Northern Michigan FruitNet 2006
Weekly Update
NW Michigan Horticultural Research Station

Jim Nugent
District Horticulturist

Nikki Rothwell
District Fruit IPM Agent

Bill Klein
Farm Mgr, NWMHRS

Duke Elsner
Agricultural & Regional Viticulture Agent

Jim Bardenhagen
Leelanau Extension Director

August 1, 2006

Growing Degree Day Accumulations as of July 31 at the NWMHRS

Year	2006	2005	2004	2003	2002	16yr. Avg.
GDD42	2446	2464	1935	2058	2145	2155.9
GDD50	1586	1640	1153	1261	1437	1371.0

WEATHER

It's HOT!! Degree days are accumulating rapidly with this heat. Rainfall this past week has reduced the drought stress in NW Michigan, but the current heat puts high demand on water needs for plants.

Note: Degree days accumulate very rapidly when the highs are well into the 90's. However, keep in mind that pest and plant development has both low temperature thresholds and high temperature thresholds. Each pest and plant differs in their upper thresholds, so degree day calculations generally do not include the upper threshold. The result is that insect development may not occur as rapidly as our degree day models predict in an exceptionally hot year like this when the upper temperature threshold is not considered.

FRUIT REPORTS

Tree Fruit

Apples: Codling moth numbers seem to be going up this week, and our average trap count was 16 moths/trap at the NWMHRS. **Obliquebanded leaf roller** (OBLR) counts have remained fairly constant this week with an average of 6 moths/trap. **STLM** numbers are still down this week while **Oriental fruit moth** numbers are up to an average of 15 moths/trap. Very few **mites** have been detected in apple, but with hot and dry temperatures predicted, we expect those numbers to increase. We caught our first **apple maggots** this week, as predicted with last week's rain; we caught nine flies on two red sticky spheres.

Cherry: Sweet cherry harvest is complete. Tart cherry harvest is nearing completion. Recent hot weather has softened fruit, further reducing the quality in a year when fruit has already suffered from multiple quality problems. See later in newsletter for link to the CIAB weekly crop report.

Nothing new in cherry this week, except last week's rain resulted in a **cherry leaf spot**

infection, but no new lesions from that wetting event are evident at this time. The **OBLR** trap counts are about 5 moths/trap in cherry, and we did detect one OBLR larvae in a tart cherry fruit last week. **Greater peachtree borer** numbers are up, and we caught over 18 moths/trap during this warm weather.

Small Fruit

Grapes: Excessive shoot growth has resulted in quite a bit of shading in the canopy in many vineyards. Side hedging and/or topping shoots will be needed to get light and air to the fruiting zone. This needs to be done as soon as possible, as shoots are already getting woody, making the process more difficult. Fruit set varies widely across the area, but in general, the crop looks very good, with exception of vineyards that suffered hail damage. **Powdery mildew** is the main concern in our hot and humid conditions. Some **Downy mildew** has been reported. **Potato leaf hopper** is still active and a concern. **Hornworm larvae** should be present now running from small to 2-inch larvae. Again, we captured thousands of **Japanese beetles** from a central location in Leelanau County. We have not detected adult feeding on neighboring commercial grape vineyards. However, watch out for Japanese beetles!!

MISCELLANEOUS

Obliquebanded Leaf Roller Larvae in Demand

We are currently testing OBLR larvae for organophosphate resistance, and we need to collect many larvae from around the state. If an orchard in the area has an OBLR infestation, please call the NWMHRS (946-1510)--we will take these larvae off your hands!

NW Station Open House

The NW Michigan Horticultural Research Station annual Open House will be held **Thursday, August 24** with an afternoon and evening program planned. Please mark your calendar. Details will follow in the next FruitNet report and your county Extension fruit grower newsletter.

Precipitation & Evaporation Chart

Date	Rainfall/wk at NWMHRS (in.)	Rainfall minus 75% of Evaporation	Evap/week (in.)	75% of Evap/week
5/2	0.00	-1.05	1.40	1.05
5/9	0.03	-1.12	1.53	1.15
5/16	2.02	1.51	0.68	0.51
5/23	0.61	-0.21	1.09	0.82
5/30	0.40	-0.68	1.44	1.08
6/6	0.05	-1.17	1.62	1.22

6/6	0.05	-1.17	1.62	1.22
6/13	1.08	0.01	1.43	1.07
6/20	0.51	-0.93	1.92	1.44
6/27	0.10	-0.81	1.21	0.91
7/4	0.30	-0.97	1.69	1.27
7/11	0.13	-1.21	1.79	1.34
7/18	0.18	-1.35	2.04	1.53
7/25	0.46	-0.72	1.57	1.18
8/1	0.78	-0.49	1.69	1.27
Totals	**6.65**	**-9.18**	**21.10**	**15.83**

Insect and disease predictive information is available at:
http://www.enviroweather.msu.edu/home.asp

The weekly **CIAB Weekly Raw Product Report** can be accessed at the following address:
http://www.cherryboard.org/Week_5_2006.pdf

