Northern Michigan FruitNet 2010
Weekly Update
NW Michigan Horticultural Research Station

Nikki Rothwell, District Horticulturist
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May 4, 2010

GROWING DEGREE DAY ACCUMULATIONS through May3rd at the NWMHRS

Year	2010	2009	2008	2007	2006	2005	20 yr. Avg.
GDD42	434	211	259	281	370	275	238.4
GDD50	197	79	120	112	173	115	101.6

Growth Stages at NWMHRS (5/3/10- 4:00pm)
Apple: McIntosh – Full bloom
Red Delicious – 90% bloom
Gala – 80% bloom
Yellow Delicious – 90% bloom
Pear: Bartlett: Petal fall
Sweet Cherry: Hedelfingen: Petal fall
Napoleon: Early shuck split
Gold: Petal fall
Tart Cherry: Petal fall
Balaton: Petal fall
Apricot: Shuck split
Plum: Petal fall
Grapes: Late bud swell

Weather

Recent daytime temperatures continue to be higher than normal for this time of the year. We hit a high of 84 degrees F. Nighttime temperatures have also been on the warmer side: mid to upper 50's. We have accumulated 434 GDD base 42 and 197GDD base 50 so far this season. We are still a few weeks ahead of our 20-year average. Conditions remain dry in most parts of the north; at the NWMHRS, we received 0.37" of rain on Friday evening. Nothing significant fell over the remainder of the weekend. Irrigation has been going on in the region.

Crop

Please see the above growth stages. With the warm temperatures, honeybees have been flying, but conditions have been windier than we would like.

Pest Report

Apples. The majority of the weather stations in the region received under 1/3" of rain over the weekend, which did not trigger an apple scab infection period according to the apple scab model. Be aware that the Kewadin and Northport weather stations' wetness meter was malfunctioning. We suspect these sites also did not experience a significant infection period. Despite the model's predication, we did capture a moderate number of apple scab spores in one Leelanau orchard. Based on a biofix of 4/2 (McIntosh green tip, the model is predicting 59% maturity and 28% discharge of spores as of Monday, 5/3). According to the forecast, our next significant chance of rain will be on Wednesday. Apple tissue should be kept covered with a protectant fungicide. Spotted tentiform leafminer are still emerging with an average of 600+ per trap this past week. Oriental fruit moth have also arrived with an average of just 2 per trap this week. As we progress into bloom, growers should be aware of the risk of fire blight. See the related article on the new *Interactive Fire Blight Model* on enviroweather.msu.edu.

Cherry. We are catching green fruitworm in the NW Station trap line, with an average of 16 moths per trap. American plum borers were detected for the second week in a row with an average of 12 per trap. As leaf tissue emerges, growers should be aware of potential cherry leaf spot infections. See the included article for management information.

Grape. In northwest Michigan, some winegrapes are still at bud swell and some are at bud burst - 1" green. Growers remain concerned about frost and cold damage.

CHERRY LEAF SPOT
Erin Lizotte, IFP/IPM District Educator, NWMHRS

Cherry leaf spot (CLS) is arguably the most damaging fungal pathogen of tart cherry. CLS primarily infects foliage and reduces the photosynthetic ability of a tree through tissue degradation and early defoliation. When significant defoliation occurs before harvest, fruit may be soft and immature, have low soluble solids, and ripen unevenly. For a point of reference, at least two leaves are needed to effectively ripen each cherry and defoliation that reduces leaf numbers to below that threshold, can cause damage to the current year's crop. Blossom production may also be reduced in subsequent years and following severe defoliation, trees are more susceptible to winter injury because of the loss of stored carbohydrates in the roots.

CLS overwinters in fallen leaves on the orchard floor and produces apothecia (sexual spore-bearing structures) in the spring. Ascospore (sexual spore) dispersal occurs during the drying period that follows a wetting event and temperatures between 60-85°F. Infection occurs through the leaf stomata, which remain susceptible throughout the growing season. The primary infection period may last 2-6 weeks depending on conditions. Following infection, acervuli (asexual spore-bearing structures) develop on the underside of the leaf and produce a visible mass of asexual spores called conidia. Spores are dispersed from leaf to leaf by wind or rain and this secondary infection cycle can be repeated several times within a season, depending on conditions. All commercial cherry cultivars are susceptible to CLS. CLS is resistant to sterol inhibitor fungicides (Indar, Elite, Orbit) in all the major fruit producing areas of Michigan.

The table below lists season long recommendations for management; we are currently heading into the timing for a petal fall application in northern Michigan. Remember to alternate the use of fungicide classes during the season to manage against resistance development and consider an early season cover that also treats for powdery mildew as early season control is key to season long suppression. To monitor for cherry leaf spot using a disease forecasting model visit www.enviroweather.msu.edu.

Cherry Leaf Spot Management Recommendations

Timing	Fungicide	Notes
Petal fall	**Bravo**	
Shucksplit	**Bravo**	
Covers	**Pristine*, Gem*, copper, Syllit or Adamant****	***These strobilurins also provide powdery mildew control**
Preharvest	**See above list but be aware of the pre harvest intervals**	**Reminder: SI applications for the control of brown rot will not control CLS**
Postharvest	**Bravo**	

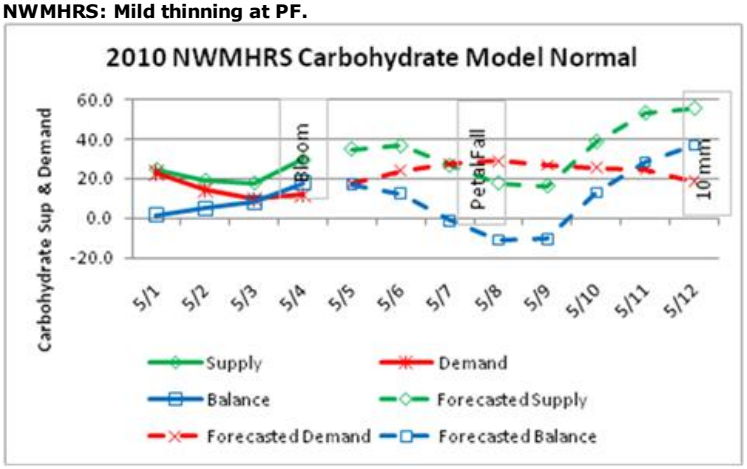
Adapted from Cherry Leaf Spot Recommendations by G.W. Sundin

****Adament is a mixture of Gem and Elite, depending on the rate used you may be applying a lower than recommended rate of these materials, a concern for resistance development.**

ESTIMATING YOUR CURRENT APPLE GROWTH STAGES

Phil Schwallier, Dist. Hort. Educator
Clarksville Horticulture Experiment Station

I am estimating your current growth stages. All models are similar, (not any significant energy shortages) for now. If excessive cloudiness occurs, additional thinning will occur.
-20 is not considered stressful.
-40 is considered stressful and thinning will work.
-50 or more is considered self thinning and quite stressful and excessive thinning may occur.
Other considerations:
Last year heavy crop= Easier thinning this year.
Frost, Pink to Petal Fall= Easier thinning this year.
Forecast : cool and sunny= Greater set potential.
Forecast: Cool to warm with clouds and rain.
Thinning Prediction: Normal sensitivity, mild thinning at PF and mild to moderate thinning at 10 mm.
NWMHRS: Mild thinning at PF.



HOW TO USE THE NEW FIRE BLIGHT INTERACTIVE PREDICTOR

Bill Shane, District Extension Fruit Educator
Tracy Aichele, Enviroweather

A new feature for predicting fire blight disease of apples blossoms was added in 2009 to the Michigan on-line weather system **Enviroweather** (www.enviroweather.msu.edu). The new tool, dubbed the Fire Blight Interactive Predictor, allows the user to modify temperature, rainfall, bloom dates, and other factors to more closely match conditions on your farm. We will explain the features of the Fire Blight Interactive Predictor on Enviroweather and how we think this can be useful to growers, consultants and others involved with fire blight.

The underlying model for blossom blight in the Fire Blight Interactive Predictor model is the same as is used in the Fire Blight Assist Chart that has been on Enviroweather for several years. The Fire Blight Interactive Predictor version provides more versatility and allows the user to gain a better understanding of conditions that favor fire blight epidemics.

The Fire Blight Interactive Predictor is based on Maryblyt, a popular computer program developed by Dr. Paul Steiner and Mr. Gary Lightner, Department of Botany at the University of Maryland. The output for the Fire Blight Interactive Predictor version closely resembles the original Maryblyt model by Steiner. The basic model predicts blossom infection by fire blight on a day when four conditions are met:

Open blossoms (B).
Sufficient warm temperatures over the past several days to increase fire blight bacterial growth on blossoms (H).

