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# 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

## June 6, 2006

**Growing Degree Day Accumulations as of June 5, 2006 at the NWMHRS**

| Year | 2006 | 2005 | 2004 | 2003 | 2002 | 16yr. Avg. |
|---|---|---|---|---|---|---|
| GDD42 | 907 | 776 | 623 | 660 | 523 | 673.5 |
| GDD50 | 491 | 400 | 286 | 310 | 261 | 352.1 |

WEATHER

The past week was warm with very little precipitation. Base 42 degree day accumulations at the NWMHRS are the second highest for this time of year since 1990.

**GROWTH STAGES at NWMHRS (6/5/06, 11:30 am)**

**Apple**: Mac: 15mm fruit, Red delicious: 18mm fruit

**Pear**: Bartlett: 13mm fruit

**Sweet Cherry**: Hedelfingen: 14mm fruit, Gold: 12mm fruit

**Tart Cherry**: Montmorency: 12mm fruit; Balaton: 12mm fruit

**Apricot:** 30mm fruit

**Plum**: NY 12: 11mm fruit

**Grapes**: Chardonnay: 10-16" shoots

TREE FRUIT REPORT

**Apple:** The last wetting event on 5/31 resulted in a high **apple scab** infection at the NWMHRS. We have seen a few lesions showing up around the area. According to the model, all apple scab spores are mature, but the model is predicting only 94% spore discharge by Monday, June 12th. **Primary apple scab** should be finished with one good rain in the northwest. **Fire blight** symptoms are evident in susceptible varieties, but we think most of this year's disease has been caused by 2005's cankers. **Codling moth** numbers really jumped with this warm weather, but our numbers are still quite variable across the region. Based on these high numbers, growers should be out scouting for early fruit infestation by young larvae. **Oriental fruit moth** trap catches are higher than usual in NW Michigan; last week, we caught an average of 41 moths/trap at the NWMHRS.

**Stone Fruit: Cherry leaf spot** symptoms are starting to show up all across the area, and again, that last wetting event on 5/31 resulted in a high infection level at the NWMHRS as well as other stations around the area. We have been observing very high levels of **bacterial canker** in **tarts** and **sweets** due to the cold, wet weather conditions two weeks ago. **Balatons** also seem to have been hit particularly hard by bacterial canker. Most of the symptoms are visible on the leaves, but we also have had reports of bacterial canker infected fruits. **Plum curculio** are coming out in force, and we have seen many egg-laying scars in both tarts and sweets. While scouting last Friday, we actually saw ovipositing weevils in **sweets**, **apricots**, and **peaches**. **American plum borer** trap catches have dropped to zero this week at the NWMHRS. **Greater** and **lesser peach tree borer** numbers are up, and we caught 6.5 and 20 moths respectively. We put **cherry fruit fly** traps into the orchard this week.

**SMALL FRUIT**

**Strawberry:** Harvest should begin next week in the northwest.

**Grapes:** There will be a grape grower meeting at the NWMHRS vineyard on ***Thursday, June 8***, starting at ***6:00 p.m***. Dr. Tom Zabadal will be present to discuss various **vineyard management** practices and progress in a project to study **mechanical dormant pruning** of wine grapes.

## CHERRY FRUIT FLY ECOLOGY AND MANAGEMENT

Nikki Rothwell, District Fruit IPM Educator, MSU Extension
Larry Gut, Entomology,MSU
Luis Teixeira, Entomology,MSU

Although there are three potential picture-winged flies that attack cherries in Michigan, the cherry fruit fly (CFF) is the main culprit in

most areas of the state. This species has been found in cultivated tart and sweet cherries as well as in the wild host—wild black cherry. Black cherry fruit flies also show up as pests in managed blocks of tart and sweet cherry, especially in southwest Michigan. In the wild, they are found predominantly in pin cherry. From a control standpoint, these two species of fruit fly are often considered one pest and managed identically. CFF are a key pest of cherry orchards, as they cause damage to the fruit by adult and larval feeding as well as by adult oviposition. However, the biggest concern for growers is the larvae that develop within the fruit. The cherry industry has a 'zero tolerance' policy for larvae in the fruit at harvest. Therefore, successful CFF control is vital.

Cherry fruit fly adults emerge from overwintering puparia over a period of 6-8 weeks beginning in early June. In recent years, monitoring of CFF populations by IPM practitioners has indicated that the highest fly captures in some managed orchards occur after harvest. In response to these reports, in 2005 we initiated a study seeking to establish the phenology of CFF, using traps to capture adult flies, and fruit sampling to determine larval infestation. We found three major flight periods in the sites we monitored (Figure 1): an early flight peaking prior to harvest in unmanaged orchards, an extended mid-season flight peaking after harvest in managed orchards, and a late flight in natural habitats (black cherry trees). There was general agreement with respect to the timing of CFF activity between fly captures on traps and larval infestation of fruit. Infestation was already high in late June in the unmanaged orchards and increased until mid July, immediately before fruit began deteriorating and dropping from the trees. In contrast, infestation in managed orchards was relatively low in late June and early July, before harvest. At these sites, infestation increased after harvest, in late July or early August. In the natural site, infestation started in early August and increased through the month. Regarding the major concern of cherry growers, which is the presence of flies in managed orchards in the period immediately before harvest, our data indicated the presence of resident CFF populations in the managed orchards we monitored. At these sites, flies captured before harvest represent the early part of a flight curve peaking immediately post harvest, rather than populations outside of the orchard as has been generally assumed.

Once flies emerge, they spend 10 days feeding on plant juices, dew, or from the surface of the leaves or fruit. This post-emergence feeding is called the pre-oviposition period where adults feed and mate. This period of time offers growers an advantage for a control strategy--they can apply insecticide to kill adult flies before they lay eggs. Traditionally CFF control has been based on the 'first fly caught'. After this first emergence, there is a 7-10 day timeframe in which growers apply insecticide.

