I must acknowledge up front that this information comes from the dedicated work of Keith Mason, Steve Van Timmeren, John Wise, and Dan Hulbert, with generous assistance from Michigan grape growers who provided access to their vineyards for our research. Insecticide testing was done at farms and also at MSU’s Trevor Nichols Research Complex in Fennville, where we have been steadily increasing the grape acreage in recent years. Last but not least, our sincere thanks to the growers who turned out on a cold February 26 this year to help us prune those research vineyards.

New insecticides
There has been a rapid increase in the number of new insecticides registered for grape growers in the past 5-10 years. This can get confusing with all the new names, different spectrums of activity, and varying restrictions. MSU’s Michigan Fruit Management Guide (MSU Extension publication E154) is a comprehensive source of up-to-date information on all these new options that is updated each year, and it encapsulates our ranking of insecticides based on our experience in research trials. Keeping informed about the latest new options and what they can (and cannot) do for you is critical as the pest management landscape keeps changing.

Tourismo 3.5SC has been registered recently for use in grapes. This is Nichino America’s pre-mix of flubendiamide and buprofezin, one of many products that are being made available to grape growers that include components that are each active on parts of the pest spectrum. Having them together provides a wider coverage of grape pests. In this case, the combination is labeled at 10-14 oz/acre for control of cutworms, grape berry moth, and redbanded leafroller. Although not on the label, this would also be expected to control mealybugs and leafhoppers due to the growth regulator activity of buprofezin. Tourismo has a 7 day PHI and 12 hour REI. For this and all other pre-mixes, users need to consider the two different chemical classes are used when they are planning for resistance management in their spray program.

Movento 2F (spirotetramat) is a new selective insecticide from a new chemical class (the tetramic acids) from Bayer Crop Science. This has some interesting properties in the plant because it is two-way systemic, meaning that it can move both up and down in the plant. For some pests this should provide improved ability to control them, especially for grape phylloxera. Although not a major pest in Michigan vineyards, the canopy of some hybrid cultivars get heavily infested by the leaf form. Movento applied to the foliage provided excellent protection of the foliage in a trial we ran last year in SW Michigan in a Rougeon vineyard. The next important question is to determine whether use of Movento also provided control of the root form of phylloxera due to its movement to the roots, and we’ll be following-up that trial during 2010.

Movento has been subject to a cancellation order by EPA (see article in the April 21 CAT Alert for details), but this only affects delivery of new product to distributors. For this year, the uses on the label are legal (including uses in vineyards), and product that growers have already, or can get from distributors, can still be used.

Kelthane MF has been discontinued, but the 50WSP formulation is still registered.

Grape berry moth management
Our research group has been working intensively on improving control of grape berry moth in Michigan vineyards, and there are some important developments to share related to a degree day model to time applications and on the efficacy of some new spray programs. Combining degree day-based timings for berry moth sprays with use of selective insecticides has performed well in high pressure vineyards for a few seasons now. To implement this program, growers need to understand how to combine these components, as described below.

Degree day model. This has been developed in collaboration with Penn State and Cornell
researchers, and we are testing it across eastern US vineyards. The first step is to record when wild grape bloomed in your farm. This is typically ~10 days before Concord, but it is important to estimate 50% bloom on a patch of wild grape somewhere near your vineyard. This date will be used as the biofix, or starting point, for the model.

The next step is to track insect growing degree days (GDD) (we use a base temperature of 47°F for berry moth) from the biofix of wild grape bloom through the season until the predicted start of berry moth egglaying for the second and third generations of this pest. It is becoming increasingly clear that these mid- and late-season generations are the ones that cause the most problems for growers and are the ones that most warrant chemical control methods in high pressure vineyards. When egglaying starts in these generations, protection of the clusters should be considered in high pressure vineyards, and the degree day model is designed to help identify these points in the season.

To track degree days automatically, in Michigan we have the model available online at the MSU Enviroweather website. Go to www.enviroweather.msu.edu, select a weather station near your farm, click on fruit, then on grape, and then on grape berry moth to bring up the degree day model. This will bring up a table with dates across the top that overlap with the period of wild grape bloom in your region, and dates down the side that run from the spring until today, also with projected weather into next week. The second generation of grape berry moth is predicted to start egglaying 810 degree days after wild grape bloom, and the third generation is predicted 1620 degree days after wild grape bloom. Table 1 is an example from last year in the Traverse City area where wild grape bloom was on June 13, and the model predicted egglaying started for the second generation on July 26th. The table turns red when 810 or 1620 are reached to highlight the points when high pressure vineyards should be protected. If you look at the website now there will be little to see because we are not yet far enough into the season, but you can ‘play’ with this by requesting the page to show you a different date range, such as last summer.