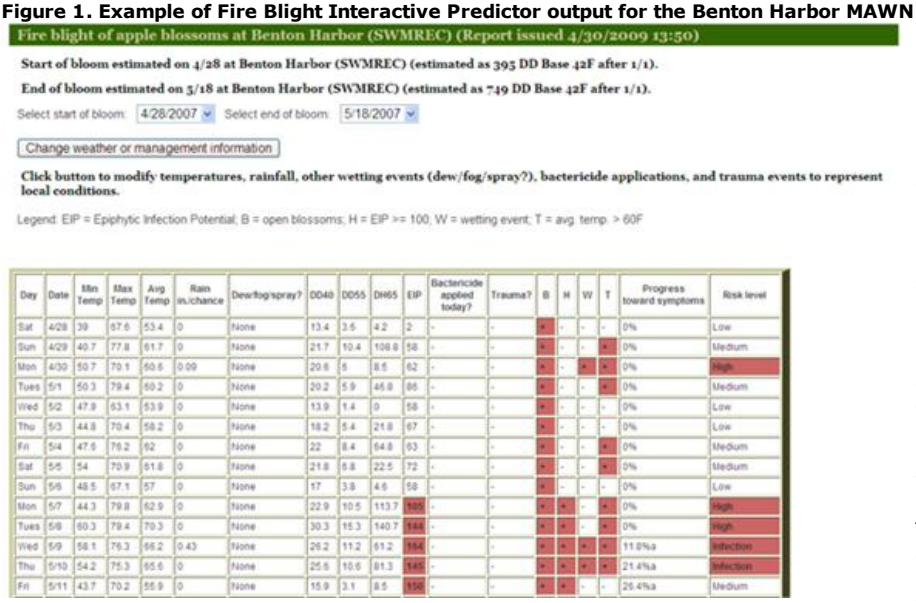
A wetting event such as rain, dew, fog or spraying (W).
Average daily temperature of at least 60°F (T).
The fire blight risk for each day during bloom is given as low, moderate, high, or infection when one, two, three, or four of these conditions are met (Figure 1). For many users, this will be all they need to know to make spray decisions. Bactericide applications are definitely needed for predicted infections and possibly for high fire blight risk ratings. The Fire Blight Interactive Predictor keeps track of multiple infection events and calculates when symptoms are expected to show in the orchard. The Predictor is useful for summarizing fire blight conditions for past seasons, which helps in comparing years and unraveling reasons for disease outbreaks.

A feature in the module that will be prized by advanced users is the ability to temporarily change rainfall, temperature, bloom start and end dates, bactericide spray, and trauma events like hail or high winds to better match local conditions or to try "what if" scenarios.

For example, if the user suspects that the maximum temperature may or has been higher than predicted or recorded for a nearby Michigan State University MAWN weather station, the higher temperature can be substituted to see the resultant prediction. The Fire Blight Interactive Predictor can be used to work backwards to discover when the infection took place that was responsible for unexpected symptoms showing up in the field.

In some respects the Fire Blight Interactive Predictor is a step backwards closer to the original Maryblyt model by Steiner and Lightner still used by some growers and consultants in its original PC DOS format, the only version released and no longer available. The Predictor uses the essence of Maryblyt model in the MSU Enviroweather network to deliver real-time fire blight predictions to busy people.

Figure 1. Example of Fire Blight Interactive Predictor output for the Benton Harbor MAWN weather station in 2007.



Fire blight of apple blossoms at Benton Harbor (SWMREC) (Report issued 4/30/2009 13:50)

Start of bloom estimated on 4/28 at Benton Harbor (SWMREC) (estimated as 395 DD Base 42F after 1/1).

End of bloom estimated on 5/18 at Benton Harbor (SWMREC) (estimated as 749 DD Base 42F after 1/1).

Select start of bloom: 4/28/2007 Select end of bloom: 5/18/2007

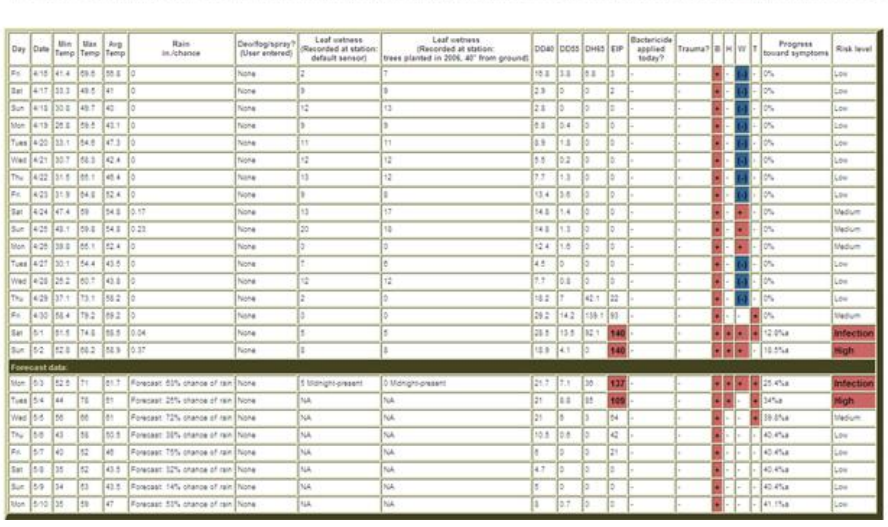
Change weather or management information

Click button to modify temperatures, rainfall, other wetting events (dew/fog/spray?), bactericide applications, and trauma events to represent local conditions.

Legend: EIP = Epiphytic Infection Potential; B = open blossoms; H = EIP >= 100; W = wetting event; T = avg. temp. > 60F

Day	Date	Min Temp	Max Temp	Avg Temp	Rain in./chance	Dew/fog/spray?	DD40	DD55	DH65	EIP	Bactericide applied today?	Trauma?	B	H	W	T	Progress toward symptoms	Risk level
Sat	4/28	39	67.6	53.4	0	None	13.4	3.6	4.2	2	-	-	*	-	-	-	0%	Low
Sun	4/29	40.7	77.8	61.7	0	None	21.7	10.4	108.8	58	-	-	*	-	-	*	0%	Medium
Mon	4/30	50.7	70.1	60.6	0.09	None	20.6	5	8.5	62	-	-	*	-	*	*	0%	High
Tues	5/1	50.3	79.4	65.2	0	None	29.2	5.9	46.8	86	-	-	*	-	-	*	0%	Medium
Wed	5/2	47.9	63.1	53.9	0	None	13.9	1.4	0	58	-	-	*	-	-	-	0%	Low
Thu	5/3	44.8	70.4	58.2	0	None	18.2	5.4	21.8	67	-	-	*	-	-	-	0%	Low
Fri	5/4	47.6	76.2	62	0	None	22	8.4	64.8	63	-	-	*	-	-	*	0%	Medium
Sat	5/5	54	70.9	61.8	0	None	21.8	6.8	22.5	72	-	-	*	-	-	*	0%	Medium
Sun	5/6	48.5	67.1	57	0	None	17	3.8	4.6	58	-	-	*	-	-	-	0%	Low
Mon	5/7	44.3	79.8	62.9	0	None	22.9	10.5	113.7	105	-	-	*	*	-	*	0%	High
Tues	5/8	50.3	79.4	70.3	0	None	30.3	15.3	140.7	144	-	-	*	*	-	*	0%	High
Wed	5/9	58.1	76.3	66.2	0.43	None	26.2	11.2	61.2	144	-	-	*	*	*	*	11.8%a	Infection
Thu	5/10	54.2	75.3	65.6	0	None	25.6	10.6	81.3	145	-	-	*	*	*	*	21.4%a	Infection
Fri	5/11	43.7	70.2	56.9	0	None	15.9	3.1	8.5	156	-	-	*	*	-	-	26.4%a	Medium

In 2010, we changed the Enviro-weather Fire Blight Interactive Predictor to better alert users to potential blossom blight conditions. The original Maryblyt model, on which the Enviro-weather version is based, specified that sufficient moisture for blossom infections could be provided by rainfall and also by dew or water from a spray application, provided other conditions were met. Until now, the Enviro-weather tool used rainfall, but not leaf wetness, as an indicator of moisture.
The newest update includes a column showing the number of hours each day with leaf wetness. A wet hour is defined as any hour with at least 15 minutes of wetness, as measured by the leaf wetness grid sensor at the Enviro-weather station. In any day with at least 1 hour of leaf wetness (LW), but no measurable precipitation, the W (wetness) cell for that day is highlighted in blue and the - symbol is changed to (-). This display alerts the user that sufficient moisture may be present to initiate an infection if the other conditions are also conducive. The user can then click on the "Change Weather or Management Information" button and enter the wetting condition information to incorporate them into infection calculations. Users must decide whether to do this or not. It is not automatic.



Blue cells indicate that leaf wetness was detected at the station. The user should evaluate if heavy dew or heavy fog was present in the orchard. Click the 'Change weather or management information' button to make this change.