This issue and past issues of the weekly FruitNet report are posted on our website at:
http://www.maes.msu.edu/nwmihort/faxnet.htm

ACTUAL AND PREDICTED DEGREE-DAY ACCUMULATIONS SINCE MARCH 1, 2006

Please send any comments or suggestions regarding this site to:
Bill Klein, **kleinw@msu.edu**

Last Revised: 8-2-06

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Northern Michigan FruitNet 2006
Weekly Update
NW Michigan Horticultural Research Station

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Agricultural & Regional Viticulture Agent

Jim Bardenhagen
Leelanau Extension Director

August 8, 2006

Growing Degree Day Accumulations as of August 7 at the NWMHRS

Year	2006	2005	2004	2003	2002	16yr. Avg.
GDD42	2680	2701	2117	2254	2339	2346.0
GDD50	1764	1820	1279	1401	1575	1505.0

WEATHER

Very hot weather in late July and early August has finally given way to more normal temperatures. Significant rain fell in NW Michigan during the past two weeks though amounts varied a great deal. Precipitation for the months of June, July and August (to date) at the NWMHRS has totaled 4.47 inches; average precipitation for that period is approximately 6.46 inches. This period of low precipitation came with above normal temperatures, which increases the demand for moisture by plants.

GROWTH STAGES at NWMHRS (8/7/06; 11:00 a.m.)

Apple: Mac: 72 mm fruit, Red delicious: 55 mm fruit, Gala: 60 mm fruit

Pear: Bartlett: 45 mm fruit

Plum: NY 12: 33 mm fruit

Grapes: Chardonnay: Green fruit

FRUIT REPORTS

Tree Fruit

Apples: Codling moth (CM) trap counts are up from last week, both here at the NWMHRS and around the region. Based on past experience, this time of year is extremely important for growers to remain diligent with their CM control. The above normal heat accumulation this year will assure a full second generation rather than our more traditional partial second generation. We are still catching **obliquebanded leaf roller** and **apple maggot**. European red mites and **two-spotted spider mites** are building in some apple blocks, but overall populations remain low.

Cherries: Tart harvest is nearly complete. Quality was hurt by a combination of wind

damage, hail, and softer than normal fruit, which was made worse by excessive heat late in the season. **Cherry leaf spot** (CLS) lesions are showing up in tart cherry orchards that received rain in the past few weeks, especially in blocks that did not receive a post-harvest spray. However, overall CLS incidence is low in the northwest, but we expect to see more disease in the coming weeks. **Brown rot** is evident in many blocks that still have hanging fruit in the trees. **Powdery mildew** can be found in almost every cherry orchard, and this disease seems to be particularly apparent this season. **Mites** in cherry are lower this year than last season.

Small Fruit

Grapes: Powdery mildew is the greatest concern at this time. Growers should be checking for cluster infections even if there has not been noticeable powdery mildew on leaves. **Potato leafhopper** activity has declined in the unsprayed row at the NWMHRS vineyard.

Within the last week several reports of **Japanese beetles** in vineyards have come in, and this insect has also been found on tart and sweet cherries, chestnuts, and other plants in many areas of Leelanau County. It looks like it will become an insect of significant concern for grape growers over the next few years, as spread is likely to continue.

NW STATION OPEN HOUSE

The **NW Michigan Horticultural Research Station Open House** will take place on **Thursday, August 24, 2006**. There will be no equipment show this year.

The educational program will begin at 3:30 with results from tests of a new Australian designed weed steamer. The program will then split into two concurrent sessions: tree fruits and wine grapes. The **tree fruit session** will discuss pathology, entomology, and horticulture results from 2006 studies. A recent re-screening of cherry leaf spot resistance to dodine was performed this winter, and the conclusions from those experiments will be discussed at the open house. We will also feature current research on cherry fruit fly as this season we have investigated emergence timing, host specificity, and trap placement. The horticulturists will be on hand to discuss cherry and apple rootstock performance and recommendations for northwest Michigan. During the **grape session,** we will take a walk through the experimental vineyard area to see the latest developments in several projects: *Vinifera* cultivar trials, hybrid cultivar trials, Riesling spacing trial, Riesling crop load experiment, canopy hedging, grape crown gall project, and Marquis table grapes.

A social time begins at 5:00 p.m., dinner at 6:00 with an evening program following organized by the Leelanau Horticultural Society. Tickets for the dinner and the social hour will be available at the door, but the Leelanau Horticultural Society would appreciate advance ticket purchases or an indication of attendance. Please contact the Leelanau Extension office at 231/256-9888 to provide this information.