**Research trial results.** During 2009, we ran a trial in southwest Michigan to use the model to drive spray applications in some small-plot research experiments at a high pressure vineyard. Figure 1 shows the results from two of the treatments in this trial. Untreated vines had almost 90% of the clusters infested by berry moth at harvest time, while our standard program (Danitol 10.6 oz on June 24th; Danitol 10.6 oz on August 11, Sevin 2 quarts on September 14) resulted in about a 40% reduction in cluster infestation. The best control was achieved in the GDD Intrepid program using no post-bloom insecticide, and targeting berry moth with the selective insecticide Intrepid at 8 oz/acre, timed using the degree day model at 810 and 1620 GDD after wild grape bloom (July 14 and August 18). These applications were made in equivalent of 50 gallons of water per acre to ensure cluster coverage, which is critical with this product. This year with the warmer season we seem to be having, these dates for predicted start of egglaying may be earlier in SW Michigan. This program resulted in almost 90% control of cluster infestation.

When comparing the cost of these programs, considering only the insecticide cost, the standard program was about $50 per acre and the GDD Intrepid was about $40 per acre. Prices are going down a little on intrepid this season and there are cheaper pyrethroids than Danitol, so growers may be able to find even less expensive ways to put together standard or Intrepid-based programs. Still, the low infestation in the program where intrepid was applied using the degree day model timings should provide some guidance on how to approach berry moth control in 2010.
Testing On-Farm. As the degree day model continues to be refined for growers to use, we have realized that the timing of insecticides that need to be applied at the start of egglaying (810 and 1620 GDD) such as Intrepid should be different than those broad spectrum insecticides that work well timed for egg hatch. For these broad-spectrum insecticides we recommend delays of 100 GDD past predicted start of egglaying (910 and 1720) to help ensure these products provide their greatest control. Testing this approach in programs that growers can implement and afford, we ran some vineyard-scale trials in 2009 with the help of four southwest Michigan growers. Comparing the infestation from berry moth with a standard program (Brigade post bloom; Sevin at 910 GDD; Imidan 1720 GDD) to an IPM program that combined the degree day model with new insecticides (Brigadier immediately post bloom; Intrepid at 810 GDD; Altacor at 1620 GDD). These two programs resulted in an average of 55% (standard) and 32% (IPM) cluster infestation at the vineyard borders, even with one grower missing the right timing in his IPM program vineyard due to sprayer malfunction. In this case the Intrepid and Altacor were applied only to vineyard borders to keep the cost comparable and to target berry moth where the infestation is highest. Even with two growers needing an application of Assail for beetle/leafhopper control, the IPM program cost $32 per acre in insecticide costs and $44 per acre for the standard program applied to the whole vineyard.

Using this degree day model for berry moth management will be discussed through the season in this newsletter and in summer extension meetings as we track the development of wild grape bloom, prediction of second and third generation, and results of our ongoing studies. Any feedback on the model and it’s ease (or difficulty!) of use can be directed to me at isaacsr@msu.edu

Check back in the newsletter through the season for more information on management of other vineyard insect pests.

Monitor grape buds for climbing cutworm and flea beetle damage

Two important insect pests of grapevines become active around the time of bud swell, and both have the potential to cause damage to early growth if populations are high. Warm weather has brought bud swell to Michigan vineyards in the past week, and there have been some isolated reports of cutworm damage in the southwest region. The main risk period is during bud swell, and cool nights are ideal for activity of cutworms. Warm sunny days can bring activity of flea beetles. The next few weeks will be an important time to scout vineyards for these two pests, to determine whether management is needed.

Cutworms. The term cutworm covers many species in the moth family Noctuidae, and as their name suggests, these insects are nocturnal. Vineyards on light-textured soils are often the most heavily infested. Both the adults and the larvae are active at night, and the larvae can climb up onto vines during very cool night-time conditions. During the day, cutworms hide in the soil or leaf litter, and can be found in the top layer of soil. Many of these insects feed on weeds, but some climb the stems of plants to feed on buds and other young foliage. These climbing cutworms are the ones causing damage to grapevines. Direct observation of feeding by the larvae requires a late-night trip to the vineyard, but their damage is quite easy to see. In Michigan vineyards, the spotted cutworm, Amathes c-nigrum, is our main pest species, and the larvae feed on buds and may also feed on leaves until the shoots are 10 to 15 cm long. However, it is the feeding on small buds that has the greatest potential for economic damage.