Day	Date	Min Temp	Max Temp	Avg Temp	Rain in./chance	Dew/fog/spray? (User entered)	Leaf wetness (Recorded at station: default sensor)	Leaf wetness (Recorded at station: trees planted in 2006, 40° from ground)	DD40	DD55	DH65	EIP	Bactericide applied today?	Trauma?	B	H	W	T	Progress toward symptoms	Risk level
Fri	4/16	41.4	59.5	50.5	0	None	2	7	10.5	3.5	0.5	3	-	-	*	-	-	-	0%	Low
Sat	4/17	33.3	49.5	41	0	None	9	9	2.5	0	0	2	-	-	*	-	-	-	0%	Low
Sun	4/18	30.8	49.7	40	0	None	12	13	2.5	0	0	0	-	-	*	-	-	-	0%	Low
Mon	4/19	26.8	59.5	43.1	0	None	9	9	8.8	0.4	0	0	-	-	*	-	-	-	0%	Low
Tues	4/20	33.1	54.6	47.3	0	None	11	11	9.9	1.5	0	0	-	-	*	-	-	-	0%	Low
Wed	4/21	30.7	58.3	42.4	0	None	12	12	5.5	0.2	0	0	-	-	*	-	-	-	0%	Low
Thu	4/22	31.5	65.1	48.4	0	None	13	12	7.7	1.3	0	0	-	-	*	-	-	-	0%	Low
Fri	4/23	31.9	64.6	52.4	0	None	9	8	13.4	3.6	0	0	-	-	*	-	-	-	0%	Low
Sat	4/24	47.4	59	54.8	0.17	None	13	17	14.8	1.4	0	0	-	-	*	-	*	-	0%	Medium
Sun	4/25	48.1	59.6	54.8	0.23	None	20	18	14.8	1.3	0	0	-	-	*	-	*	-	0%	Medium
Mon	4/26	39.8	65.1	52.4	0	None	0	0	12.4	1.5	0	0	-	-	*	-	*	-	0%	Medium
Tues	4/27	30.1	54.4	43.5	0	None	7	6	4.5	0	0	0	-	-	*	-	-	-	0%	Low
Wed	4/28	28.2	60.7	43.8	0	None	12	12	7.7	0.6	0	0	-	-	*	-	-	-	0%	Low
Thu	4/29	37.1	73.1	55.2	0	None	2	0	18.2	7	42.1	32	-	-	*	-	-	-	0%	Low
Fri	4/30	50.4	79.2	65.2	0	None	0	0	29.2	14.2	139.1	93	-	-	*	-	-	*	0%	Medium
Sat	5/1	51.5	74.6	65.5	0.04	None	5	5	28.5	13.5	92.1	140	-	-	*	*	*	*	12.8%a	Infection
Sun	5/2	52.8	69.2	58.9	0.37	None	9	8	16.9	4.1	0	140	-	-	*	*	*	-	19.5%a	High
Forecast data:																				
Mon	5/3	52.5	71	61.7	Forecast: 63% chance of rain	None	5 Midnight-present	0 Midnight-present	21.7	7.1	36	137	-	-	*	*	*	*	25.4%a	Infection
Tues	5/4	44	75	61	Forecast: 25% chance of rain	None	NA	NA	21	8.8	85	109	-	-	*	*	-	*	34%a	High
Wed	5/5	56	66	61	Forecast: 72% chance of rain	None	NA	NA	21	9	3	64	-	-	*	-	-	*	39.8%a	Medium
Thu	5/6	43	58	50.5	Forecast: 38% chance of rain	None	NA	NA	10.5	0.5	0	42	-	-	*	-	-	-	40.4%a	Low
Fri	5/7	40	52	46	Forecast: 75% chance of rain	None	NA	NA	6	0	0	21	-	-	*	-	-	-	40.4%a	Low
Sat	5/8	35	52	43.5	Forecast: 32% chance of rain	None	NA	NA	4.7	0	0	0	-	-	*	-	-	-	40.4%a	Low
Sun	5/9	34	53	43.5	Forecast: 14% chance of rain	None	NA	NA	5	0	0	0	-	-	*	-	-	-	40.4%a	Low
Mon	5/10	35	59	47	Forecast: 53% chance of rain	None	NA	NA	9	0.7	0	0	-	-	*	-	-	-	41.1%a	Low

A FEW TIPS ABOUT APPLYING APOGEE

Phil Schwallier, Clarksville Hort. Res. Station Coordinator
Nikki Rothwell, District Horticulturist

Apogee® is a plant growth regulator composed of prohexadione-calcium that can be used in apples with significant advantages to the grower. Prohexadione-calcium is a compound that is part of a new class of gibberellin biosynthesis inhibitors called the cyclohexanetriones. Prohexidione-calcium reduces terminal growth by inhibiting important enzymes that help form growth-specific gibberellins. This group of plant hormones is primarily responsible for regulating shoot elongation in apple trees. In laymen's terms, Apogee helps control tree vigor. Controlling vigor can reduce the amount/intensity of

pruning, decrease internal shading, a major proponent to properly color apples, and reduce canopy density for thorough pesticide coverage. In one Canadian study, properly timed Apogee applications eliminated the need to summer prune. This product has also been a reliable tool for minimizing impacts of shoot blight caused by the fireblight pathogen, *Erwinia amylovora*. Shoots that have less growth are not as susceptible to fire blight. When applying Apogee to apples, growers should consider the following: timing, rate per acre, thinning relationships, and compatibility with other chemistries in the tank.

Timing
Apogee should be applied when vegetative shoot growth is less than three inches. To best time the application, there is a 7 to 10-day window beginning at king bloom petal fall. This timing applies to most varieties in most years. Two more applications should be made at two-week intervals following the bloom application. Sometimes a fourth application is needed when excessive rainfall or light crops increase vegetative growth.

Rate
The rate per acre is usually calculated on a tree row volume basis and can be adjusted to two-thirds of the full-rate. The two-thirds rate is the starting rate growers should consider if they have not had experience with using Apogee. Growers with past experience will know if this 2/3 rate is too high or too low for a particular block. This suggested two-thirds rate per acre is a season-long rate. For example, if trees are at 75% tree row volume, then 24 ounces per acre is the seasonal rate (48 * 0.75 * 2/3).

Best results are achieved when the seasonal rate is split into three or four sprays. For example, 8 + 8 + 8oz per acre for a total of 24oz per acre per season. When fire blight is a severe risk, the first application at king bloom petal fall timing should be increased, perhaps as much as 150 percent of the split rate. For example, the rate should be increased from 8oz per acre to 12oz per acre. If the first spray rate is increased, subsequent sprays (second and third sprays) should be reduced. The seasonal application would be 12 + 6 + 6 = 24 ounces per season instead of 8+8+8=24oz.

Thinning
Apogee tends to increase fruit set, hence more aggressive thinning is often needed. If using Apogee, growers should increase thinning by 10 or 15%. For example, if the rate to thin was 1 pt Sevin + 8 ppm NAA, the thinning rate in blocks where Apogee has been used should increase to 1 pt Sevin + 10 ppm NAA.

Compatibility
Apogee is not compatible with calcium or boron in the tank. We also recommend that Apogee be applied after thinner application. If the two-week timing interval is also the ideal time to thin, make the thinning application first and follow with Apogee a few days later. Growers should be sure to follow the label recommendations for AMS and surfactants.

To conclude, Apogee is an excellent tool to help control vegetative growth, which decreases the need for summer pruning and can suppress the spread of fireblight among shoots and within shoots. The above recommendations are the best way to maximize the use of Apogee.

WEBSITES OF INTEREST

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

60 Hour Forecast
http://www.agweather.geo.msu.edu/agwx/forecasts/fcst.asp?fileid=fous46ktvc

Information on cherries is available at the new cherry website:
http://www.cherries.msu.edu/

Fruit CAT Alert Reports
http://www.ipmnews.msu.edu/fruit/

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

ACTUAL AND PREDICTED DEGREE-DAY
ACCUMULATIONS SINCE MARCH 1, 2010

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

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May 11, 2010

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Year	2010	2009	2008	2007	2006	2005	20 yr. Avg.
GDD42	476	302	317	406	470	384	326.7
GDD50	214	127	145	186	227	179	148.6

Growth Stages at NWMHRS (5/10/10 - 5:00 p.m.)

Apple: McIntosh – Petal fall
Red Delicious – Late petal fall
Gala – Late petal fall
Yellow Delicious – Late petal fall
Pear: Bartlett: 8 mm fruit
Sweet Cherry: Hedelfingen: 7 mm fruit
Napoleon: 7 mm fruit
Gold: 6 mm fruit
Tart Cherry: Late petal fall
Balaton: Late petal fall
Apricot: 11 mm fruit
Plum: Late petal fall
Grapes: Late bud burst

Weather

Sunday night was another cold one here in the north. Many of the weather stations reported below freezing temperatures, and our coldest site, the Elk Rapids weather station, recorded a low temperature of 23.1 degrees F. Daytime temperatures have been in the mid-40's to mid-50's. We have accumulated 476 GDD base 42 and 214 GDD base 50; our 20-year average is 327 GDD base 42 and 149 GDD base 50. We have received some significant rainfall in the region, and the Research Station reported 0.37" on 1 May, 0.44" on 4 May, and 1.06" on 8 May. Conditions have been particularly windy this season, and these high winds have presented some problems for spraying. Growers have been running their frost fans on a regular basis in the area.

Crop Report

Please see above for fruit development. As we continue to endure the frosts, many growers have reported an ever shrinking crop for most fruits. Sweet cherries are coming out of the shuck, and fruit is evident but the crop has been reduced since bloom. The tart cherry crop has also been on the decline, and many growers are reporting 20-25% of a crop. However, time will tell the results. Growers with orchards further south think that they will fare better than the more northerly orchards. Apples are in various stages of bloom throughout the region, and the apples at the research station are in late petal fall. Monday's frost impacted the blossoms, particularly fruit in the low sites, but many orchards were past the height of bloom. We have seen a significant amount of dying Macintosh apples throughout the region. In our area, the injury is not specific to Linda Macs as we have seen problems in Rogers Red, Marshall, and Pioneer Macs. Grape growers are concerned about the recent cold temperatures, and less optimal sites suffered some damage on Sunday night. Strawberry growers have been frost protecting during these cold nights. Growers are starting to feel caught up, and despite the early season, growers are getting in the groove.