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Dinner Tickets Form – NW Michigan Hort Research Station Open House

Name_____Phone_____

No. of Tickets _____ x $15 = _____

Please make check payable to ***Leelanau Horticultural Society***

and mail to: P.O. Box 987, Leland, MI 49654

Seasonal Evaporation & Precipitation

Beginning May 1, 2006, at NWMHRS

Date	Rainfall/wk at	Rainfall minus	Evap/week (in.)	75% of Evap/week

	NWMHRS (in.)	75% of Evaporation		
5/2	0.00	-1.05	1.40	1.05
5/9	0.03	-1.12	1.53	1.15
5/16	2.02	1.51	0.68	0.51
5/23	0.61	-0.21	1.09	0.82
5/30	0.40	-0.68	1.44	1.08
6/6	0.05	-1.17	1.62	1.22
6/13	1.08	0.01	1.43	1.07
6/20	0.51	-0.93	1.92	1.44
6/27	0.10	-0.81	1.21	0.91
7/4	0.30	-0.97	1.69	1.27
7/11	0.13	-1.21	1.79	1.34
7/18	0.18	-1.35	2.04	1.53
7/25	0.46	-0.72	1.57	1.18
8/1	0.78	-0.49	1.69	1.27
8/8	0.92	-0.36	1.70	1.28
Totals	**7.57**	**-9.53**	**22.80**	**17.10**

Insect and disease predictive information is available at:

http://www.enviroweather.msu.edu/home.asp

The weekly **CIAB Weekly Raw Product Report** can be accessed at the following address:

http://www.cherryboard.org/Week_6_2006.pdf

This issue and past issues of the weekly FruitNet report are posted on our website at:
http://www.maes.msu.edu/nwmihort/faxnet.htm

ACTUAL AND PREDICTED DEGREE-DAY ACCUMULATIONS SINCE MARCH 1, 2006

Please send any comments or suggestions regarding this site to:
Bill Klein, **kleinw@msu.edu**

Last Revised: 8-8-06

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Weekly Update
NW Michigan Horticultural Research Station

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Duke Elsner
Agricultural & Regional Viticulture Agent

Jim Bardenhagen
Leelanau Extension Director

August 15, 2006

Growing Degree Day Accumulations as of August 14 at the NWMHRS

Year	2006	2005	2004	2003	2002	16yr. Avg.
GDD42	2863	2913	2258	2454	2557	2533.4
GDD50	1891	1976	1364	1545	1737	1636.6

WEATHER

This week's weather was not too hot, not too cold, not too dry, not too wet, not too humid, with no storms…WOW! Of course, it also means there's not much to talk about.

FRUIT REPORTS

Tree Fruit

Apples: Codling moth numbers are down again at the NWMHRS with an average of only two moths/trap. We captured very few **obliquebanded leaf roller** (OBLR) this week, and **oriental fruit moth** numbers are down from last week with an average of three moths/trap. We also caught five **apple maggots** this week on red sticky spheres.

Cherries: Tart cherry harvest was completed in NW Michigan by the middle of last week. The CIAB crop report for the week should be close to the final report. It indicates for NW Michigan that 109.7 M lbs were packed and 3.9 M lbs known diversion to date, for a total of 113.6 M lbs. Totals for the U.S. to date are 246.2 M lbs processed and 13.8 M lbs diverted, for a total of 260. This report should include nearly all production except random row diversion as this is calculated based on processor reports by grower to the CIAB (weekly reports are based on gross production numbers supplied by processors, not detailed by grower). It is surprising how little fruit was diverted northwest and west central Michigan in a year with so many quality problems. **Cherry leaf spot lesions** can be easily detected in some blocks while others remain very clean. **OBLR** trap counts in cherry are much higher than in apple, with 12 moths/trap compared to less than one in apple. **Greater peachtree borer** numbers are down considerably, to less than four moths/trap this week. We have seen very high **cherry fruit fly** numbers in blocks where we are still trapping—some traps have caught over 75 flies in this last week.

PLUM POX FOUND IN MICHIGAN

Jim Nugent, District Horticulturist, MSUE
Nikki Rothwell, District Fruit IPM Educator

Plum pox virus (PPV) was confirmed last week in a single plum tree in SW Michigan. Following is a press release that explains the current situation. A team of folks from MSU & MDA will be gathering additional information on the situation that will be distributed next week. At this point, we really do not know if this incidence is a single tree that acquired the infection from propagation material or if the tree was infected by aphid transmission from another source. Obviously, everyone hopes this one tree is a single, isolated find. A thorough investigation is currently underway, so we'll learn much more in the coming days and weeks. We have also learned that a PPV infected plum tree was discovered last month in western New York.

We have placed links on the NWMHRS web site to some good sites that describe plum pox. Both Penn State and Ontario have developed excellent web sites as both areas have had to deal with PPV infestations in stone fruits. Also, USDA's APHIS division has a good site. Access these links at **http://www.maes.msu.edu/nwmihort/linkindex.htm#ppv**

LANSING, MI-The Michigan Department of Agriculture and Michigan State University today announced that aggressive efforts are underway to manage the presence of a viral plant disease known to infect certain stone fruits, such as peaches, nectarines, apricots, and plums. The strain identified, however, is not known to affect cherry trees. The United States Department of Agriculture earlier confirmed plum pox virus (PPV) in samples collected from a routine survey at the MSU Southwest Michigan Research and Extension Center (SWMREC), near Benton Harbor. PPV poses no human or animal health threat.