Cutworm feeding on a bud can reduce the crop by 1-2 clusters so the high potential for rapid damage by cutworms requires that growers make good management decisions. 2-5% percent bud injury is an economic threshold for an insecticide treatment in juice grapes to prevent further damage, so vineyards should be scouted during the period of bud swell to identify regions with cutworm pressure (see below).

Flea beetle (Steely beetle). This small beetle attacks buds (Fig 2.) of both wild and cultivated grape, and is another early season grape pest. The adult beetles move to the vines at bud swell, and usually are localized within the vineyard, especially at vineyard borders. Sites near overwintering habitats such as woods or abandoned vineyards are especially at risk. Beetles are most easily seen during warm sunny weather when they tend to be on the top of vines, usually mating or feeding on canes and buds.

Adults are shiny dark blue, about 4-5 mm long, and...
have strong hind legs that enable them to jump if disturbed (hence the name). The overwintering adults cause the greatest damage by boring into developing buds and hollowing out the inside, while the larvae and summer adults feed on leaf tissues. Bud feeding is similar to that caused by cutworms, with similar effects to the vine (see above cutworm description).

Wherever possible, cleaning up overwintering sites (wasteland and woodland) near to vineyards can help combat grape flea beetle. Early season (immediate post-bloom) sprays for grape berry moth will also help to reduce the later larval populations of this insect.

Scouting for bud damage. Growers should watch for damage by cutworms and flea beetle, especially if the vines remain in the susceptible bud swell stage for a while during cooler weather. Cutworms tend to be more of a problem in sandy sites, so these should be prioritized for scouting. Both cutworms and steely beetle can cause damage quickly if the temperatures warm up, and since they are difficult to catch “in the act,” regular scouting for the first signs of damage is essential to prevent significant bud loss.

An action threshold of 2% damaged buds is recommended in juice grapes, and this can be determined by sampling 10 buds on each of 10 vines spread through the vineyard. Thresholds in winegrapes may be lower due to the higher value of the crop, but there has been little formal research on this topic. Still, it is clear that the potential damage justifies scouting and management if cutworm damage is detected.

Once the shoots get past bud burst and into the 1-3 inch range the danger from flea beetles and cutworms is diminished significantly.

Cultural control. Vineyards that are weedy tend to have more cutworm problems, presumably because the larvae have more places to hide and conditions are better for them. Weedy vineyards also provide more places for the cutworms to hide from sprays applied for their control, so improving weed control is one component of an IPM program to reduce cutworm damage.

Although it may be too late for this year if you have finished pruning, leaving some extra buds is a potential strategy for hedging your risk against cutworm (and frost) injury. Scouting is still required though, to make sure the damage doesn’t exceed the number of extra buds left behind.

Chemical control. An appropriate insecticide application should be considered if scouting shows significant damage is occurring, and assessments of damage should include wooded borders where flea beetle pressure may be higher, and areas where cutworms have been a recurring problem.

The special local needs label for Lorsban 4E for cutworm control in Michigan expired in 2009, but Lorsban Advanced is labeled for cutworm at 1 quart per acre. There are also a number of pyrethroid insecticides registered for use against cutworms including Mustang Max (2-4oz/acre), Danitol (10.6oz/acre), and Brigade (3.2-6.4oz/acre) that provide excellent control of cutworms and flea beetle. Sevin is also registered for use against flea beetles and has performed very well in observations of treated vineyards at 2 qts/acre.

Recent research in Washington State vineyards has shown excellent protection against cutworms using only trunk sprays of a pyrethroid. This approach targets the spray on the surface that larvae have to climb up to reach the buds and it also reduces the cost of application. However, it is important to realize that this approach will not protect the upper canopy from flea beetle feeding injury.

For photos of grape flea beetle and cutworm damage to grapes, see the pages at the grapes.msu.edu website:

www.grapes.msu.edu/cutwm.htm

www.grapes.msu.edu/fleabeetle.htm
2010 Fungicide update for grapes

There are various trends in crop protection worldwide that are changing the landscape for grape fungicides. We have seen an overall increase in new fungicide registrations over the past two years. One distinct trend is that there are more downy mildew fungicides on the market due to outbreaks of cucurbit downy mildew in the United States. Since these fungicides also work well against downy mildew in grapes, we are now seeing a range of new products for grapes, e.g., Presidio, Revus, Tanos, Forum, and Ranman. The threat of soybean rust, an invasive disease of soybeans, has speeded up the review of sterol inhibitor fungicides by the EPA and led to the registration of several new SI products for grapes, including Mettle. Growers may also have noticed that commonly used fungicides, like mancozeb and copper have become more expensive – one of the reasons is the increasing price of copper worldwide. Furthermore, the number of natural fungicide products, including biological control agents and plant extracts (e.g., Regalia), has been steadily increasing. This has increased the number of disease control options for organic grapes.