Pest Report

Apples. Most of the weather stations in the region received around 1" of rain over the weekend. Despite the rainfall, the average temperature during the wetting period was only 41 °F, which was not sufficient to cause an infection period. Despite the model's predication, we did capture a moderate number of apple scab spores in one unsprayed Leelanau orchard. The past wetting event trap catches are as follows:

Based on a biofix of 4/2 (Macintosh green tip), the model is predicting 81% maturity and 47% discharge of spores as of 10 May. According to the forecast, our next significant chance of rain will be 11 May, and cool and wet conditions will continue into the weekend. Apple tissue should be kept covered with protectant fungicide applications. Spotted tentiform

Apple scab spore catch, 2010	
Date	Spores/rod
5-Apr	300
6-Apr	36
8-Apr	255
13-Apr	45
16-Apr	24
26-Apr	12
3-May	60
4-May	0
5-May	105
10-May	60

leafminer are emerging at a slower pace this week with an average of 137/trap compared to 600+ per trap last week. We caught 3 oriental fruit moth per trap this week. As we continue through bloom growers, should be aware of the risk of fire blight and consult the model regularly. We have approached the epiphytic infection potential level that warrants application, but the recent cool weather has prevented further fire blight predictions.

Cherry. We are catching green fruitworm in the Station trap line, with an average of just 1 moth per trap this week, down from 16 last week. American plum borers were detected for the third week in a row with an average of just 2 per trap. As leaf tissue emerges growers should be aware of potential cherry leaf spot infections, the cherry leaf spot model has not predicted an infection period over the past week.

Grape. In northwest Michigan, some winegrapes are still at bud swell and some are at bud burst-1" green. Growers remain concerned about frost and cold damage. We have received some reports of climbing cutworm damage from regional vineyard managers.

PRINCEP HERBICIDE LABEL CLARIFICATION

Amy Irish-Brown, District Fruit IPM Educator, MSU-E
Erin Lizotte, District IFP/IPM Educator, MSU-E
Bernie Zandstra, Dept of Horticulture, MSU

A typographical error has recently been discovered on the current Princep herbicide label in regards to the Pre-Harvest Interval (PHI) for apples. In the apple section of the label, there is a restriction that the PHI for Princep alone on apples is 150 days. Farther down the label under the tank mixing section, there is a footnote that the PHI for Princep tank mixed with Roundup or Touchdown is 14 days. Syngenta will correct this on future labels. The intent of the current Princep label is that the PHI for apples is 150 days regardless of whether Princep is applied alone or in tank mixture with Touchdown or Roundup. Therefore, all applications of Princep have a 150 day PHI restriction for use on apples.

Princep (simazine) is most effective when applied to weed free soil in late fall or in early spring before weeds begin to grow. Addition of Roundup improves kill of early-emerging weeds, especially perennials and horseweed. Simazine is not very effective when applied this late in the year, so this change in the Princep label should not cause major changes in weed control practices.

If growers need another preemergence herbicide application in May or June, Matrix is available. It gives better weed control than simazine, and preemergence weed control will be maintained for about 2 months. A foliar active herbicide such as glyphosate, paraquat, or glufosinate should be included in the tank mix.

Several new herbicides are in the process of being registered for apple and other tree fruit, which will help extend weed control late into the summer and the harvest season.

ESTIMATING CURRENT GROWTH STAGES

Phil Schwallier, District Extension Educator

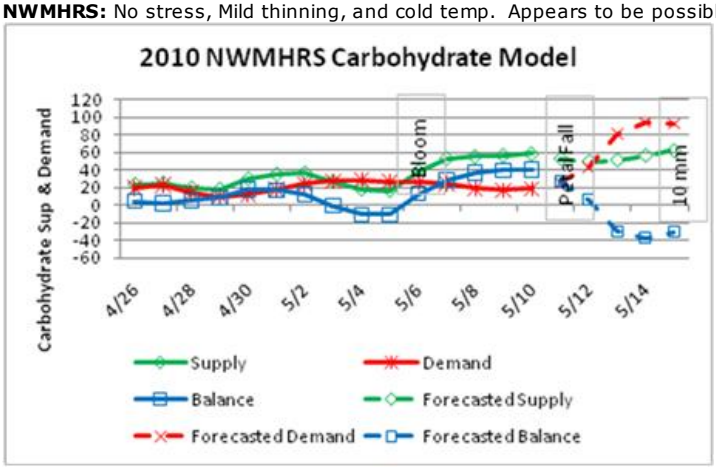
All models are similar, (not any significant energy shortages) for now. If excessive cloudiness occurs and warm temps, additional thinning will occur.

-20 in not considered stressful.
-40 is considered stressful and thinning will work.
-50 or more is considered self thinning and quite stressful and excessive thinning may occur.

Other considerations:

Last year heavy crop=	Easier thinning this year.
Frost, Pink to Petal Fall=	Easier thinning this year.
Forecast : cool and sunny=	Greater set potential.

Forecast: Cool with clouds and rain, little to no stress, fruitlets will set.
NWMHRS: No stress, Mild thinning, and cold temp. Appears to be possible future stress.



MDA WATER PROGRAM OFFERS ASSISTANCE FOR FARMERS AND HOMEOWNERS IN 2010

LANSING, Mich. - The Michigan Department of Agricultures (MDA) program addressing environmental risks for farmers and homeowners has changed its name to the Michigan Water Stewardship Program (MWSP). The program formerly known as the Michigan Groundwater Stewardship Program is a legislatively enabled partnership, established in 1994, designed to help individuals reduce the risks of water contamination.

The Michigan Water Stewardship Program is nationally recognized as the standard for voluntary environmental risk reduction and regulatory compliance, said James Johnson, Director of the MDA Environmental Stewardship Division. Our program addresses meaningful, permanent, and voluntary practice changes - one property at a time.

The MWSP addresses environmental risks through several distinct programs, including:
Agriculture, turfgrass and residential technical assistance
Clean Sweep (free pesticide disposal to Michigan residents)
Pesticide Container Recycling
Groundwater Monitoring
Clean-up and disposal advice for large spills involving pesticides, manure and fertilizer

The MWSP is available locally through Conservation District offices. The primary means for identifying on-farm environmental risks are with assessment tools such as Farm*A*Syst and Crop*A*Syst. The A*Syst evaluations are conducted by Conservation District Stewardship Specialists who work one-on-one with farmers to identify environmental risks, create a plan to eliminate the risks, and provide the technical assistance needed to implement the plan.

Additionally, the MWSP in cooperation with federal, county, and local government has established 15 permanent Clean Sweep sites located throughout the state for the proper disposal of unused and unwanted pesticides. Michigan residents may dispose of pesticides at any Clean Sweep site, which will collect packages for shipping and properly dispose of free of charge.

The Pesticide Container Recycling Program provides a way for agricultural producers and agri-businesses to collect and recycle #2 plastic high density polyethylene (HDPE) pesticide containers. Collecting and recycling properly cleaned pesticide containers conserves valuable landfill space and reduces the need for new raw material. The plastics collected are recycled.

The groundwater monitoring program samples private wells across the state for general chemistry, pesticides, and volatile organic compounds. The program supports the State Groundwater Management Plan by providing data on private drinking water well quality to retain pesticide product registrations, where those products can be used without negative impacts on groundwater quality.

For the rapid, cost-effective clean up and proper use or disposal of manure, pesticides, and fertilizer, MDA has established a Spill Response Program. Department staff respond to incidents reported to the toll-free MDA Spill Hotline at 800-405-0101 by emergency first responders, responsible parties, or other persons that observe an uncontrolled release.

The Michigan Turfgrass Environmental Stewardship Program (MTESP) is dedicated to protecting environmental resources by advancing turfgrass management practices, preventing pollution, and increasing regulatory compliance within the golf and commercial turf industry. The program represents a partnership between MDA, Michigan State University, and the Michigan Turfgrass Foundation. MTESP staff work with golf course superintendents and lawn care companies to conduct site visits that identify environmental risks on the property and develop Environmental Action Plans to address those risks. Golf courses and lawn care companies that have identified and abated all environmental risks on the property become certified courses in the MTESP.

For additional information on the MWSP visit www.michigan.gov/waterstewardship or call 517-335-6529.

Oil and Gas Lease Educational Program

May 19, 2010
Banks Township Hall, Ellsworth MI

Agenda

Open - 6:00 p.m.

Welcome and Introductions
Stan Moore, County Extension Director, Antrim County MSUE

Geology and Fracking
Halliburton Representative

Oil and Gas Production in Michigan
Andy VanAlst, Independent Land Man

Benefits of oil and gas leasing to Michigan
What is a lease?
What is important to oil and gas companies?
Understanding post production cost
How pools/units are set up
Pooling/Unitization and Uniform Spacing Patterns
Understanding the Lease
Curtis Talley, District Farm Management Educator

Know what it says and the implications for the future
Items that you may negotiate
Break

Surface Damages/Restoration
Mike Meriwether, Antrim Conservation District, Forester

Erosion, Wetlands and Streams
Heidi Shaffer, Antrim Conservation District, Soil Erosion Officer

Bringing it all Together for a Win-Win Lease
Joe Quandt, Attorney

Writing up changes and addendums
Common pitfalls
Common things overlooked and misunderstood
Conclusion - 9:00 p.m.