"Michigan and its partners have always worked closely to protect the state's agricultural diversity," said Robin Rosenbaum, MDA Plant Industry Section Manager. "Early discovery of the virus through routine surveillance demonstrates that this aggressive approach to plant pests and diseases works."

The USDA will establish a cooperative eradication program with the state of Michigan, including extensive detection and delimiting surveys, establishing a quarantine if needed in areas where infections are found, and removing infected orchards and other host material within the buffer area of any infection. MDA specialists are currently surveying blocks of trees in the immediate vicinity of the infected tree to determine the extent of infection.

"We know there is no risk to nonsusceptible crops, and we are collaborating with the agencies to analyze the leaf samples that are collected," says Ray Hammerschmidt, MSU Department of Plant Pathology chairperson and coordinator of MSU Diagnostic Services. "Hopefully, this will be an isolated situation."

The D strain identified in Michigan is the same strain discovered in Pennsylvania in 1999, and later Canada and New York. It is less virulent than other strains, not as easily transmissible by aphids, and will not affect the production, harvest or transportation of stone fruit in Berrien County this year since this strain is not transmitted by fruit.

PPV can be transmitted by aphids or transplanted rootstock, however, it is too early to determine the source of the virus in the Michigan tree. USDA and MDA personnel are working to establish both the extent and the origination of the SWMREC incidence. PPV has not been found in any other Michigan location.

Area growers are invited to attend a public information session on Wednesday, August 16, 2006, at 6:30 p.m. at MSU Southwest Michigan Research and Extension Center, 1791 Hillandale Road, Benton Harbor, MI 49022.

NW STATION OPEN HOUSE

REMINDER - The NW Michigan Horticultural Research Station Open House will take place on Thursday, August 24, 2006 beginning at 3:00 p.m., with educational programs for tree

fruit and grape growers from 3:30-5:00. There will be no equipment show this year.

Tickets for the dinner and the social hour will be available at the door, but the Leelanau Horticultural Society would appreciate advance ticket purchases or an indication of attendance. Please contact the Leelanau Extension office at 231/256-9888 to provide this information.

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Dinner Tickets Form – NW Michigan Hort Research Station Open House

Name_____Phone_____

No. of Tickets _____ x $15 = _____

Please make check payable to *Leelanau Horticultural Society*
and mail to: P.O. Box 987, Leland, MI 49654

Seasonal Rainfall and Evaporation
Beginning May 1, 2006 at NWMHRS

Date	Rainfall/Wk (In)	Evap/week	75% of Evap	Rainfall minus 75% of Evaporation
5/2	0.00	1.40	1.05	-1.05
5/9	0.03	1.53	1.15	-1.12
5/16	2.02	0.68	0.51	1.51
5/23	0.61	1.09	0.82	-0.21
5/30	0.40	1.44	1.08	-0.68
6/6	0.05	1.62	1.22	-1.17
6/13	1.08	1.43	1.07	0.01
6/20	0.51	1.92	1.44	-0.93
6/27	0.10	1.21	0.91	-0.81
7/4	0.30	1.69	1.27	-0.97
7/11	0.13	1.79	1.34	-1.21
7/18	0.18	2.04	1.53	-1.35
7/25	0.46	1.57	1.18	-0.72
8/1	0.78	1.69	1.27	-0.49
8/8	0.92	1.70	1.28	-0.36
8/15	0.11	1.73	1.30	-1.19
Totals	**7.68**	**24.53**	**18.40**	**-10.72**

Insect and disease predictive information is available at:
http://www.enviroweather.msu.edu/home.asp

The weekly CIAB Weekly Raw Product Report can be accessed at the following address:
http://www.cherryboard.org/Week_7_2006.pdf

This issue and past issues of the weekly FruitNet report are posted on our website at:
http://www.maes.msu.edu/nwmihort/faxnet.htm

ACTUAL AND PREDICTED DEGREE-DAY ACCUMULATIONS SINCE MARCH 1, 2006

Please send any comments or suggestions regarding this site to:
Bill Klein, **kleinw@msu.edu**

Last Revised: 8-15-06

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August 22, 2006

Growing Degree Day Accumulations as of August 21 at the NWMHRS

Year	2006	2005	2004	2003	2002	16yr. Avg.
GDD42	3057	3100	2392	2687	2735	2711.9
GDD50	2029	2108	1443	1722	1859	1759.2

WEATHER

Very little rain has fallen in NW Michigan during the past two weeks. Precipitation at the NWMHRS totaled 0.12 inches for the two week period, bringing the total for August to 1.04 inches. Temperatures during the past two weeks dropped to more seasonable levels. Degree day accumulations are approximately equal to the hot year of 1998 and remain slightly behind the even hotter years of 1991 and 2005.