Monitoring protocols for adult CFF activity have improved in recent years. Traps can be a valuable management tool, as they provide a relative estimate of pest pressure and an indication as to when control measures should begin. Adult emergence and seasonal activity is best monitored using attractant-baited yellow sticky traps. Good protocols include placing traps in perimeter rows, baiting with an ammonia source, and checking the traps at least weekly and more frequently at the start of emergence. Placement of the traps within the canopy is also important: traps should be placed as high in the canopy as possible. Indeed, studies conducted in Michigan have revealed that very few flies are captured when traps are placed low in the canopy. The highest captures, by far, were recorded in the upper part of the canopy. We are currently investigating the benefits of monitoring CFF in the upper canopy by placing traps on a PVC or bamboo pole, and will update the industry on our findings this winter.

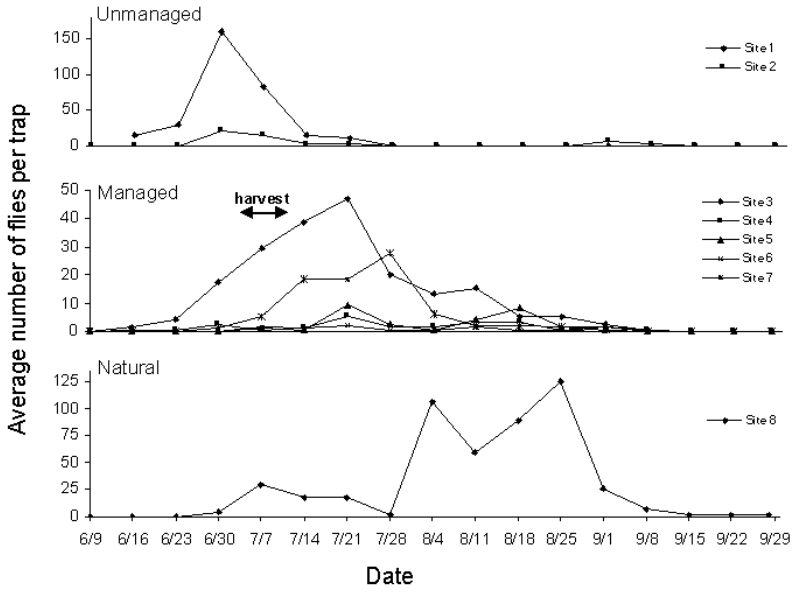


**Figure 1. Average number of flies captured per trap in unmanaged and managed cherry orchards, and natural area (black cherry trees) in southwest Michigan during 2005.**

Control options include insecticides in the organophosphate (OP) class, synthetic pyrethroids, and more recently the neonicotinoids, Fruit Fly Baited insecticides and Particle Film. The OP's, like Guthion and Imidan, have been the standard for control because of their contact activity on CFF and long stable residues. The synthetic pyrethroids, like Asana and Warrior, also act as contact poisons on CFF adults, but they generally provide only moderate control because of short residual activity. Two new control options on the market are the neonicotinoids Provado and Actara, which have performed well in field efficacy trials. Provado has a 7-day pre-harvest interval, while the PHI for Actara is 14 days. Thus Provado provides a good option for CFF control at that critical window of a week or so before harvest. Additionally, it is registered for use in both sweets and tarts. Since Actara is also active on PC, economical options for using this material would be a single application at 4.5-5.5 ounces/acre at second cover or a few weeks before harvest when control of both pests is often needed. Organic cherry growers may want to consider use of GF120 Fruit Fly Bait, Entrust (organic formulation of SpinTor) or Surround WP (kaolin). GF120 Fruit Fly Bait has been shown to provide effective control on various fruit fly species, but requires precise timing (CFF pre-oviposition period) and specialized application equipment. Entrust has been shown to be active on fruit fly species but starting sprays during the pre-oviposition period on a 7 day interval is important for good performance. Field trials with Surround WP have shown good fruit protection from CFF when used on large blocks and when coverage is maintained.

As a final management note, having fly populations infesting fruit that remain on the tree after harvest may be problematic because resident populations represent a source of infestation the following year. Growers with known high fly captures or fruit infestation post-harvest should consider applying an insecticide at this time to combat the resident populations and maintain them at such a low level that the threat of infestation prior to harvest is negligible. Our initial work on post-harvest CFF treatments has indicated that *the critical time to apply an insecticide is within the first week after harvest.*

## LOTS O' BACTERIAL CANKER

Nikki Rothwell, District Fruit IPM Educator, MSU Extension

Bacterial canker has been showing up in orchards all around northwest Michigan this past week. We have been observing very high levels of this pathogen in tarts and sweets, and Balatons seem to have been hit particularly hard by bacterial canker. Most of the symptoms are visible on the leaves, but we have reports of bacterial canker starting to show up on fruit.

Bacterial canker is caused by two related bacteria, *Pseudomonas sypringae* pv. *syringae* and pv. *morsprunorum*. Although this disease is more common on sweet cherry than tart, we have seen symptoms in both species this year. Leaf and fruit infections occur most often with an extended period of cold wet weather during or after bloom; most areas in Michigan endured such a spell for a couple of weeks in May. This time period is when bacterial canker set in, which resulted in the symptoms that are now visible. Bacterial canker on leaves shows up as leaf spots, but unlike cherry leaf spot (CLS), these symptoms are dark brown, often circular and surrounded by a yellow halo. These spots can join to form areas of dead tissue. The middles of the spots often fall out and the leaves have a ragged appearance. On fruit, the lesions again look like brown spots, but they are surrounded by wet-looking tissue. Eventually, the lesions cave in and the margins turn yellow or red as the fruit age.