Generic fungicides are now becoming more common since the patents have run out on a number of older fungicides. Examples of these are Legion, Nevada, Orius, TebuStar and Tebuzol. An article discussing generic fungicides will appear in the next issue of this newsletter and more information can also be found in the Michigan Fruit Management Guide (E-154). In order to extend fungicide patents, companies have started developing pre-mixes of different fungicide active ingredients. These pre-mixes also have a broader spectrum of activity than single-ingredient products and are convenient to use. An example is Adament, which is a pre-mix of Flint and Elite.

Adament (tebuconazole and trifloxystrobin) is a mixture of a systemic (tebuconazole) and surface-systemic (trifloxystrobin) fungicide. It is a broad-spectrum fungicide that is labeled for control of multiple diseases on grapes, cherries, peaches, and nectarines. Adament is rainfast when dry, generally within 2 hours. Adament is effective against cherry leaf spot, brown rot, and powdery mildew on cherries, and powdery mildew in grapes. It has excellent efficacy against powdery mildew (where fungicide resistance is not present) and black rot, and is moderately effective against Botrytis bunch rot. Adament is best used as a protectant. Do not apply this product on ‘Concord’ grapes, as crop injury may result. Do not make more than two consecutive applications or a total of six applications in grapes per season.

AgriStar Sonoma (myclobutanil) is a generic version of Rally (which used to be called Nova). It is labeled for broad-spectrum disease control grapes. Note that AgriStar Sonoma is not labeled for berry crops, whereas Rally is. The REI is 24 hours and the PHI is 14 days for grapes. The efficacy of this product has not been specifically evaluated in Michigan.

Forum (dimethomorph) is a new, systemic 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 may be applied through irrigation systems with restrictions (for instructions see the label). Forum is not for use in greenhouse and transplant production. The REI is 12 hours and the PHI is 28 days. Forum has not been evaluated for disease control in Michigan.

Gavel (mancozeb and zoxamide) is a broad-spectrum protectant fungicide with a supplemental label for control of downy
Gavel (mancozeb and zoxamide) is a broad-spectrum protectant fungicide with a supplemental label for control of downy mildew, bunch rot, and dead arm (this is an old term for a disease complex now known as Eutypa dieback and Phomopsis) in grapes. 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 fungicide efficacy trials in grapes in Michigan but its use is limited later in the season because of the 66-day pre-harvest interval.

Iprodione (iprodione) has the same active ingredient as Rovral. It is a contact fungicide with locally systemic properties for grapes. Thorough coverage is essential for effective control. Alternating Iprodione with fungicides with a different mode of action may delay the buildup of resistant pathogen strains. Do not exceed a 4-spray maximum for wine grapes and a 1-spray maximum for table grapes. The spray suspension should be applied within 24 hours of preparation and the pH of the spray solution should be buffered to 5.0-7.0 if necessary to prevent degradation of the fungicide. The efficacy of this product has not been specifically evaluated in Michigan.

Legion (fosetyl-Al) has the same active ingredient as Aliette. It is available as an 80 WDG formulation. This product is labeled for control of downy mildew in grapes. Do not tank mix Legion 80 WDG with copper compounds or apply to foliage that bears copper residues from previous sprays as this could result in phytotoxicity. Stickers, spreaders and wetting agents are not recommended with this product. Legion is acidic in nature and must not be tankmixed with acid-type compatibility spray adjuvants, such as Buffit Spray Aide, Triton AG-44M, or with adjuvants that aid foliar penetration, such as Herbex or Induce. The REI is 12 hours. The PHI is 15 days in grapes. This product has not been specifically evaluated in Michigan.

Mettle (tetcraconazole) is a new sterol inhibitor fungicide. It is a systemic fungicide labeled for control of powdery mildew and black rot in grapes. When a post-infection application is used for black rot, it is recommended within 72 hours of an infection period. Mettle is absorbed quickly into the plant tissue and is rainfast within 2 hours of application. Do not make more than 2 applications of Mettle to grapes per year. The maximum amount of Mettle allowed per season is 10 fluid ounces and there must be at least 14 days between applications. Do not apply Mettle through any kind of irrigation system. The REI of Mettle is 12 hours and the PHI is 14 days. Mettle is being tested for disease control in Michigan vineyards this year.

Nevado (iprodione) has the same active ingredient as Rovral. It is labeled for use against Botrytis bunch rot in grapes. The PHI is 7 days. The efficacy of this product has not been specifically evaluated in Michigan.