FRUIT REPORTS

Tree Fruit

Apple: Harvest of some very early apples (Lodi, etc.) has begun. We are observing some apples with a sunken area on one side of the fruit, generally near the calyx end. The skin develops a premature red coloration. When cutting into the apple, the flesh has an area of brown, corky tissue, 1-2 mm below the skin. The cause of the damage was the late frost on May 21 and/or 22. The area of the fruit that sustained damage was facing upward at the time of the frost. This injury has been observed on Honeycrisp. There are no diseases to report in apples this week**. Codling moth** (CM) trap counts are low here at the NWMHRS. However, many growers in the region have been reporting high numbers of CM larval stings and even larvae in the fruit. **Obliquebanded leaf roller** (OBLR) numbers are low, and the two red sticky spheres at the NWMHRS captured only three apple maggots this week. **Oriental fruit moth** catches are also low, with only an average of 3/trap. **European red mites** and **two-spotted spider mites** are evident in some apple blocks.

Cherry: There is some leaf drop from **cherry leaf spot** (CLS) infection in the region, but overall most orchards are still looking good for this time of year**. Brown rot** is evident in most blocks, in both tarts and sweets that still have hanging fruit**. Powdery mildew** can also be detected quite easily in most cherry blocks. **OBLR** counts at the NWMHRS are much higher in cherry, 21/trap, compared to those captured in apple, 3.5/trap. We caught an average of six **greater peachtree borer moths** this week, and **cherry fruit flies** are still evident in most cherry orchards**. Two-spotted spider mites** are on the rise in tart cherry blocks, but it is too late to control them during this season.

Small Fruit

Grapes: Fruit continued to develop at a rapid pace over the last week, with many vineyards now at verasion. A few vineyards are having problems with **powdery mildew** this year, but the incidence of this disease is very inconsistent. Surprisingly, the un-sprayed row at the NWMHRS is showing very little powdery mildew! Insects to watch for at this time are **hornworm larvae** (especially in young vineyards) and **grape berry moths**. Growers with a history of grape berry moth should place a high priority on trapping and scouting at this time.

TART CHERRY CROP REPORT
Jim Nugent

With tart cherry harvest complete in all areas of the country, this week's CIAB crop report will be close to the final crop number. There will be an addition of random row diversion, but this number is likely quite small. The CIAB report indicates production in NW MI of 114.3 M lb, which compares exceptionally close to the USDA pre-harvest estimate of 115 M lb. Total US production of 263 M lb is up only slightly from the USDA estimate of 256 M lb.

My compliments to the staff at USDA's National Agricultural Statistics Service, including Dave Kleweno from Michigan, for the good estimate and also to the growers who provided them with their individual pre-harvest estimates.

For the complete CIAB report, go to http://www.cherryboard.org/.

Seasonal Rainfall and Evaporation
Beginning May 1, 2006 at NWMHRS

Date	Rainfall/Wk (In)	Evap/week	75% of Evap	Rainfall minus 75% of Evaporation
5/2	0.00	1.40	1.05	-1.05
5/9	0.03	1.53	1.15	-1.12
5/16	2.02	0.68	0.51	1.51
5/23	0.61	1.09	0.82	-0.21
5/30	0.40	1.44	1.08	-0.68
6/6	0.05	1.62	1.22	-1.17
6/13	1.08	1.43	1.07	0.01
6/20	0.51	1.92	1.44	-0.93
6/27	0.10	1.21	0.91	-0.81
7/4	0.30	1.69	1.27	-0.97
7/11	0.13	1.79	1.34	-1.21
7/18	0.18	2.04	1.53	-1.35
7/25	0.46	1.57	1.18	-0.72
8/1	0.78	1.69	1.27	-0.49
8/8	0.92	1.70	1.28	-0.36
8/15	0.11	1.73	1.30	-1.19
8/22	0.01	1.40	1.05	-1.04
Totals	**7.69**	**25.93**	**19.45**	**-11.76**

Insect and disease predictive information is available at:
http://www.enviroweather.msu.edu/home.asp

The weekly CIAB Weekly Raw Product Report can be accessed at the following address:
http://www.cherryboard.org/Week_8_2006.pdf

This issue and past issues of the weekly FruitNet report are posted on our website at:
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ACTUAL AND PREDICTED DEGREE-DAY ACCUMULATIONS SINCE MARCH 1, 2006

Please send any comments or suggestions regarding this site to:
Bill Klein, kleinw@msu.edu

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Jim Bardenhagen, Leelanau Extension Director

August 29, 2006

Growing Degree Day Accumulations as of August 28 at the NWMHRS

Year	2006	2005	2004	2003	2002	16yr. Avg.
GDD42	3230	3275	2574	2883	2920	2880.1
GDD50	2146	2227	1568	1861	1988	1896.1

WEATHER

This week some areas of NW Michigan received the heaviest rainfall of the season on 8/25 and 8/26, while other areas were not as fortunate. Rain for the past week at the NWMHRS totaled 2.02 inches. This is the highest weekly total since receiving the same amount during 5/10 – 5/16. Cooler weather, shorter days, and heavy dews have all contributed to the lowest evaporation rate since the week ending 5/23.

FRUIT REPORTS

Tree Fruits

Apples: Codling moth numbers are down again at the NWMHRS with an average of only two moths/trap. We captured very few **obliquebanded leafrollers** (OBLR) this week, and **oriental fruit moth** numbers are down from last week with an average of three moths/trap. We caught no **apple maggots** on red sticky spheres this week.