WEBSITES OF INTEREST

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

60 Hour Forecast
http://www.agweather.geo.msu.edu/agwx/forecasts/fcst.asp?fileid=fous46ktvc

Information on cherries is available at the new cherry website:
http://www.cherries.msu.edu/

Fruit CAT Alert Reports
http://www.ipmnews.msu.edu/fruit/

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

ACTUAL AND PREDICTED DEGREE-DAY
ACCUMULATIONS SINCE MARCH 1, 2010

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

Last Revised: 5-11-10

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Northern Michigan FruitNet 2010
Weekly Update
NW Michigan Horticultural Research Station

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

May 18, 2010

GROWING DEGREE DAY ACCUMULATIONS through May 17th at the NWMHRS

Year	2010	2009	2008	2007	2006	2005	20 yr. Avg.
GDD42	549	369	393	483	547	417	409.6
GDD50	245	156	177	224	256	186	191.3

Growth Stages at NWMHRS (5/14/10 - 2:30 p.m.)
Apple: McIntosh – Late petal fall
Red Delicious – Late petal fall
Gala – Late petal fall
Yellow Delicious – Late petal fall
Pear: Bartlett: No fruit
Sweet Cherry: Hedelfingen: 8 mm fruit
Napoleon: 8 mm fruit
Gold: 7 mm fruit
Tart Cherry: Shuck split to 5 mm fruit
Balaton: Shuck split to 5 mm fruit
Apricot: 11 mm fruit
Plum: Shuck split
Grapes: Late bud burst

Weather

Daytime temperatures are becoming more summer-like. The past two days have reached into the high 60's and low 70's, and temperatures are predicted to go up into the mid-70's. Nighttime temperatures have remained cool—mid to low 40's, and dipping down into the high 30's on a few nights. No severe frosts have been recorded since last Monday night. In terms of growing degree days, we have accumulated 549 GDD base 42 and 245 GDD base 50; we are about 50 GDD ahead of our 20-year average. Area weather stations recorded rainfall on the night of 13 May, and the NWMHRS received just under a half inch.

Crop Report

Please see above for crop development. The frost event of 10 May did more damage than initially believed. The cherries, both sweet and tart, that had emerged from the shuck were damaged by the frost. Those fruits are black to brown and will fall from the tree. Overall sweet cherries are showing lots of frost scars, and these fruit will have a highly likelihood of cracking if we have rain near harvest. The tart cherry crop has also thinned in recent weeks, and there are many guesstimates of 30-50% of the 2009 crop. However, the cherry crop in both tarts and sweets, seems variable by orchard block. Some blocks fared better than others, and block location seems to be playing an important role in yields this year. Apples are still up in the air in terms of crop development. Growers think that they lost fruit after the 10 May frost, but most apples are in late petal fall, so the crop is not yet visible for assessment. The Macintosh 'issue' that is resulting in mortality in orchards across the northwest is more widespread than we first anticipated. Strawberries are in bloom in the region, and growers are still frost protecting to maintain the crop. Strawberry growers anticipate that they will harvest fruit almost at the same time as last season. Grapes suffered some damage in the last frost, and vineyards on marginal site obviously had more damage than those on good sites. However, some *Vinifera* spp. fared well because they were not much past bud burst, while others had considerably more damage.

Pest Report

Apples. Most of the weather stations in the region received between 0.25-0.47" of rain 13 May, with average temperatures in the high 40's during the wetting period. Despite the model's predication for a light-moderate infection period, we caught no spores in our trap site in Leelanau County. Based on a biofix of 4/2 (Macintosh green tip), the model is predicting 92% maturity and 62% discharge of spores as of 18 May. According to the forecast, our next significant chance of rain will be on Friday 21 May, with temperatures predicted to remain warm providing ideal conditions for **apple scab** infection. Apple tissue should be kept covered with protectant fungicide applications. Early in the season when fruit

scab is not a concern and temperatures are cooler, Scala and Vanguard are good options to tank mix with EBDCs for scab control. As we move into warmer weather and the risk of fruit scab increases, growers should be considering second generation sterol inhibitors (Indar and Inspire Super), or captan tank mixed with EBDCs. **Spotted tentiform leafminer** are emerging at a faster pace with the warm up this week with an average of 225/trap compared to 160 per trap last week. We caught 8 **oriental fruit moth** per trap this week. **Redbanded leafroller** and **oblique-banded leafroller** larvae (<1") were observed rolling leaves in apple orchards. There are numerous insecticides that are effective against these early season Lepidopterans, including but not limited to Delegate, Mustang Max, Belt, Voliam Flexi and Leverage. When choosing an insecticide, consider secondary pests that can be controlled with an individual application; multiple early season insects can be controlled with the same chemistries. As we continue through bloom, growers should be aware of the risk of **fire blight** and consult the model regularly. With temperatures climbing, the EIP looks sure to reach 100 by 19 May and will continue to increase. Additionally the forecasts are predicting wetting events for the weekend. Trees should be going into the wetting event covered with a streptomycin application. Refer to the E154 Fruit Management Guide for more pesticide information, and always read and follow the pesticide label.

Cherry. Green fruitworm emergence continues, with an average of just 1 moth per trap for the second week in a row. Growers currently at petal fall and looking to manage Lepidopteron pests such as **oblique-banded leafroller** and **green fruitworm** have many options including Lorsban, pyrethroids, Delegate, Belt, Leverage, and Voliam flexi. Keep in mind that pyrethroids may flare mites, and some sites may have OBLR resistance to both Guthion and pyrethroids. If utilizing SpinTor, Entrust, or Delegate, good coverage is key as these insecticides need to be ingested by the insect**. American plum borers** were detected for the fourth week in a row with an average of 9 per trap. **Lesser peach tree borer** was observed for the first time this week with an average of 3 per trap. Trunk applications of Lorsban are commonly used to manage borers and should be applied in conjunction with peak adult emergence on-farm**. Plum curculio** activity is significant around the region. Growers who have fruit coming out of the shuck may be considering an insecticide application for plum curculio. Guthion (1.5 lb season long maximum this year), Imidan, Avaunt, Actara, Assail, Voliam Flexi, and Imidan (not on sweets) are all rated as excellent. As leaf tissue emerges, growers should be prepared for **cherry leaf spot** infection. The cherry leaf spot model predicted an infection period on 13 May at some regional weather stations. As we approach first cover timing, growers should consider an application that contains both a leaf spot and mildew material as early season suppression of mildew have proven important to season long control. Products such as Pristine and Gem contain strobilurin fungicides that are effective against both leaf spot and powdery mildew. These products should be tank-mixed with 3lb Captan to slow resistance development. Bacterial canker appears sporadic but severe in areas. Refer to the E154 Fruit Management Guide for more pesticide information and always read and follow the pesticide label.

Grape. In northwest Michigan, some winegrapes are at 1-2" green. We have received some reports of climbing **cutworm** damage from regional vineyard managers, and there will be relief that the warmer weather will move vines out of the period vulnerable to cutworm.

LECANIUM SCALE ON SWEET CHERRIES

N.L. Rothwell, District Horticulturist, MSU-E
R. Isaacs, Dept. of Entomology, MSU

We have observed scale on sweet cherry in the past few weeks. At first, we thought the relatively few numbers of these small insects was an anomaly, but upon further scouting, they have both grown in size and number. In fact, some of the scale populations have reached numbers that warrant a control measure, particularly on young trees. This write up is a reminder for growers to be on the lookout for scale in their orchards (and strawberry fields) to determine whether they have similar infestations.

At this time, the scales on sweet cherry branches appear as either small, flat dark black ovals or a bit larger and tan colored. They tend to be on the lower side of the shoot, so growers should look on the undersides of branches to see the scale, because of this location, they can be hard to see and identify at first glance. Some infestations have only a few scales per branch, while others are well-covered. One tell-tale sign is the shiny film of honeydew that the scales excrete (similar to aphids) onto surfaces beneath the scales. This shiny residue can help you find scale infestations on a tree or strawberry plant, but in rainy weather the honeydew can be washed off rather quickly.
The scale species found this spring has been identified as Lecanium scale, which is a soft scale pest of many deciduous plants. Last year was a bumper year for Lecanium scale in many parts of Michigan, particularly in hardwoods. We surmise that the crawlers that emerged last August have settled down and survived the winter in orchards and field adjacent to infested woody areas. Lecanium scale has one generation per year and is currently growing through molts from the overwintered scale (small black one in the photo), to a larger tan scale, and will then molt again before becoming a mature female. This female stage will lay eggs under a 'turtle-like' exoskeleton, the eggs then hatch and the crawlers disperse from the protective covering to find new places to feed. If infestations are high, growers should take precautionary measures before the female forms this more hardened off, 'turtle-like' scale where insecticides will be less effective.