Nutrol (monopotassium phosphate; 50% P2O5 and 32% K2O) is a water-soluble fertilizer (0-52-32) as well as a fungicide against powdery mildew. This product is labeled for control of powdery mildew in apples, stone fruits, and grapes. It is a salt and acts primarily as a contact fungicide. Nutrol will not cause phytotoxicity, even at high concentrations. Nutrol is a non-toxic, environmentally friendly product that is exempt from residue tolerances. It can also be used as a pH buffer to prevent alkaline hydrolysis of pesticides. A 1% solution will have a pH between 4.5 and 6.0. Nutrol is compatible with most commonly used agricultural chemicals. The PHI is 0-days. This product has not been evaluated in Michigan.

Orius (tebuconazole) has the same active ingredient as Elite. It is labeled for use against black rot and powdery mildew in grapes and is available as Orius 45DF and Orius 45WP. The PHI is 14 days. The efficacy of this product has not been specifically evaluated in Michigan.

Presidio (fluopicolide) is a new systemic fungicide which is active against diseases caused by downy mildews and other oomycetes in grapes. This fungicide has a novel mode of action and has protective, curative, eradicative, and antisporelant properties. Presidio is locally systemic and translaminar and moves systemically via xylem tissue. Furthermore, Presidio is compatible with many fungicides and insecticides and is rainfast in 2 hours. The PHI for grapes is 21 days; 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 resistance management. Presidio has worked well against downy mildew in trials in Michigan.

Rampart (monoposyl and dipotassium salts of phosphorous acid; equivalent to 3.9 lb phosphorous acid per gallon) is a systemic phosphate fungicide labeled for downy mildew and powdery mildew in grapes. Application is foliar, aerially, as a root dip or through the irrigation system (with restrictions). Do not apply at less than 3-day intervals. Do not apply to plants that are dormant, or heat or moisture stressed. To avoid copper phytotoxicity, do not tank-mix with copper or apply to plants that have been treated with copper-based compounds at less than 20-day intervals. Allow foliage to dry completely after application. Do not apply when conditions favor wet tissue for prolonged periods >4 hours. The REI is 4 hours and the PHI is 0 days. This product has not been evaluated for disease control in Michigan.
Ranman (cyazofamid) is a new fungicide for control of downy mildew in grapes. Ranman has limited systemic activity, so should be applied in a preventive mode. Make fungicide applications on a 10-14 day schedule when conditions are favorable for disease development. Do not apply more than 6 sprays of Ranman per season and no more than 3 consecutive sprays before switching to fungicides with different modes of action for the next three applications. Do not use any surfactant with Ranman. Application water volumes for ground application should at least be 100 gal per acre. Ranman may be applied through irrigation systems with restrictions (for instructions see the label). The REI is 12 hours and the PHI is 30 days. This product has not been evaluated for disease control in Michigan.

Regalia (extract of Reynoutria sachalinensis = giant knotweed) is a plant extract-based 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 systematic throughout the plant but limited to the leaf it is applied to. The resistance reaction takes 1 to 2 days to develop. Light is required for best results. Regalia should therefore be used as a preventative treatment. Applications have to be repeated every 7-14 days to protect new growth. Regalia is labeled for control of downy mildew in grapes. Regalia has a 0-day PHI and a 4-hour REI. In past trials in grapes, Regalia was tested in a different formulation and showed moderate to good control of powdery mildew and Botrytis bunch rot. Regalia is being tested this year in grape trials in Michigan.

Revus (mandipropamid) is a new systemic fungicide which is active against downy mildew in grapes. 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. The PHI is 14 days for grapes. This product has shown good efficacy against downy mildew in grape trials in Michigan. Revus will soon be available as a pre-mix with difenoconazole (a sterol inhibitor) and will be called Revus Top.

Sonata (Bacillus pumilis QST 2808) is a protectant biofungicide that is OMRI listed and therefore can be used in organic production. Sonata is labeled for use against powdery mildew in grapes. Sonata has a 0-day pre-harvest interval and a 4-hour re-entry interval. Adding a terpene-based spray adjuvant, such as Nu-Film-P can improve coverage and control. If disease pressure is high, alternate or tank mix this product with other effective fungicides. Sonata has shown moderate to good efficacy (when tank-mixed with Nu-Film-P) against powdery mildew, downy mildew, and Phomopsis in grape trials in Michigan.