Cherry: Cherry leaf spot lesions can be easily detected, and we have noticed some defoliation in blocks around the region, but again, most trees look good for this time of year. OBLR trap counts are still relatively high in cherry with an average of 15 moths/trap. **Greater peachtree borer** numbers are down considerably, to less than two moths/trap this week. In some blocks, we are still catching high numbers of **cherry fruit flies**. We have also observed firing in some tart blocks, and we attribute this result to a building population of mites and the dry weather. The past weekend's rain will alleviate this problem.

Final Spray for Apple Insect Pests

Nikki Rothwell, District Fruit IPM Educator

The final spray for apples is here. This season, I highly recommend applying this last insecticide application unless a particular block has had extremely low insect trap counts throughout the year. Many growers in the region have reported extensive codling moth (CM) damage this year, and during a scouting run yesterday, I found obliquebanded leaf roller (OBLR) larvae feeding in clusters of apples. Therefore, I want to make sure growers are not taking any chances for infestation this late in the season.

The two major pests we have continued to catch in our traps are the obvious ones: CM and OBLR. However, the adult moths are not the major concern at this stage, as most adults have already laid eggs and the hatching larvae are the important life stage to watch. We need to concentrate on minimizing larval damage to the fruit, as they are the prime target at this time. When CM attack the ripening fruit, the resulting damage is readily apparent. The injury can either be a deep entry or a 'sting'. Deep entries occur when larvae eat through the apple skin into the side or calyx end of the fruit. Often this type of injury has brown frass around the entry, and the hole is ringed with bright red. Stings are a result of CM larvae that do not 'enter' the fruit—they die before they can tunnel into the fruit to feed. Often, when apples are injured by CM larvae, a grower can cut into the fruit and find the larva feeding near the seed region. The relative size of the larva, big or small, will provide a general indication of when the larva entered the fruit; the larger the larva, the longer it has been feeding in the apple.

OBLR larval damage may not be as obvious as CM damage. OBLR feeding does not have the round deep entries, and literally looks more like 'munching' than CM damage. Apples that have been damaged by OBLR bear corky type scars at harvest. At this time of the year, scouting efforts should be concentrated around the apple clusters rather than the terminals. Since these pests are in the leafroller family, they are fond of hiding out in places not easily accessible to insecticide applications. At this time of year, they will take refuge in rolled leaves or in between clusters of apples.

Since we have not captured any apple maggots (AM) in the last week, most spray programs will probably concentrate on CM and OBLR. The major concern at this time is the pre-harvest interval (PHI) as harvest is fast approaching. The following products are good choices for lepidopteran control: 1) Assail, given an excellent rating for CM with a PHI of 7 days, 2) Imidan, given an excellent rating for CM and fair/poor rating for OBLR with a PHI of 7 days, 3) SpinTor, given a fair rating for CM and an excellent rating for OBLR with a PHI of 7 days, and 4) Entrust, given a fair rating for CM and an excellent rating for OBLR with a PHI of 7 days. Entrust is much more expensive than SpinTor, but if a grower is organic, only Entrust is OMRI-certified. Pyrethroids are an option, but the PHI's are longer

than the products listed above, between 14-21 days. If AM is a concern in a particular block, both Assail and Imidan are labeled excellent for this apple pest. Lastly, a word of caution, Calypso and Assail are often thought of as interchangeable because they are both neonicotinoids, but the PHI for Calypso is 30 days while Assail's is only 7days.

Small Fruit

Grapes: There is nothing new to report on insect pests and diseases in grapes. **Powdery mildew** is evident in many vineyards and some areas have the highest levels of the disease we have ever observed. We have attached a nice article written by Dr. Annemiek Schilder from the August 22, CAT Alert. There is still time to collect petiole samples for nutrient analysis. As long as leaf senescence has not started, the results should be valid and useful. Vines with low nutrient levels, trunk injuries (girdled by ties, etc.), or crown gall infections are starting to express their ailments now that the full stress of fruit maturation is imposed on them. This is a great time of the season to walk vineyards and map out their problems.

Management of Powdery Mildew on Grape Clusters
Annemiek Schilder, Plant Pathology, MSU

This summer, powdery mildew, caused by the fungus *Uncinula necator*, has appeared relatively early on clusters of susceptible grape varieties in Michigan, e.g., Chardonnay, Chardonnel, Seyval, Aurore and even Concord grapes. In some vineyards, over 75% of the clusters have powdery mildew on them with over 25% of the berries infected. Such high levels of disease are of concern, as severe powdery mildew infections can cause splitting, rotting and dehydration of berries, resulting in lower juice yield. Grapes with powdery mildew generally mature earlier and are smaller and lighter than healthy grapes. Powdery mildew can also affect wine quality by imparting off-flavors and other undesirable sensory qualities. Even inconspicuous (late-season) infections barely visible can compromise the integrity of the berry skin by creating small dead spots, which can provide entry points for pathogens that cause Botrytis and sour bunch rots.