As mentioned above, the scales' feeding creates honeydew that can act as a substrate for sooty mold (black fuzzy mold visible on most hardwood trees throughout the region). Sooty mold does not cause damage, but the scales' sap removal when feeding can weaken shoots. As we have not observed high levels of Lecanium scale in orchards, we know that their feeding will weaken the trees, but we do not know the threshold for control measures. The rule of thumb is that vigorous and healthy trees and plants can tolerate some scale infestation, but if high populations of Lecanium scale are found, control programs should be considered.

Natural enemies usually regulate scale populations and prevent outbreaks of these pests, but growers with high populations this season should consider chemical control options. At this time of the season, it is too late for oil applications to suffocate the scale; this control option would typically be at the early spring dormant timing. Esteem is registered for Lecanium scale on cherry at 13-16oz per acre; high infestations should use the higher rate of Esteem. Esteem also has a special label on strawberry, but Lecanium scale is not listed as a targeted pest. Esteem is an insect growth regulator that acts by disrupting the scale's normal molting. Application of Esteem should be planned soon, to disrupt their development before they reach the mature adult stage. Esteem's effects may take some time to see, but with good coverage and timely application, it should prevent the scales reaching the stage where crawlers will be produced. Movento is also labeled in sweet cherry, and although no data exists for Lecanium scale, this product has had good results on San Jose Scale. Growers should apply Movento at 88-140 g/acre (365-585ml/acre). Again this product should be applied soon and again 21 days later.

Most other insecticides that are active on scale are used at the crawler stage, later in the season, after the insect has emerged from the waxy covering. Crawlers are much more vulnerable to insecticides than the mature scales, and we will be monitoring the infested fields to identify when we see crawler emergence. Growers can scout for crawlers by placing some double-sided sticky tape near to scales on infested shoots, and checking with a hand lens until you see tiny dots (the young crawlers) on it.

THINNING TIME AGAIN
Nikki Rothwell, District Horticulturist, MSU-E

Factors to Consider:

Crop from last year. Light crop last year results in increased flowering in present year. Heavy crops will likely result in reduced flowering. Last year was a good apple season, and many blocks had high numbers of fruit. With a heavy crop last year, thinning will be easier this season.
Frost damage. As we have suffered many frosts this season, thinning may be a challenge. First, if at all possible, check to see if you actually have fruit in the orchard before thinning. Optimum thinning time is around 10mm, so most growers will know how the block has fared with this season's many challenging spring frosts. Frost at pink to petal fall often results in easier thinning. If frost has taken out the king bloom, thinning becomes more difficult.
Pollination and bee activity. Growers have reported improved hive quality this season, but we have had extremely windy and cold conditions. Honeybees like to fly on sunny, calm days with the temperatures above 50 degrees F. We have not had many of those this season, but some growers have noticed excellent bee activity on those surprise warm and calm days. Pollination will play a major role in this season's apple crop, just as the frosty conditions during this spring.
Weather conditions during thinning. Cold temperatures and sunny weather increase fruit set. Cloudy conditions increase thinning (See Table 1).
Tree vigor and growth. Trees that are growing vigorously with lots of leaves and lush growth present are harder to thin than less vigorous trees.
Table 1. Abiotic factors that affect thinning.

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

Again this season, we are using a new tool that is designed to help growers put some science behind their thinning decisions. This tool is designed to help with thinning evaluation using the hypothesis that fruit set is based on tree carbohydrate supply and demand:

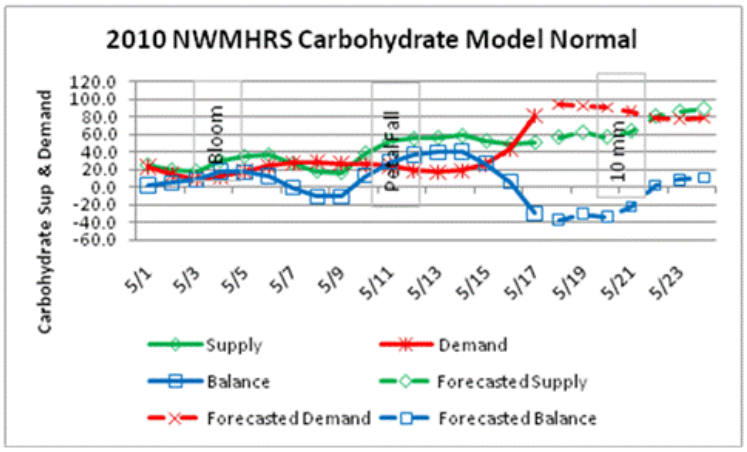
Fruitlets need energy (carbohydrates) to set, and if they become deficient of energy, they more readily drop from the trees. Fruitlets with fewer carbohydrates will be easier to thin.
Stress at fruit set timing, either from thinners, weather conditions, or tree energy levels will cause increased fruit drop. This new carbohydrate model helps predict energy levels based on current weather conditions as well as predicted forecasts to determine optimal times to thin.

The model output (Figure 1) indicates that thinning stress is possible now thru 5-22. These output levels are a bit surprising as weather forecasts do not seem to indicate very stressful conditions. If thinners are applied, please have check trees left and perhaps thin at a bit less aggressive.

How to interpret the model:

-20 in not considered stressful.
-40 is considered stressful and thinning will work.
-50 or more is considered self-thinning and quite stressful--excessive thinning may occur.

The NWMHRS model predicts normal to moderate thinning should occur now. Moderate to aggressive thinning should occur near 5-18 thru 5-22.



YOUNG MAN LOOKING TO WORK ON A FARM

Following is information for Peyton Ginakes, (904)207-8518, ginak002@umn.edu

University of Minnesota, Twin Cities campus
College of Food, Agriculture and Natural Resource Sciences (CFANS)
Just completed my sophomore year, expected to graduate May 2012
Pursuing Bachelor of Science in Environmental Science, Policy, & Management, with emphasis on Conservation and Resource Management. Minor in Soil Science

I am looking for an internship where I can learn about sustainable farming, specifically ways to conserve soil, compost, market

locally, etc. I want a farm in the future, but since I have never had any farming experience, I want an internship that can help me learn how to go about the farm-building process. I can work from early June through August. I love being and working outdoors, and I'm hard-working and able.

TREE ASSSISTANCE PROGRAM (TAP) FOR ORCHARDISTS AND NURSERY TREE GROWERS

Click Here for a pdf file with program details.

WEBSITES OF INTEREST

Insect and disease predictive information is available at:
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60 Hour Forecast
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ACTUAL AND PREDICTED DEGREE-DAY
ACCUMULATIONS SINCE MARCH 1, 2010

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

Last Revised: 5-18-10

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Northern Michigan FruitNet 2010
Weekly Update
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Nikki Rothwell, District Horticulturist
Erin Lizotte, District Fruit IPM/IFP Agent
Bill Klein, Farm Mgr, NWMHRS
Duke Elsner, Agricultural & Regional Viticulture Agent

May 25, 2010

GROWING DEGREE DAY ACCUMULATIONS through May 24th at the NWMHRS

Year	2010	2009	2008	2007	2006	2005	20 yr. Avg.
GDD42	715	501	435	609	604	526	504.5
GDD50	356	237	191	304	284	243	243.0

Growth Stages at NWMHRS (5/24/10 - 3:30 p.m.)

Apple: McIntosh – Trees removed
Red Delicious – 6 mm fruit
Gala – 8 mm fruit
Yellow Delicious – 7 mm fruit
Pear: Bartlett: 10 mm fruit
Sweet Cherry: Hedelfingen: 12 mm fruit
Napoleon: 12 mm fruit
Gold: 11 mm fruit
Tart Cherry: 10 mm fruit
Balaton: 10 mm fruit
Apricot: 28 mm fruit
Plum: 7 mm fruit
Grapes: 1-3" shoots

Weather

Like the rest of the state, the northwest has been particularly hot over the past few days. Temperatures soared into the high 80's on Sunday, and we hit 90 on Monday afternoon. Temperatures are forecasted to be in the 80's for the remainder of the week. Our degree day accumulations continue to be ahead of our 20-year average. We have accumulated 715GDD base 42 and 356GDD base 50 (averages: 505GDD base 42 and 243GDD base 42). We received some rain on Thursday night, and here at the NWMHRS, the weather station reported 0.23" of rain. Overall, the region is dry with the hot temperatures and windy conditions.

Crop

Please see the above growth stages. Overall, the crop across the northwest is variable as mentioned in past weeks. However, fruit is now visible in sweet and many tart cherry orchards. Some growers have been pleasantly surprised at their crop while others are asking for 'low-spray' programs for tart cherries. Sweet cherries have frost scars, which could present problems as we near harvest. Growers will be applying gibberellic acid to bearing cherries, and many are going to be thinning apples this week. With the past rain and heat, growers have been trying to catch up with mowing. Unusual insect pests have plagued growers this season; Lecanium scale and tent caterpillars are causing problems in tree fruit, strawberry, grapes and raspberries. Strawberries are in full bloom.