Sporan (rosemary oil, clove oil, thyme oil, wintergreen oil, lecithin, butyl lactate) is a broad-spectrum protectant fungicide for use in grapes. Sporan is OMRI listed so it can be used in organic production. Sporan has no re-entry interval and a 0-day pre-harvest interval. Diseases listed on the label are: powdery mildew, downy mildew, black rot, Botrytis bunch rot, and Eutypa dieback in grapes. In trials in Michigan, Sporan gave fair control of downy mildew and black rot.

Tanos (famoxadone and cymoxanil) is a new, broad-spectrum fungicide for control of downy mildew in grapes. It 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) fungicides is allowed per season. The PHI is 30 days for grapes.

TebuStar (tebuconazole) has the same active ingredient as Elite. It is labeled for control of black rot and powdery mildew in grapes. The PHI is 14 days. The efficacy of this product has not been specifically evaluated in Michigan.

Tebuzol (tebuconazole) has the same active ingredient as Elite and is available as Tebuzol 45DF. It is labeled for control of black rot and powdery mildew in grapes. The PHI is 14 days. The efficacy of this product has not been specifically evaluated in Michigan. See Elite.

Thiophanate Methyl (thiophanate methyl) has the same active ingredient as Topsin M. It is labeled for use against powdery mildew, black rot and bitter rot in grapes. The PHI is 14 days and the REI is 2 days. The efficacy of this product has not been specifically evaluated in Michigan.

Topaz (mono- and dipotassium salts of phosphorous acid; 3.9 lb phosphorous acid per gallon) is a systemic phosphite fungicide labeled for control of downy and powdery mildew in grapes. Do not apply at less than 3-day intervals. Do not apply to plants that are dormant, or heat or moisture stressed. To avoid copper phytotoxicity, do not tank-mix with copper compounds or apply to plants that have been treated with copper-based compounds at less than 20-day intervals. Allow foliage to dry completely after application. Do not apply when conditions favor wet tissue for prolonged periods >4 hours. The REI is 4 hours and the PHI is 0 days. This product has not been evaluated for disease control in Michigan.
There is still time for a delayed “dormant” spray against Phomopsis

There is still time for delayed dormant sprays in grapes thought the vines are technically no longer dormant. The goal of the dormant spray is to kill fungal pathogens that overwinter in the woody parts of the vine. While it is not possible to kill all of the fungus inoculum, it is possible to make a dent in spore-production, reducing disease pressure during the growing season. In most years we have seen a benefit from dormant sprays, but the degree has varied (~10 to 70%). Results tended to be better during relatively dry springs than very wet springs. An early mancozeb spray (1-2” shoot growth) may also work to kill fungus inoculum in addition to protecting new growth.

In 2005, we tested whether applying “dormant” sprays at 1-2 inches of shoot growth was still effective at reducing Phomopsis in ‘Niagara’ grapes (Table 1). The difference in spray timing was only 11 days that year, however. A reduction in rachis infection at harvest was seen for both Sulfur 6L and Cuprofix. While Cuprofix at 1-2” shoot appeared somewhat less effective, the differences were not statistically different, which means that they could have been due to natural variation in the vineyard. The season-long fungicide spray program was the most effective at reducing Phomopsis at harvest.

We did not see any phytotoxicity as a result of the treatments in ‘Niagara’ grapes, even when applied at 1-2 inch shoot growth. ‘Niagara’ and ‘Concord’ are only slightly copper sensitive. The risk of copper phytotoxicity to green leaves is greater under cool, wet, slow-drying conditions which allow copper ions to be absorbed by the leaves. Concord is sulfur sensitive, but sulfur phytotoxicity is much more likely at temperatures above 85-90°F which are unusual at this time of the year.

To get the maximum benefit out of dormant sprays, it is important to ensure thorough coverage of the canes by focusing nozzles of spray equipment only on the cordon, lowering air intake, slowing down and spraying at a sufficiently low volume (e.g., 20-30 gpa) that allows good coverage of the canes but no run-off. This ensures that the product is not diluted too much. Spraying every row is advised.

Dormant sprays should not be used as a stand-alone disease control measure. One or two mancozeb or captan sprays around mid-May when Phomopsis is expected to be most active may be beneficial. A strobilurin fungicide, such as Abound, Pristine or Sovran, applied at bloom or 1st post-bloom is also recommended to provide additional protection of the clusters against Phomopsis as well as black rot, powdery mildew, and downy mildew. Phosphorous acid fungicides also have good efficacy against Phomopsis and can be used throughout the growing season, either alone or in combination with other fungicides (do not tank-mix with copper).