Symptoms
Symptoms of powdery mildew on clusters include a white to gray powdery coating on the surface of the berry. The coating is made up of fungal threads (mycelium) and spores. On severely infected berries, the skin underneath is gray to brown discolored due to the formation of dead spots where the fungus penetrates the berry skin. Later in the season, small brown-to-black specks become visible on the berries. These are cleistothecia, the overwintering fruiting bodies that cause new infections next spring. The rachis (cluster stem) can also be infected. In some cases, powdery mildew may be mistaken for downy mildew. However, downy mildew tends to be fluffier and less dense than powdery mildew and is never gray. It also tends to be more unevenly spread over the berry and cluster than powdery mildew. 'Chancellor' grapes are the poster child for downy mildew infection of the clusters.

Conditions favoring infection
The likely reason for the early onset and severity of the disease this year is the long rainy period that occurred in May, which would have been beneficial for spore release by the overwintering cleistothecia lodged in the bark, followed by extended dry, warm weather in June and July, which favored further disease development. Ascospore discharge is initiated in the spring if 0.10 inch or rain occurs at an average temperature of 50°F. Most mature ascospores are discharged within 4 to 8 hours after the onset of wetting and are carried by wind to susceptible plant tissues. They can infect any green surface on the developing vine resulting in primary infections. The fungus then grows on the plant surface and produces a second type of spore (conidia) under high relative humidity. These conidia are windborne and cause secondary infections. Under optimal conditions, the disease can spread rapidly, as the time from infection to production of conidia can be as short as seven days. Unlike other grape pathogens, the fungus does not need free water for infection; moderate to high relative humidity (40 to 100%) is sufficient for germination of conidia. In fact, rainfall is detrimental to survival of conidia as they tend to burst in water. Although infections can occur at temperatures from 59° to 90°F, temperatures between 68° and 77°F are optimal for disease development. Temperatures above 95°F inhibit spore germination, and the fungus may be killed at temperatures above 104°F.

Effect of berry age on susceptibility
Berry age has a marked effect on susceptibility to powdery mildew. Researchers in New York showed that when clusters of 'Chardonnay', 'Riesling', 'Gewürtztraminer', and 'Pinot noir' were inoculated from pre-bloom to six weeks post-bloom, only fruit inoculated within two weeks of bloom developed severe powdery mildew. Berries became substantially resistant to infection by three to four weeks after bloom, resulting in diffuse, non-sporulating colonies on berries and were virtually immune at six to eight weeks after bloom. Also, rachises of 'Chardonnay' and 'Riesling' fruit clusters developed severe powdery mildew when inoculated at bloom, whereas rachises inoculated 31 days after bloom developed only trace levels of powdery mildew. Therefore, early sprays (from immediate pre-bloom until three to four weeks after bloom) are critical for preventing powdery mildew on the clusters. This coincides with critical sprays for black rot. When timing fungicide sprays, it is important to remember that all clusters in the vineyard may not be of the same age. If there is much variation in cluster development, the critical period for applying fungicides should be extended until the youngest clusters have caught up.

Effect of powdery mildew on wine quality
Recent studies have shed more light on the effects of powdery mildew on wine quality. In a study done in Australia, grapes were selected in different infection categories: 0%, 1-5%, 10-30% and 31-100% of the bunch covered with sporulating powdery mildew. Titratable acidity, total phenolic content, hydroxycinnamates, flavonoids and brown pigments in juice and wine increased with increasing infection. Even small amounts of infection (1 to 5% of the bunch infected) resulted in increased oily/viscous mouth feel characters, which was correlated with phenolic content (grapes produce phenolic compounds in response to infection by fungal pathogens).

Wine made from grapes with higher levels of infection (particularly the 31 to 100% category) were also perceived as having fungal, earthy and cooked tomato attributes compared to the control. In another study done in Ontario, grapes were selected based on percent of the berry surface with scarring due to powdery mildew infection: none (0%), Low (1 to 25% of the surface scarred), moderate (26 to 75% of the surface scarred) and severe (100% of the surface scarred). Visually, the pressed juice became darker and more turbid as severity of powdery mildew infection increased. The research showed that a low infection severity (1 to 25% of the berry surface scarred) did not result in detectable differences in wine quality versus the control. However, wines made from moderately to severely infected berries (26 to 100% scarring) had a higher pH and titratable acidity as well as reduced citrus aroma and tropical flavor. In addition, an earthy aroma and flavor and caramel flavor, higher viscosity and bitterness were detected by tasters.

Management
Powdery mildew on the clusters is best controlled by maintaining an open canopy and applying effective fungicides during the critical period (immediate pre-bloom until three to four weeks after bloom), which has now passed. For infection prevention, good fungicide options include sulfur, sterol inhibitors (Nova, Elite, Procure, Rubigan, Bayleton), strobilurins (Pristine, Sovran, Abound, Flint), Endura and Quintec. Remember that some grape varieties are sensitive to sulfur, Pristine or Flint, and that fungicides differ in their pre-harvest

intervals. Also, sulfur applied late in the season may interfere with wine-making so is not advised beyond veraison.