Pest Report

Apples. Most of the weather stations in the region received about 0.2" of rain 21 May, with average temperatures in the high 50's during the wetting period. Despite the model's predication for a moderate scab infection period, we caught no spores in our trap site in Leelanau County. However, this is an abandoned block and may have defoliated early, which would minimize the spore release due to leaf decomposition. Based on a biofix of 4/2 (McIntosh green tip), the model is predicting 99% maturity and 79% discharge of spores as of 24 May. According to the forecast, there is no significant chance of rainfall in the coming week—but with the hot temperatures in the region, an isolated thunderstorm is a possibility. Apple tissue should be kept covered with protectant fungicide applications. As we move into warmer weather and the risk of fruit scab increases, growers should be considering second generation sterol inhibitors (Indar and Inspire Super) or Captan tank mixed with EBDCs. Growers should be aware of the risk of **fire blight** where bloom is still present and should consult the model regularly with epiphytic infection potentials (EIP's) well above 300 this week (100 is the indicator to spray, if we have a wetting event). Growers should be going into the wetting events or potential trauma events with a protective streptomycin application.

Spotted tentiform leafminer numbers are down with an average of 55 per trap. We caught an average of 64 **Oriental fruit moth** per trap this week, the largest emergence by far this season. **Redbanded leafroller** and **oblique-banded leafroller** larvae (≤1") were observed rolling leaves in apple orchards for the second week in a row. There are numerous insecticides that are effective against these early season Lepidopterans, including but not limited to Delegate, Mustang Max, Belt, Voliam Flexi and Leverage. When choosing an insecticide, consider secondary pests that can be controlled with an individual application as multiple early season insects are susceptible to the same chemistries. **Codling moth** was trapped and biofixed on 20 May and continues to be caught this week with an average of 19 moths per trap. Refer to the E-154 Fruit Management Guide for more pesticide information and always read and follow the pesticide label.

Cherry. Green fruitworm emergence has ceased after 6 weeks of trap catches. Growers, currently at petal fall and looking to manage for Lepidopteron pests such as oblique-banded leafroller and green fruitworm, have many viable options including Lorsban (tarts only), pyrethroids, Delegate, Belt, Leverage, and Voliam flexi. Keep in mind that pyrethroids may flare mites and some sites may have OBLR resistance to both Guthion and pyrethroids. If utilizing SpinTor, Entrust or Delegate good coverage is key as these insecticides need to be ingested by the insect.

American plum borers were detected for the fifth week in a row with an average of 17 per trap**. Lesser peach tree borer** was observed for the second week with emergence increasing from 3/trap last week to 29 this week. We have not captured **greater peach tree borer**, but the larvae are present in the trunks at this time. Trunk applications of Lorsban are commonly utilized to manage for borer and should be applied in conjunction with adult emergence on farm. Mating disruption is also available for the peach tree borer species but should be deployed earlier in the year. Growers that have high borer pressure should consider disruption for 2011.

Plum curculio activity is significant around the region. Growers who have fruit coming out of the shuck should be covering the exposed fruit from egg-laying PC females. Guthion (1.5 lb season maximum this year), Imidan, Avaunt, Actara, Assail, Voliam Flexi, and Imidan (not on sweets) are all rated as excellent. If growers are planning a Guthion application in conjunction with the 375DD PITS model, we have accumulated 220DD since Montmorency bloom. Full coverage, intensive scouting and the use of Guthion are key to properly implementing the PITS model; this model should only be used in tart cherry.

As leaf tissue emerges, growers should be aware of potential **cherry leaf spot** infections. The cherry leaf spot model predicted an infection period in conjunction with the wetting even on 21 May at all regional weather stations. As we approach first or second cover timing, growers should consider an application that contains both a leaf spot and mildew material as early season suppression of mildew have proven important to season-long control. Products such as Pristine and Gem, which contain strobilurin fungicides, are effective against both leaf spot and powdery mildew and should be tank mixed with 3lb Captan to slow resistance development. **Bacterial canker** appears sporadic but severe in areas with leaf symptoms starting to really stand out now. Refer to the E-154 Fruit Management Guide for more pesticide information and always read and follow the pesticide label.

Grape. Most varieties are at bud burst with up to 2" of green tissue exposed. Significant frost/freeze damage is visible on less optimal vineyard sites, but overall vines look good considering the extreme weather conditions this spring. Most growers report sporadic bud damage regardless of site quality but remain optimistic about the potential crop for this season.

As we move into the season, we have spotted some of the usual suspects on our scouting trail and have also observed some interesting new comers. The first **grape berry moth** was caught in Leelanau County on 19 May. The grape entomology team has been working to develop and perfect a model for this pest. The model tracks the predicted percent of egg laying and the start of second and third generation egg laying to help identify key treatment timings. Be sure to record the date of wild grape bloom at your location to use this model!
We have also observed **forest tent caterpillar** in vineyards. It appears that the caterpillars crawled or were blown in from neighboring woodlots and are feeding on vines but do not appear to be doing significant damage to the newly emerging leaves and shoots at most sites. At this stage of development, the caterpillars should be migrating to locate the right place to pupate into adult moths. Management for this pest is not recommended at this time. Forest tent caterpillar follow a boom-bust cycle of population density and the 2009-10 seasons have seen extremely high populations around northwest Michigan. Forest tent caterpillars are a native species with indigenous natural enemies, diseases, and resource limitations that are expected to naturally control populations in the coming seasons.

Lastly, **lecanium scale** has been observed in higher than expected levels in area orchards and vineyards. Lecanium scale overwinter as 'black caps' that look a lot like lenticels. As they molt and become larger and lighter in color they are more easily visible when scouting. Some high density populations may warrant management. Female scales are now hardening and eggs are visible under the female 'shells'. Growers should wait until crawlers have emerged for control as the females are not susceptible to insecticides at this time.

FIRST GENERATION CODLING MOTH MANAGEMENT, 2010
John Wise, MSU Trevor Nichols Research Complex; Larry Gut, MSU Entomology; David Epstein, MSU IPM Program; Peter McGhee, MSU Entomology

This week's forecast suggests that day and night temperatures will be above normal over the next seven to 10 days, which should bring widespread emergence of adult codling moths and the beginning of oviposition (egg laying). To get the most benefit from a codling moth control measure, growers should treat a block after moth captures have been recorded and the accumulation of growing degree days (GDD) required for a particular action, as indicated in Table 1, has taken place.

Table 1. Codling Moth GDD Model and insecticide timings for control.

	Event	**Action**
GDD° base 50 (Post Biofix)		
Pink bud	Development of overwintering larvae.	Set traps.
0 GDD° = Biofix (~200 DD° after Jan 1)	1st sustained moth captures	Set DD° = 0

100 GDD°	1st generation egg laying (oviposition).	Timing for ovicide materials.
250 GDD°	Start of 1st generation egg hatch.	Timing for larvacide materials.
350 GDD°	1st generation egg laying & hatch.	Delayed timing if pest pressure is low, or for 2nd treatment if an ovicide was applied at 100 DD°).
500-650 GDD°	Peak of 1st generation egg hatch.	Timing for additional larvacide if monitoring of CM activity indicates a treatment is needed.
1000 GDD°	Expected end of 1stgeneration activity.	

Egg control
Although several insecticides have limited ovicidal activity, only Rimon is considered a strong ovicide material, thus codling moth egg laying is the optimal timing for this material (Table 2). Rimon applied at codling moth biofix plus 100 GDD also provides excellent control of obliquebanded leafrollers.

Larval control
The vast majority of insecticides used for codling moth control are aimed at killing larvae (Table 2). This is not an easy task, as young larvae feed and enter the fruit within a few hours of hatching. Options for controlling codling moth larvae include conventional contact poisons, like the organophosphate (OP) compounds, Guthion and Imidan and a number of pyrethroid insecticides. These materials kill larvae that crawl across or consume the lethal residues. They primarily target newly emerging larvae at codling moth egg hatch, and thus are typically applied beginning at 250 GDD post biofix. Pyrethroid insecticides appear to be more effective in the spring for first generation codling moth, than summer and have a broad activity spectrum. Pyrethroids are toxic to mite predators and should be used carefully to avoid outbreaks of phytophagous mites. Apple growers should be aware that resistance to the OP compounds has been detected in Michigan orchards throughout the state, most extensively in the Fruit Ridge and Southwest production areas. The levels of resistance detected were high enough in those orchards that sole reliance on OP's for codling moth control is not likely to provide sufficient control. In addition, populations resistant to OP compounds may also be resistant to pyrethroids.

Delegate (spinetoram) is a new compound in the same insecticide class as SpinTor (spinosad). The active ingredients of both Spinosyn compounds are similar in that they are waste metabolites produced during the growth of a bacterium. A major difference between the two AI's however, is that spinetoram is much more lethal to codling moth larvae. In small-plot and on-farm trials, Delegate has provided excellent control of both first and second generation codling moth. It kills larvae as they hatch and begin feeding, thus should be applied at the larvicidal timings indicated in Table 1. Delegate has very good activity against obliquebanded leafrollers, suppression activity on apple maggots, and limited lethal action on plum curculio when ingested (Table 3).

Altacor (rynaxypyr) and Belt (flubendiamide) belong to a new class of Diamide insecticides that work on the insect by activating ryanodine receptors, thus depleting internal calcium and preventing muscle contraction. In small-plot and on-farm trials, Altacor and Belt have provided excellent control of both first and second generation codling moth. Altacor and Belt provide excellent obliquebanded leafroller control, and limited suppression activity on apple maggot (Table 3).