There are no good control options for bacterial canker at this time. Copper compounds do reduce the pathogen early in the season, but even copper may not be a viable compound, as many strains of *P. syringae* have shown some level of resistance. Copper is also not recommended for sweet cherries after trees break dormancy. If bacterial canker enters the wood tissue, then growers should prune out the infected areas either this summer or next winter.

## CODLING MOTH ALERT

Nikki Rothwell, District Fruit IPM Educator, MSU Extension

Codling moth (CM) numbers have increased dramatically with recent warm temperatures. This trend has been noted in northwest Michigan, as well as all over the fruit growing regions of the state. Although all CM numbers are on the rise, the numbers vary across the region. We have biofix dates that are over two weeks apart in the northwest, even though temperatures do not seem to be dramatically different. We have a few hypotheses as to why we see such a spread in CM emergence times. First, organophosphate (OP) resistance has been documented in the northwest. Last year we tested three orchards, and two of these orchards reported high levels of resistance while the third orchard reported no CM resistance to OP's. We have just finished testing two more orchards this season and found that both apple blocks had a low to moderate level of resistance. This information tells us that resistance is a problem here in the northwest, albeit variable in its degree. The major "take home" message to all apple growers is that we do have resistance in the region, and we should take extreme care with using OP's as they may not work well or at all depending on resistance levels.

Second, this seemingly drastic range of biofix dates may in part be due to variable population numbers in different orchards. This idea is based simply on the number of CM in a block. For instance, if Block A has a high CM population, we will catch more moths in pheromone traps than in Block B which has a low population. Therefore, Block A will catch moths earlier than Block B simply because there are more moths in Block A. Areas that have had a CM problem in recent years are more likely to have a high population, and we are trapping moths sooner in problematic orchards than in areas that do not have high CM populations.

Although these numbers and emergence times are perplexing, they are a good reminder to growers that they should be monitoring each of their orchards with pheromone traps. We do not think using the NWMHRS's biofix date is a reliable tactic for all northwest growers because of this variability. Growers should be trapping on their farms and using their own biofix, as this strategy seems to be the only one that is consistent for each individual block. Growers also should be using the CM chart on enviroweather (www.enviroweather.msu.edu) to help them with their insecticide application timing. We have many new chemistries that require fairly precise timing, and this chart provides the growing degree day accumulations necessary for each insecticide. For reference, the NWMHRS biofixed on Friday, May 26$^{th}$, and we will approach the 250GDD mark sometime this weekend.

### WEED STEAMER DEMONSTRATION DATES

We will be demonstrating the weed steamer at 10:30am at the Antrim County IPM Update. This demo will take place on **Tuesday, June 13$^{th}$** at the Jack White Farm, US-31, just south of Elk Rapids. The machine will also be out for growers to see on **Wednesday, June 14$^{th}$** at the Leelanau County IPM Update at 1pm at the Larry Esch farm on Horn Road.

## A NEW DEER REPELLENT

By Jim Nugent, District Horticulturist, MSU Extension

A new deer repellent called BrowseBan has just received federal registration for use on apple, cherry, grape and several vegetable and field crops. It contains the active ingredients capsaicin and related capsaicinoids. It is recommended for use at 1 gal. of product per 100 gal. of water. Application in high deer pressure areas is recommended to begin prior to growth in spring and continue on a 7 day schedule. In moderate to light pressure areas, application should begin at the first sign of damage and continue on a regular schedule. Rainfall after application may reduce effectiveness.

BrowseBan is manufactured by Kalsec Incorporated, 3713 W. Main St., Kalamazoo, MI 49006. For more information visit www.browseban.com or call Kalsec, Inc. at 269-349-9711.

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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

## July 11, 2006

Growing Degree Day Accumulations as of July 10 at the NWMHRS

| Year | 2006 | 2005 | 2004 | 2003 | 2002 | 16yr. Avg. |
|---|---|---|---|---|---|---|
| GDD42 | 1757 | 1788 | 1368 | 1521 | 1475 | 1571.9 |
| GDD50 | 1065 | 1131 | 753 | 892 | 935 | 954.9 |

WEATHER

During the past two weeks, there have been three rain events but all were quite low in total precipitation. At the NWMHRS, precipitation for the past two weeks has totaled 0.3 and 0.13 inches respectively.

**GROWTH STAGES at NWMHRS (7/10/06; 8:30 a.m.)**

**Apple**: Mac: 56 mm fruit, Red delicious: 44 mm fruit

**Pear**: Bartlett: 32 mm fruit

**Sweet Cherry**: Hedelfingen: 24 mm fruit, Gold: 23 mm fruit

**Tart Cherry**: Montmorency: 19 mm fruit; Balaton: 21 mm fruit

**Apricot:** 35mm fruit

**Plum**: NY 12: 26 mm fruit

**Grapes**: Chardonnay: Berry touch

### Tree Fruit

**Apples: Codling moth** numbers are up this week at the NWMHRS, and trap catches have been jumping up and down for the past three weeks: ~20 moths/trap down to ~5 moths/trap and back up again. **Obliquebanded leaf roller** catches averaged 8 moths/trap. There are still very few catching oriental fruit moth in the northwest.

**Cherry:** Sweet cherries are being harvested. Cracking is exceptionally low, particularly given the large number of fruit with frost scars. Tart harvest is just beginning in a few sites, and will be increasing during the next week. **Cherry leaf spot (CLS)** symptoms are evident in many tart cherry blocks, and there is a particularly high level of **powdery mildew** on most terminal shoots. We continue to catch **cherry fruit flies** in the entomology block at the NWMHRS, but we have also caught flies in commercially managed blocks.

Small Fruit

**Grapes:** Fruit set is complete, and in most vineyards the crop looks good. Crop estimation methods can now be conducted to determine crop adjustment plans. Foliar condition remains very good, with moderate levels of **potato leafhopper** being the greatest concern. High humidity weather conditions are predicted for later this week, so **powdery mildew** may be a significant threat.