There is some concern about potential fungicide resistance to the sterol inhibitor fungicides as some growers have seen a lack of control. One would first have to rule out poor timing, poor coverage and excessive disease pressure before considering fungicide resistance, but in vineyards that have received sterol inhibitor sprays for many years, resistance is a real possibility. In addition, there appears to be a link between resistance to sterol inhibitors and strobilurins, which is of concern. Alternating fungicides with different modes of action is therefore important. Quintec (quinoxifen), Endura (boscalid) and Sulfur (sulfur) are especially useful in this regard since they have unique chemistries different from the sterol inhibitors or stobilurins (just as a reminder, boscalid is one of the two active ingredients in Pristine). If powdery mildew is already present on the clusters, there are several possible eradicants available: JMS Stylet Oil (paraffinic oil); Armicarb, Kaligreen and MilStop (all potassium bicarbonate salts); and Oxidate (hydrogen peroxide). None of these compounds has been tested specifically for eradicative activity in Michigan, although previous trials have showed JMS Stylet Oil to be more effective than Armicarb or Oxidate for control of powdery mildew when applied on a preventive schedule. Prev-Am (boric acid/citrus extract) may also be an option but, although it is a good surfactant, has not been tested for efficacy as a powdery mildew eradicant. Sulfur can also kill colonies, but would have to be applied at high rates to be effective.

Whatever product is used, thorough coverage of the clusters will be critical, which means using higher spray volumes (at least 50 to 100 gallons per acre) while spraying every row. One concern with JMS Stylet Oil is that it can delay Brix accumulation, so it is best not to use it after veraison. Also, do not apply oil and sulfur within 14 days of each other. While most berries may already have become naturally resistant to infection, a protective fungicide such as Quintec or Pristine may still help protect younger clusters as well as leaves from infection. At the high labeled rate, Quintec provides up to three weeks of protection of sprayed foliage (but not new foliage). Removing leaves in the fruiting zone can also help reduce powdery mildew severity by increasing airflow, light penetration and fungicide penetration and is also advised for control of bunch rots.

GRAPE & WINE RESEARCH PROGRAM

Duke Elsner, Agriculture Educator, MSU Extension

A program titled '***Ideas and Philosophy of Grape and Wine Research: 1969-2006'***
will be given by Dr. Stan Howell, MSU Department of Horticulture, on **Thursday,**
August 31 at **7:00 p.m.** at the NW Michigan Horticultural Research Station. Dr. Howell is retiring this year after a long career in grape and wine research. He has world-wide

experience in viticulture and wine production as well as close ties to many of our northwest Michigan grape and wine producers. Although his presentation will focus on grape and wine issues, Stan has worked with many other fruit crops and has valuable insight on the processes and philosophy of fruit crop production and research.

Ample time will be provided for a question and answer session, and the program will be followed by a tasting of local wines. This event is sponsored by Parallel 45 Vines & Wines, Inc.

CIAB MEETING

The Cherry Industry Administrative Board (CIAB) is holding its September meeting at the NW Michigan Horticultural Research Station on **September 8, 2006**, **8:00 - noon**. The *Optimum Supply Formula* will be finalized at this meeting, and Mr. Jeff Manning, consultant for the Promotion Committee, will make a presentation about the work done so far on the promotion initiative. Growers are welcome and encouraged to attend the meeting and learn more about these issues.

Seasonal Rainfall and Evaporation Beginning May 1, 2006 at NWMHRS

Date	Rainfall/Wk (In)	Evap/week	75% of Evap	Rainfall minus 75% of Evaporation
5/2	0.00	1.40	1.05	-1.05
5/9	0.03	1.53	1.15	-1.12
5/16	2.02	0.68	0.51	1.51
5/23	0.61	1.09	0.82	-0.21
5/30	0.40	1.44	1.08	-0.68
6/6	0.05	1.62	1.22	-1.17
6/13	1.08	1.43	1.07	0.01
6/20	0.51	1.92	1.44	-0.93
6/27	0.10	1.21	0.91	-0.81
7/4	0.30	1.69	1.27	-0.97
7/11	0.13	1.79	1.34	-1.21
7/18	0.18	2.04	1.53	-1.35
7/25	0.46	1.57	1.18	-0.72
8/1	0.78	1.69	1.27	-0.49
8/8	0.92	1.70	1.28	-0.36
8/15	0.11	1.73	1.30	-1.19
8/22	0.01	1.40	1.05	-1.04
8/29	2.02	1.09	0.82	1.20
Totals	**9.71**	**27.02**	**20.27**	**-10.56**

Insect and disease predictive information is available at:
http://www.enviroweather.msu.edu/home.asp
This issue and past issues of the weekly FruitNet report are posted on our website at:
http://www.maes.msu.edu/nwmihort/faxnet.htm

ACTUAL AND PREDICTED DEGREE-DAY
ACCUMULATIONS SINCE MARCH 1, 2006

Please send any comments or suggestions regarding this site to:
Bill Klein, kleinw@msu.edu

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