The neonicotinoids, Assail and Calypso, will provide very good control of codling moth with a residual action of 10-14 days. Proper timing and coverage is required to achieve control. These compounds are primarily larvicidal, but also have some ovicidal activity when applied over the top of the egg. Field trials have indicated that use of Assail in combination with pyrethroids or carbaryl can result in outbreaks of phytophagous mites. Assail and Calypso are fairly broad-spectrum materials. In contrast to the insect growth regulators and Diamides, the major secondary targets of these neonicotinoids are the sucking insects, specifically aphids (GAA and RAA) and leafhoppers (Table 3). The initial application of Assail or Calypso targeting first generation codling moth will also provide control of plum curculio, Oriental fruit moth and spotted tentaform leafminer, and they will control apple maggot.

Clutch/ Belay, another neonicotinoid registered for use in pome fruits, is a broad-spectrum material targeting codling moth as well as aphids, leafhoppers, plum curculio, spotted tentiform leafminers, Oriental fruit moths and pear psylla. Research trials have indicated that Clutch/ Belay is not as effective as Assail or Calypso for second generation codling moths.

Proclaim is a codling moth control material in the Avermectin class of insecticides. It has provided good control of first generation codling moth in trials at the **Trevor Nichols Research Complex** and in on-farm demonstration trials. Proclaim also has very good activity against obliquebanded leafrollers.

Intrepid is an insect growth regulator that provides good control of codling moth with a residual action of about 10-14d. This product is an insect growth regulator that primarily affects codling moth larvae, but also has substantial activity on eggs, and has sublethal effects on adults. The best results have been achieved by taking advantage of the ovicidal and sublethal effects. For example, applying an early spray at biofix plus 150-200 GDD or a delayed timing of 350 GDD. At the early timing, Intrepid will also control obliquebanded leafroller larvae that are still present in orchards harboring high numbers of this troublesome pest. The addition of an agricultural adjuvant is recommended to improve initial spray deposition. As a cautionary note, growers should be aware that populations resistant to OP compounds might also be resistant to Intrepid.

Avaunt is an oxidiazine material that provides fair control of codling moth with a residual action of about 10-14d. Avaunt will also provide control of plum curculio and leafrollers.

There are several new pre-mix insecticides labeled for codling moth control, including Voliam flexi (thiamethoxam + chlorantraniliprole), Tourismo (flubendiamide/buprofezin), and Leverage (imidacloprid + cyfluthrin) that combine two active ingredients as pre-mix formulated compounds. When these are used for codling moth control care must be taken **NOT** to

use a product in the following generation that is in the same insecticide class as either of the pre-mix active ingredients.

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

There are many options for incorporating virus into your codling moth management program. Deciding how much, when and how often to apply product can be quite confusing. Keep in mind the following factors when trying to sort things out:

CpGV must be ingested by the codling moth larva and may not kill it immediately.
The virus breaks down in the environment, thus a spray may only be effective for a week or so.
The virus is highly lethal, a few OB's are all that are required to cause death. Our overall experience is that frequent application of a low rate of product is the best approach.
Growers can opt to use the virus as part of a multi-tactic codling moth control program. Rotating it with chemical insecticides is a good means of combating resistance. We suggest the following approaches to incorporating codling moth virus into a management program. If you want to restrict your use to a single generation, target the first generation. Some virus-infected larvae will not die immediately, allowing them to cause fruit damage and even complete larval development. Fortunately, stings or deeper entries in small fruits attacked by first generation larvae often fall off the tree or are removed by thinning. Additionally, research conducted in 2003 revealed that less than 4 percent of the individuals that managed to complete larval development survived to pupate and emerge as summer generation adults. Thus, applications against the first generation can greatly reduce the size of the summer generation that will need to be controlled.

Regardless of the generation targeted, it is best to make at least two applications. If you want to rotate a CpGV product with other controls, try applying a chemical insecticide as the first spray at the start of egg hatch (250 GDD) and the virus as the second spray. This is because more eggs will be present and covered by the virus spray at the later timing. The insecticide and virus could then be rotated again, or the virus could be applied weekly at a low rate for the remainder of the egg hatch period.

Combined use of an ovicide and larvicide
Over the past few years, we have been evaluating novel codling program that takes advantage of the ovicidal or larvicidal properties of various compounds. In one program, an ovicidal material is applied at the start of egg laying and a larvicidal material is applied at a delayed timing of 350-400 GDD. For this delayed timing program we used Rimon as the ovicide and followed with either Assail, Calypso, Altacor or Belt as the larvicide. All programs proved highly effective in controlling first generation codling moths. The delayed larvicidal treatment is possible because the early ovicide treatment kills eggs that would have hatched in the period starting at 250 DD. Another nice feature of this program is that the delayed application of the larvicide is a more efficient timing than the standard first cover timing of 250 DD. Only a small portion of the first generation egg hatch occurs between 250-350 DD, ca 15 percent, while more than 50 percent of the hatch occurs over a two to three week period beginning at 350 DD. The combined strategy also shortens the period of time that larval control is necessary, presenting an opportunity to reduce the number of sprays needed to achieve control.

Table 2. Chemical class, activity and timing of insecticides used for CM control.

*** May cause mite flaring in combination with carbaryl or pythrethroids that kill predacious mites**

Table 3. Relative activity spectrum of compounds against spring and early summer apple pests

CM-codling moth, OFM-oriental fruitmoth, OBLR-obliquebanded leafroller, PC-Plum curculio, STLM-spotted tentiform leafminer, GAA / RAA -green / rosy apple aphid, WALH-white apple and potato leafhoppers, SJS-San Jose scale, TPB-tarnished plant bug

* some activity, ** better activity, *** best activity relative to other insecticides

NWMHRS CARBOHYDRATE MODEL

WEBSITES OF INTEREST

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

60 Hour Forecast
http://www.agweather.geo.msu.edu/agwx/forecasts/fcst.asp?fileid=fous46ktvc

Information on cherries is available at the new cherry website:
http://www.cherries.msu.edu/

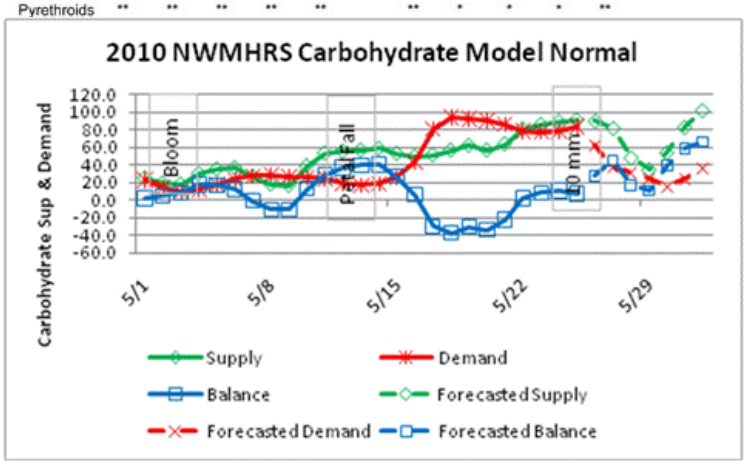
Fruit CAT Alert Reports
http://www.ipmnews.msu.edu/fruit/

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

Chemical class, activity and timing of insecticides used for CM control

Compound trade name	Chemical class	Life-stage activity	Optimal spray timing for codling moth	Mite flaring potential
Guthion, Imidan	**Organophosphates**	**Eggs, Larvae, Adults**	**Biofix + 250 DD**	**L - M**
Asana, Warrior, Danitol, Decis. Baythroid XL	Pyrethroids	Eggs, Larvae, Adults	Biofix + 250 DD	H
Rimon	**IGR (chitin inhibitor)**	**Eggs, Larvae**	**Biofix + 100 DD Residue under eggs**	**M***
Delegate	Spinosyn	Larvae	Biofix + 250 DD	
Altacor, Belt	**Diamide**	**Eggs, Larvae**	**Biofix + 200-250 DD**	
Assail, Calypso,	Neonicotinoid	Larvae, Eggs &	Biofix + 200-250 DD Residue over eggs	M*
Intrepid	**IGR (MAC)**	**Eggs, Larvae, Adults(sublethal)**	**Biofix + 150-200 DD Residue over eggs**	**L**
Avaunt	Oxidiazine	Larvae	Biofix + 250 DD	L
Esteem	**IGR (juvenoid)**	**Eggs, Larvae**	**Biofix + 100 DD Residue under eggs**	**L**
Proclaim	Avermectin	Larvae	Biofix + 200-250 DD	L
Granulovirus	**Biopesticide**	**Eggs, Larvae**	**Biofix + 250 DD Residue over eggs**	**L**
Voliam flexi	Diamide + Neonic.	Eggs, Larvae	Biofix + 200-250 DD Residue over eggs	
Tourismo	**Diamide + IGR**	**Eggs, Larvae**	**Biofix + 200-250 DD**	
Leverage	Pyrethroid + Neonic.	Eggs, Larvae, Adults	Biofix + 200-250 DD	H

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



http://www.maes.msu.edu/nwmihort/faxnet.htm

ACTUAL AND PREDICTED DEGREE-DAY ACCUMULATIONS SINCE MARCH 1, 2010

Please send any comments or suggestions regarding this site to:
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