Large **sphinx moths** are now on the wing, so larvae may begin to appear in the next few weeks. Leelanau county growers should be on the lookout for **Japanese beetles**. First found in Leelanau county in 2005, their population is high in the Sugar Loaf resort area, but it appears to be spreading from this area.

### Pest of Concern—Japanese Beetle in Leelanau County

Nikki Rothwell, District Fruit IPM Educator, MSUE

We have been trapping for Japanese beetles in Leelanau County on Bodus Road, where the Michigan Department of Agriculture (MDA) caught beetles last year. We believe this population was shipped up as larvae on rolls of sod. We caught our first and only beetle on 3 July, and this week, we captured over 1,000 beetles in 10 trap located in the 'epicenter'. In order to determine how far this population has moved out from the area of concern, we placed traps in concentric rings from Bodus Road to approximately three miles from the original site of infestation. We will continue to monitor these beetles until the fall—stay tuned!

We Want Your Brown Rot

This season we are conducting a survey for potential sterol inhibitor (SI) resistance in brown rot. We need cherries, both tart and sweet, that have brown rot or have had brown rot in the past. We would love all the brown rot samples we can collect, so if you would like to participate, please give Erin Taylor a call at 231- 878-3371.

## CHERRY VARIETY SHOWCASE
## July 18th, 4:30 p.m.
## NW Michigan Horticultural Research Station

Program:

Fresh market and processing sweet and tart variety displays and discussions
Introduce two new processing sweet cherry varieties
Samples from International Plant, NWMHRS, SWMREC, Clarksville, & Geneva, NY
Next generation test selections from Cornell Univ. and New York grower, Jim Bittner
Join us for a barbecue dinner!

Speakers:

Jim Nugent, MSU, NWMHRS

Robert Andersen, Emeritus, Cornell Univ.

Amy Iezzoni, Dept of Horticulture, MSU

Wally Heuser, International Plant Management

Sponsored by: International Plant Management and MSU Extension.

If you have questions, contact Summit Sales at 800-424-2765. RSVP is not required, but would be appreciated by Summit Sales.

| 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 |
| 6/13 | 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 |
| Totals | **5.23** | **-6.62** | **15.80** | **11.85** |

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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

Last Revised: 7-12-06



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Farm Mgr, NWMHRS

**Duke Elsner**
Agricultural & Regional Viticulture Agent

**Jim Bardenhagen**
Leelanau Extension Director

**June 13, 2006**

**Growing Degree Day Accumulations as of June 12, 2006 at the NWMHRS**

| Year | 2006 | 2005 | 2004 | 2003 | 2002 | 16yr. Avg. |
|---|---|---|---|---|---|---|
| **GDD42** | 1027 | 1004 | 798 | 783 | 683 | 852.8 |
| **GDD50** | 559 | 571 | 405 | 378 | 367 | 457.8 |

**WEATHER**

Cool weather during the past week has resulted in the degree day accumulations for 2006 to slow to 2005 levels. A nice rain fell last week in NW Michigan.

**GROWTH STAGES at NWMHRS (6/12/06, 1:30 p.m.)**

**Apple**: Mac: 26 mm fruit, Red delicious: 25 mm fruit

**Pear**: Bartlett: 17mm fruit

**Sweet Cherry**: Hedelfingen: 18mm fruit, Gold: 13 mm fruit

**Tart Cherry**: Montmorency: 13mm fruit; Balaton: 13 mm fruit

**Apricot:** 33 mm fruit

**Plum**: NY 12: 18 mm fruit

**Grapes**: Chardonnay: 10-16" shoots

**Tree Fruit:**

**Apples:** The last wetting event on 6/6 resulted in a high **apple scab** infection at the NWMHRS and many other stations in the northwest. Although rare, we are observing apple scab lesions in some blocks. The model is predicting we are close to the end of primary scab, but we are not saying that it is over quite yet. **Codling moth** numbers have been down, probably due to the cool evening temperatures. **Oriental fruit moth** trap catches are much lower than last week's counts, with only an average of 7 moths per trap at the NWMHRS.

**Cherry:** We have really started to see **cherry leaf spot** symptoms show up in the past week. **Powdery mildew** is also evident in many blocks around the region. **Plum curculio** have been seen in high numbers this spring, but cool weather has reduced their activity in

have been seen in high numbers this spring, but cool weather has reduced their activity in recent days. There are plenty of oviposition scars visible on many different stone fruits. All borer numbers are down this week -- less than one per trap for **greater and lesser peach tree borers**, and an average of 2.3 **American plum borers** per trap this past week. We captured our first **cherry fruit flies** at the NWMHRS last **Wednesday, June 7th**. This block is unsprayed, and we know that the CFF pressure in this area is much higher than most commercial orchard locations in NW Michigan. CFF traps should be placed in orchards ASAP and checked regularly.

**Wine grape: Potato leaf hoppers** are present in the area, so wine grape growers should be aware of this pest; flip over the leaf and check on the underside for a side-ways moving greenish leafhopper.

| **Seasonal Evaporation & Precipitation** | | | | |
|---|---|---|---|---|
| **Beginning May 1, 2006, at NWMHRS** | | | | |
| | | | | |
| 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 |
| 6/13 | 1.08 | 0.01 | 1.43 | 1.07 |
| | | | | |
| Totals | **4.19** | **-2.70** | **9.19** | **6.89** |

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

Bill Klein, **kleinw@msu.edu**

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Northwest Michigan Horticultural Research Station
6686 S. Center Hwy • Traverse City, Michigan 49684
Tel: 231/946-1510 Fax: 231/946-1404

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## *Weekly Update*
## NW Michigan Horticultural Research Station

**Jim Nugent**
District Horticulturist

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District Fruit IPM Agent

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Farm Mgr, NWMHRS

**Duke Elsner**
Agricultural & Regional Viticulture Agent

**Jim Bardenhagen**
Leelanau Extension Director

**June 20, 2006**

**Growing Degree Day Accumulations as of June 19 at the NWMHRS**

| Year | 2006 | 2005 | 2004 | 2003 | 2002 | 16yr. Avg. |
|---|---|---|---|---|---|---|
| **GDD42** | 1224 | 1163 | 952 | 942 | 807 | 1019.1 |
| **GDD50** | 700 | 674 | 504 | 481 | 435 | 569 |

**WEATHER**

Temperatures by the end of this past week got very warm. A nice rain on Sunday brought about 0.5 inches to NW Michigan.