<table>
<thead>
<tr>
<th>Trial in ‘Niagara’ grapes in Lawton, MI, 2005</th>
<th>Phomopsis rachis infection at harvest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment, rate/A Application timing*</td>
<td>Severity (%) Control [%]***</td>
</tr>
<tr>
<td>Untreated.................................</td>
<td>26.9 a**</td>
</tr>
<tr>
<td>Sulfur 6L 10 pt.........................Budswell (single spray)</td>
<td>10.6 b [61]</td>
</tr>
<tr>
<td>Sulfur 6L 10 pt..........................1-2” Shoot growth (single spray)</td>
<td>9.6 b [64]</td>
</tr>
<tr>
<td>Cuprofix Disperss 3 lb ..................Budswell (single spray)</td>
<td>7.4 b [73]</td>
</tr>
<tr>
<td>Cuprofix Disperss 3 lb ..................1-2” Shoot growth (single spray)</td>
<td>12.2 b [55]</td>
</tr>
<tr>
<td>Dithane Rainshield 3 lb 1”, 6-10”, 10-16” shoot Abound 2.08 SC 12 fl oz Bloom 2nd postbloom Ziram 76 DF 3 lb 1st postbloom 3rd postbloom</td>
<td>2.7 c [90]</td>
</tr>
</tbody>
</table>

*Budswell spray: April 14, 2005; 1-2 inch shoot spray: April 25, 2005

**Values in the same column that share a letter are not significantly different from each other at the 95% confidence level.

***Percent control relative to the untreated check.
Factors affecting wine grape quality in 2009

After the noteworthy weather of the 2009 growing season, many growers were left trying to sort out what, if anything could have been done to produce a better crop under such “cool” weather conditions. For those of us who were able to attend the Winegrape Kickoff on 16 April, Dr. Paolo Sabbatini began to address this issue from a unique perspective. How do we define a “cool” season and what does it really mean to vine growth and fruit quality at harvest? Were quality and ripening issues in 2009 caused by 1) lack of sun reducing photosynthesis, 2) insufficient heat that reduced biochemical activity, or 3) was it a short ripening season with few days after veraison and an early frost? Dr. Sabbatini addressed each of these questions utilizing weather data collected at the Northwest Michigan Horticultural Research Station (NWMHRS).

Solar radiation in 2009 was compared to 2007 (a year that provided high quality crop) to determine the role sunlight plays in crop quality. Surprisingly, solar radiation levels were similar between 2007 and 2009, including during the critical ripening period from veraison and harvest. These findings effectively eliminate solar radiation levels as a major factor in fruit quality during 2009. However, the comparison of heat accumulated as growing degree days (GDD, calculated with base 50 F) in 2007 and 2009 yielded more interesting results (Figure A). The 2009 season accumulated 760 GDD less than 2007 (from April 1st to the first fall frost) and more than 350 GDD less than the 10-year average (Figure A). With a total of only 1909 GDD in 2009, our region did not accumulate the minimum 2000-2100 GDD generally required to mature white varieties (Riesling or Pinot gris), and far less than the necessary 2200-2300 GDD for red varieties (Cabernet franc or Merlot). Based on the data, GDD appears to have played a major role in the 2009 season. Degree day accumulation before first frost is obviously effected by when the first frost occurred, so the obvious question becomes, how long was the 2009 growing season? The first frost occurred on 12 November 2009, certainly not the earliest in the past ten years. The season length was estimated at 145 days – an average season length for the 2 appellations areas in the NW part of the state. Therefore, despite having a moderate number of days to accumulate degree days, the temperatures were inadequate to mature the fruit.

Fruit quality is highly dependent on site selection, canopy management and crop load. Under “cool” climate conditions, it is pivotal to achieve a long-term physiological balance in the vineyard between vine growth and reproduction to obtain maximum fruit maturity and quality; in order to achieve such balance, estimation of yield potential plays a central role. Crop estimation methods are available, and they rely on data collected in the vineyards (number of vines per acre, number of clusters per vine, number of berries per vine). There are a variety of methods available to growers and each should choose the one that is accurate and feasible. Researchers in viticulture have developed different systems for estimating crop load that can be divided in two groups: 1) one is based on cluster weights during “lag phase” which is the time during the growing season when the berry’s growth slows momentarily (around 50-60 days after bloom) and 2) is the traditional method based on historical records of cluster weights (specific for location and cultivar blocks). The “Lag Phase Technique” suggests that at stage II of berry development (lag phase) berries are approximately half their final fresh weight. This technique uses seed hardness as the primary indicator that berries have entered lag phase. The other traditional method is based on the historical record of cluster weights for a single cultivar in different locations. Multiplying the number of clusters by expected final cluster weight produces a harvest fruit weight per vine value. Despite differences in these methods, both systems could provide good results, but they rely largely on the grower’s ability to provide accurate cluster/vine and vine/acre information. Another potential tool is a model utilized in juice grapes which estimates the final yield based on the assumption that berries are approximately half their final weight at 1200 GDD (Figure B). After estimation, crop thinning is the primary method of increasing fruit quality. In general, fruit thinning before fruit set has a minimal impact on yield because of components of yield compensation (increased set, larger berries) but impacts sugar accumulation. Thinning very late (veraison) reduces crop, but there is a little increase in fruit maturity (sugar) but several positive effects on phenolic and aromatic makeup of the fruit. Thus, in our climate, the best time to thin appears to be between 20 and 40 days after bloom, at the end of the cell
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The 2010 season has started early with accumulated degree days well ahead of the 50 year average (we are 19 days ahead of 2009 right now). The impact of early season GDD accumulation is related to early vine growth and potential of spring frost events. If bud break occurs early in the season, young shoots are vulnerable to frost damage during spring; however, without frost, the grapes will have enough time to fully ripen high quality fruit.