**GROWTH STAGES at NWMHRS (6/19/06; 2:00 p.m.)**

**Apple**: Mac: 34 mm fruit, Red delicious: 33 mm fruit

**Pear**: Bartlett: 19 mm fruit

**Sweet Cherry**: Hedelfingen: 20 mm fruit, Gold: 16 mm fruit

**Tart Cherry**: Montmorency: 14 mm fruit; Balaton: 14 mm fruit

**Apricot:** 33 mm fruit

**Plum**: NY 12: 20 mm fruit

**Grapes**: Chardonnay: bloom

**Tree Fruit**

**Apples:** Sunday's wetting event (6/18/06) resulted in a high **apple scab** infection at the NWMHRS and many other stations in the northwest. This rain most likely discharged the remaining apple scab spores, and we are now calling the end of primary apple scab. **Codling moth** numbers are back up this week, and we are now starting to catch **obliquebanded leaf rollers**. We are still catching **oriental fruit moth** in the northwest, and we suspect their numbers will decline in the coming weeks. **Potato leaf hoppers** (PLH) are evident in most blocks. Growers should pay particular attention to PLH populations in non-bearing apples as these trees have a lower tolerance to PLH damage than older trees and tend to receive fewer insecticide sprays.

**Cherry: Cherry leaf spot** (CLS) symptoms are evident in many tart cherry blocks, and the

**Cherry: Cherry leaf spot** (CLS) symptoms are evident in many tart cherry blocks, and the Sunday rain resulted in moderate to high CLS infection all across northwest Michigan. At the end of last week, we were still observing active **plum curculio** (PC). PC that were collected in NW MI last week and dissected still contained many eggs yet to be laid. **American plum borer** and **lesser peach tree borer** counts are down, while **greater peach tree borer** numbers are constant at an average of 7.7 adults/trap at the NWMHRS. **Obliquebanded leaf roller** adults are being trapped in cherry at significantly higher numbers than in apple blocks. In the past two weeks, we have caught a total of 25 **cherry fruit fly** adults in our unsprayed entomology block.

**Plum:** As potato leaf hopper numbers increase, growers should be monitoring plums for potential damage.

**Small Fruit**

**Grapes:** Most Vinifera cultivars are beginning to bloom. Cluster numbers and size look good at the NW Station. Disease pressure has remained low. **Rose chafer** have not been numerous compared to previous years**. Potato leafhopper** numbers are up significantly, with injury now easy to find in vineyards. Growers should especially watch young vineyards for this pest. Hornworm larvae have not been seen yet.

**SUMMER LEAFROLLER CONTROL**
**Larry Gut, John Wise, Entomology, MSU**
**David Epstein, Entomology, MSU IPM Program**

This past week marked the beginning of the first of two flight periods of adult obliquebanded leafroller (OBLR) in Michigan. The first OBLR flight typically begins in mid June and lasts about 6 weeks. The second flight takes place from early August to mid-September. OBLR flight can be tracked through the season using pheromone-baited traps. Moth captures in pheromone traps also are used to initiate an OBLR degree-day model, base 42°F. First sustained moth catch (catch on two successive dates) in pheromone traps is used as a biofix. Key events in the life history of OBLR can subsequently be predicted using the degree-day model. For example, egg hatch begins around 400 degree-days after biofix.

Although moth captures in pheromone traps provide valuable information to the scout and grower, they are not a reliable indicator of leafroller abundance or potential damage. OBLR traps have a large active space. In other words, they potentially catch moths that originate from within the trapped orchard, neighboring or more distant orchards, and native habitats. Thus, high moth catches may or may not indicate that the orchard being monitored has a leafroller problem. Very low catches of less than five per week strongly hint that OBLR is not a problem, but assessing larval activity is highly recommended to confirm this.

To get the information needed to make a sound management decision, a scout must look for leafroller larvae, or at least signs of their presence. Larvae are green with brown to black head capsules and are about 25 mm long when fully grown. Often, a scout will detect signs of leafroller activity rather than the actual larva. The name leafroller comes from the larva's habit of rolling leaves to form a shelter. These feeding sites are most often found at the tips of growing shoots. Larvae also will use silk webbing to attach two leaves or a leaf and fruit together to form a shelter. The presence of webbing is a good clue that leafrollers are around.

Finding young OBLR larvae in the early spring is difficult, thus most growers take preventative measures at this time. If they were successful, fruit damage will be avoided and few larvae will survive and move to the shoot tips to feed. Scouting orchards for surviving OBLR larvae in growing terminals is the best way to judge whether intervention in the summer is likely to be needed as well. Orchards in which less than 2% of the terminals were infested should be monitored in the summer, but controls may not be warranted. Higher

levels of shoot infestation are cause for concern and control measures are likely needed to prevent fruit injury. This investment of time could result in saving several sprays.

**Obliquebanded Leafroller GDD Model**

| DD° Base 42 (Post | Event | Action |
|---|---|---|

| | | |
|---|---|---|
| **Biofix)** | | |
| Tight cluster | Majority of larvae have emerged from shelters | Examine fruit buds for larval activity |
| 0 DD° = biofix (~900 DD° after Jan 1) | 1st sustained moth captures | Set DD° = 0 |
| 220-250 DD° | Peak moth flight - overwintering generation | |
| 400-450 DD° | Start of egg hatch | Timing for scouting-based treatment |
| 1000 DD° | End of egg hatch | |
| 2300 DD° | Peak moth flight - 2nd generation | |
| 2750 DD° | Start of 2nd generation egg hatch | Timing for scouting-based treatment |

Degree-day models are essential tools to be used in timing insecticide sprays. Optimal timing for summer sprays varies according to the life stage or stages that are targeted by the product of choice. For conventional insecticides, like organophosphates (OPs), pyrethroids, and carbamates, the first sprays should be targeted between 400 and 450 GDD after biofix to control hatching larvae before they can damage fruit. Obliquebanded leafrollers are resistant to OPs in most apple growing regions of the state, and are generally not the best option for control. Bt's are most effective when applied during warm weather conditions (daily highs in the 70's F). If Bt products are used, the latter timing (450 GDD) may be the better choice because they have a short residual, which must be present to control the larvae at the time and location they are actively feeding. If the first application is applied too early, it may take four or more sprays to keep active ingredient on the foliage throughout the long period of larval activity. Bt products are generally more effective with a lower tank pH. SpinTor has a similarly short residual (seven to ten days), but provides some contact efficacy, which will help kill larvae as they move to the actively growing terminals. SpinTor is also a good choice for leafroller control in cherry blocks where control with OPs and pyrethroids is failing to provide adequate protection. Proclaim, a new material (Avermectin class) has also shown very good activity against OBLR, and requires ingestion by larvae.

In contrast, if Intrepid is used early it should be targeted to cover OBLR egg masses around 350 GDD post-biofix, so that larvae will consume the chemical as they eat their eggshells upon emergence. Intrepid can also be used later to protect fruit against damage from older larval instars. Upon application, Intrepid has a long residual effect, but should be reapplied where necessary on a 14-day interval to insure coverage of new terminal growth. Good, thorough coverage is key to leafroller control with materials requiring ingestion to be effective. The addition of an agricultural adjuvant to Intrepid 2-F is recommended to improve spray deposition.

Rimon acts by suppressing development within the egg, as well as larvae that consume it

Rimon acts by suppressing development within the egg, as well as larvae that consume it. Hatching of eggs laid by treated adults will also be inhibited. Eggs are particularly susceptible to these products when laid on top of sprayed residue, thus sprays should target 100-200 GDD after OBLR biofix. Similarly, Esteem applied at OBLR **egg laying** timing will also provide some control, though it is more typically used for the overwintering generation.

It should be noted that treating the summer generation of OBLR with SpinTor, Rimon or Proclaim would also provide some control of codling moth, Oriental fruit moth, and spotted tentiform leafminer. Intrepid applied at the earlier summer OBLR timing would also assist in controlling codling moth and tufted apple budmoth. Esteem will provide control of San Jose scale crawlers and some added control of codling moth. Bt's can also be expected to control other leafrollers when applied in the summer for OBLR control.

As with many of our key apple pests, OBLR has a track record of developing resistance to insecticides. Currently there are some good options for control of this pest. Practicing good resistance management should help conserve their efficacy. We encourage you to rotate materials with different modes of action. For example, if Rimon was the material of choice for control of overwintering larvae, opt for Proclaim, SpinTor or Intrepid if a summer treatment is warranted. During periods of warm weather, Bt is an excellent option and a good resistance management strategy.

| Compound Trade Name | Chemical Class | Life-stage Activity | Optimal Spray Timing for OBLR | Residual Activity | Mite Flaring Potential |
|---|---|---|---|---|---|
| Guthion, Imidan | Organophosphates | Larvae | Biofix + 400-450 DD | 10-14 days | L - M |
| Lannate, Sevin | Carbamates | Larvae | Biofix + 400-450 DD | 5-7 days | M - H |
| Asana, Warrior, Danitol, Decis | Pyrethroids | Larvae | Biofix + 400-450 DD | 7-10 days | H |
| Deliver, Dipel, Crymax | *Bt's* | Larvae | Biofix + 450 DD | 5-7 days | L |
| Spintor, Entrust | Spinosyn | Larvae | Biofix + 400-450 DD | 7-10 days | L |

| | | | | | |
|---|---|---|---|---|---|
| Rimon | IGR<br>(chitin inhibitor) | Eggs,<br>Larvae | Biofix + 100-200 DD<br>Residue under eggs | 14+ days | M* |
| Proclaim | Avermectin | Larvae | Biofix + 400-450 DD | 7-10 days | L |
| Intrepid | IGR (MAC) | Eggs, Larvae,<br>Adults (sublethal) | Biofix + 350 DD<br>Residue over eggs | 14+ days | L |
| Esteem | IGR (juvenoid) | Eggs, Larvae | Biofix + 100 DD<br>Residue under eggs | 10-14 days | L |

**PRE-HARVEST DISEASE CONTROL IN CHERRY**
Nikki Rothwell, District Fruit IPM Educator
Mira Danilovich, District Fruit Horticulturist

Two primary diseases that affect cherries during the summer season are cherry leaf spot and brown rot. Powdery mildew can also affect tart cherries in a hot, dry year such as this one. Major constraints to an economically viable cherry production in Michigan include adequate control of these diseases.