Figure A. Growing Degree Day accumulation (GDD, base 50 F) compared to the 10-year average at the NWMHRS. The red line represents 2009 and the thin black line 2007. The mean (bold black line) is calculated from 1999-2009 data. 2007 and 2009 were two exceptional years: 2007 unusually warm (above the standard deviation of the 10-year mean) and 2009 unusually cold (below the standard deviation of the 10-year mean).

Figure B. Cabernet franc berry growth (percentage of the final berry weight) average of 2 years (2008 and 2009) during the growing season in relation to the GDD accumulation. Note that 50% final berry weight was (red line) occurred 1340 and 1358 in 2008 and 2009, respectively.
Northwest: Save the date for 2010 Grape IPM Updates

Dates have been set for the Summer Grape IPM Updates. Topics to be covered include horticulture, pathology and entomology. Feel free to bring along insect and disease samples for diagnosis and management recommendations. These free updates run from 3-5 PM and Pesticide Recertification Credits will be available. More information: Erin Lizotte, 231-946-1510.

May 7
3-5PM
Longcore Vineyard, Traverse City
Speaker: Annemiek Schilder

Annemiek Schilder will be at the Longcore Vineyard (11545 Bluff Rd, Traverse City) on May 7 to discuss protectant strategies for disease management, with special emphasis on powdery mildew.

Additional meetings will be held on:

June 4
3-5PM
NWMHRS
Speaker: Duke Elsner

July 9
3-5PM
2Lads Winery, OMP
Speaker: Paul Jenkins and Paolo Sabbatini

August 6
3-5PM
Ligon Farm, OMP
Speaker: Paolo Sabbatini

September 3
3-5PM
L. Mawby
Speaker: Rufus Isaacs

2010 Viticulture Field Day

The 21st Annual MSU Viticulture Field Day & Steak Cookout will be held on Thursday, July 29th! Yes, that is correct! This year’s field day will be held on the last Thursday of July rather than on a Wednesday due to a scheduling conflict with a blueberry conference. This will be the first time in the 21-year history of this event that it will not be held on a Wednesday so mark your calendars for Thursday, July 29th! More information: Tom Zabadal, 269-944-1477.

Southwest wine grape grower meetings planned for 2010

Summer wine grape meetings will resume in Berrien County in 2010. Three meetings are planned- May 19th, June 16, and August 4th. The May meeting will be held at SWMREC beginning at noon. Annemiek Schilder will present information about virus diseases in grapes including symptoms to look for, best times to sample, and sample collection procedures. We will have a blind tasting of Riesling wines which were made from varying crop levels; a summary of survey information from the winter wine evaluation workshop; and we will discuss current crop development. We will also decide on topics and locations for the June and August meetings. Please bring your ideas for this year’s meeting topics. You may also phone us or email suggestions to Diane Brown (rytlews1@msu.edu; 269-944-4126 x 4 0 1 2) or Tom Zabadal (zabadal@msue.msu.edu; 269-944-1477 x 206) The meeting cost is $15.00/person, which includes lunch. Please RSVP by May 13th to Diane Miner at SWMREC (phone: 1-269-944-1477 x 201).

Southwest juice grape grower meetings planned for 2010


May 20 - Pre-bloom
6PM
Location TBA
Speakers: Rufus Isaacs & Annemiek Schilder

June 15 - Crop Estimation
6PM
Location TBA
Speaker: Paolo Sabbatini

August 17
6PM
Location TBA
Speakers: Rufus Isaacs & Annemiek Schilder