**CHERRY LEAF SPOT**. The fungus *Blumeriella jaapii* (Rehm) causes cherry leaf spot (CLS) in both tart and sweet cherries, although tart cherries show more susceptibility to CLS than sweets. CLS primarily infects leaves, but this disease ultimately decreases overall tree vigor and health. Purple lesions first show up on upper leaf surfaces, and eventually these spots turn brown. Wet weather causes whitish masses of conidia to grow on the undersides of the leaf in centers of the lesions. Often CLS appear as a one dimensional spot, surrounded by a light halo, on the top of the leaf, while the bottom-side lesion looks as if it is three-dimensional. A minimal number of lesions can cause the leaf to turn yellow and abscise. Trees severely defoliated prior to harvest produce light red fruit that have minimal soluble solids. These defoliated trees have difficulty forming buds and setting fruit for up to two years after severe infection; these trees are also less cold hardy and can die with low winter temperatures.

**Chemical control.** Cherry leaf spot control revolves primarily around fungicide applications as all cherry cultivars are susceptible to leaf spot. The first spray is usually applied as soon as the first leaves have unfolded. Sprays are often repeated on a 10-14 day (or 7 day alternate row) interval until harvest. There are many chemicals labeled for CLS, but MSU research from 2003-2004 has shown CLS to be developing resistance to one class of fungicides, the sterol inhibitors (SI's: Elite, Funginex, Indar, Nova, Orbit and Rubigan). This

fungicides, the sterol inhibitors (SI's: Elite, Funginex, Indar, Nova, Orbit and Rubigan). This research suggests that Michigan growers need to shift from SI's to alternative chemistries for leaf spot control, which includes chlorothalonil (Bravo), strobilurins (Flint and a new product Gem), strobilurin + Boscalid (Pristine), copper compounds, dodine, ziram, and captan. Bravo is the chemical of choice prior to shuck split and post-harvest, as this chemistry provides good CLS protection, and it does not have resistance potential. A tank mix of ziram and captan is an option for covers. Dodine is also an effective chemical where resistance has not yet occurred, but the preliminary research does not show that this compound is particularly effective. Strobulirins work well against CLS, and Pristine is an excellent chemistry if powdery mildew is also a problem in the orchard. New research has also suggested that copper compounds are effective against CLS in tart cherries only; we recommend using copper at 1.2 lbs of actual metallic copper and mixing it with 6-9 lbs of lime as a safener. When using an SI, always tank mix with another chemistry, such as captan.

**BROWN ROT.** Warm, wet and/or humid weather is conducive to brown rot *(Monillinia fruticola)* development, and brown rot is a major disease of stone fruits. Sweet cherries are particularly susceptible to brown rot. Once the fruit begins ripening and changing color, it becomes more susceptible. This pathogen can gain easy access to fruit when any type of injury (insect damage, hail injury, bird pecks, bruised and/or cracked fruit, etc.) is present. Once the pathogen becomes established, soft brown spots appear on the fruit. These spots rapidly expand into lesions covered with powdery masses of creamy-tan colored conidia. Under favorable conditions, the entire fruit may rot within 48 hours. Eventually fruit that remains on the tree dries out; these fruits are often referred to as "mummies", and they become source for future infections.

**Disease management**. As it is true with any disease, reducing inoculum level will lower disease pressure. Control of blossom infection is important to minimize disease inoculum for fruit protection. Fruit injury should be minimized to reduce the fruit's susceptibility to *M. fruticoloa*. Insect damage to the fruit should also be curtailed to decrease disease outbreaks.

**Chemical control.** There are several good fungicides that provide adequate control for brown rot disease. Protectants (captan, wettable wulfur) may be an adequate option in low-pressure situations. Materials from this group must be applied prior to the expected wetting event. Sterol-inhibitors (Elite, Indar, Orbit) will provide excellent control of fruit brown rot, but these materials should be used judiciously as resistance has been reported with these products in cherry leaf spot disease. SI products are best applied before the onset of the infection, but some of these fungicides have a limited back action of 24-36 hrs (Indar, Orbit). SI are again best applied in a tank mix with a protectant, such as captan. Strobilurins (Flint, Pristine) adequately control brown rot, and they are currently an option for fungicide resistance management. They must be applied prior to the wetting event since there are no available data as to their kick-back action. Other options are available for brown rot blossom blight control, such as Rovral and Bravo, **cannot** be used for summer control.

**POWDERY MILDEW**. Tart cherries are particularly susceptible to powdery mildew (*Podosphaera clandestina*) during hot, dry weather. When mildew first infects young leaves, it looks like a whitish felt-like patch (mycelium) on the bottom of the leaf. The top of leaf usually boasts a wrinkle, and there is a halo-like appearance where the mycelium is growing on the underside of the leaf. These powdery lesions can spread quickly and can soon cover the entire leaf. Eventually, small brown to black globular bodies develop in the mycelium. Fungal spores are spread from leaf to leaf when temperatures hit 68 degrees F. Powdery mildew takes hold of an orchard when temperatures are high and moisture is generally low but spiked with times of high humidity. Mildew can spread rapidly throughout an orchard if inoculum levels are high. Heavily infected terminal leaves tend to shatter during mechanical harvesting.

**Disease management**. Increasing air flow in the orchard is the best cultural control for powdery mildew. Pruning trees to improve air circulation will create a less optimal environment for powdery mildew development.

**Chemical control**. Powdery mildew is often controlled with fungicide applications. Since this disease is most often a problem in hot and dry years, every season may not require a powdery mildew fungicide application. However, powdery mildew is important to control at

the onset of the problem as this disease progresses rapidly and can overtake the orchard in a short amount of time. The disease is best controlled during the first cover to the pre-harvest period. Flint, Gem, and Pristine are both excellent against powdery mildew. Nova, Rubigan, and Elite (SI's) are all fair to good against mildew, but their use should be minimized due to resistance concerns. Sulfur may provide some control of powdery mildew, but we will be evaluating this control option this summer.

**UNDERSTANDING THE ACTARA LABEL**
**Nikki Rothwell, District Fruit IPM Educator**

Actara is a newer chemical in the class of neonicotinoids that many cherry growers have used for plum curculio (PC) control. Although this material looks very good against PC, there may be a bit of confusion about the product's labeled use. Only 8oz. of Actara can be used per season; however, the labeled rate that is effective against PC is 4.5-5.5oz/acre. In addition, this total amount of material must be applied only at two times per season: one application pre-bloom and the other application post-bloom**. In other words, for growers using Actara to control PC, they can ONLY put on ONE FULL SPRAY (4.5-5.5 oz) of Actara during the season, as we do not apply insecticides pre-bloom in cherry.** If Actara is used as an alternate row middle spray, growers can go out with 'two' applications with ~10 days between sprays, but since the rate is halved on an alternative row application, the total sum of the product would still be at the recommended 4.5-5.5oz/acre rate.

**CHERRY VARIETY SHOWCASES**

Two Cherry Variety Showcases will be held this summer in Michigan. International Plant Management (IPM), Summit Tree Sales and MSU Extension are jointly sponsoring both events.

**July 6, at 11:30 a.m. at MSU's Clarksville Horticultural Research Station.**

The program will include:

- Variety displays and discussions
- Haygrove Tunnels over an established orchard
- Orchard tours
- Dwarfing cherry information
- Join us for lunch!

Speakers include Greg Lang (MSU), Andy Crittenden (Haygrove), Wally Heuser (IPM), Bill Shane (MSU), Phil Schwallier (MSU) and Amy Iezzoni (MSU)

Haygrove Tunnels is also a cosponsor of this session.

**July 18, at 4:30 p.m. at MSU's Northwest Michigan Horticultural Research Station.** The program will include:

- Fresh and processing variety displays of cherries collected from several test plantings in Michigan and NY.
- Introducing two new processing sweet cherry varieties from the NY breeding program.
- Discussions of varieties with Jim Nugent (MSU), Greg Lang (MSU), Wally Heuser (IPM), Susan Brown (Cornell University) and Amy Iezzoni (MSU).
- Join us for a barbeque dinner!

If you have questions, contact Summit Sales at 800-424-2765. RSVP is not required, but would be appreciated by Summit Sales.

| **Seasonal Evaporation & Precipitation** | | | | |
|---|---|---|---|---|
| **Beginning May 1, 2006, at NWMHRS** | | | | |
| | | | | |
| Date | Rainfall/wk at NWMHRS (in.) | Rainfall minus 75% of | Evap/week (in.) | 75% of Evap/week |

| | | 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 |
| | | | | |
| | | | | |
| Totals | **4.70** | **-3.63** | **11.11** | **8.33** |

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: 6-20-06



# 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

**July 25, 2006**

**Growing Degree Day Accumulations as of July 24 at the NWMHRS**

| Year | 2006 | 2005 | 2004 | 2003 | 2002 | 16yr. Avg. |
|---|---|---|---|---|---|---|
| **GDD42** | 2203 | 2271 | 1753 | 1866 | 1909 | 1962.6 |
| **GDD50** | 1399 | 1503 | 1027 | 1125 | 1257 | 1233.8 |

## WEATHER

Temperatures the past two weeks were generally above normal. Seasonal degree day accumulations are only slightly behind the very hot 2005 season. Storms on 7/17 brought strong winds and hail to areas of NW Michigan, though generally low amounts of rain. Conditions have been very dry in NW Michigan. At the NWMHRS, rainfall for June and July has totaled 2.77 inches, with only 1.68" since June 7. Evaporation during June and July has totaled 13.06".

## GROWTH STAGES at NWMHRS (7/24/06, 10:00 a.m.)

**Apple**: Mac: 64 mm fruit, Red delicious: 50 mm fruit

**Pear**: Bartlett: 40 mm fruit

**Tart Cherry**: Montmorency: harvest; Balaton: harvest

**Apricot:** Harvest

**Plum**: 58.900.12: 28 mm fruit

**Grapes**: Chardonnay: green fruit

## Tree Fruit

**Apples: Codling moth** numbers are all over the board in the Northwest. Here at the NWMHRS, we trapped an average of 5 moths/trap this week. Thus far, our trap catches have not declined to zero moths, which would provide us with a distinctive end to first generation flight**. Obliquebanded leafroller** (OBLR) counts are down to less than 2 moths/trap. **STLM** numbers are also down this week. Very few mites have been detected in apple, but with hot and dry temperatures predicted, we expect those numbers to increase. **Green apple aphids** are evident, but spotty in blocks around the area. No **apple maggots** have been caught here at the NWMHRS but we expect emergence to increase following the rain on 7/24.

**Cherry:** Sweet cherry harvest is very near completion. Tart harvest is over half done. Hail caused damage to all unharvested fruit in the affected areas. **Cherry leaf spot** (CLS) symptoms are evident in most tart cherry blocks, but overall disease in the region is low. **Powdery mildew** is present in many blocks, and this disease seemed to show up overnight. **Brown rot** has been problematic in some sweet cherry blocks. **Cherry fruit fly** (CFF) numbers are particularly high this season; in some managed blocks, we are catching over 75 flies/trap/week. Ethephon damage in sweets and tarts is common due to exceptionally high temperatures. This is the second year in a row with heat induced ethephon problems in area orchards.

## Small Fruit

**Grapes:** In one centralized location of Leelanau County, we are catching over 10,000 **Japanese beetles** per week. We are expanding our trapping this week. Grape growers west of Lake Leelanau need to be regularly scouting vineyards for the presence of Japanese beetles.

## MISCELLANEOUS

### Thinking About Summer Control of Apple Insect Pests

Nikki Rothwell, District Fruit IPM Educator

Summer is officially here--complete with her hot temperatures and increasing apple insect pests, and one of the big questions for growers is how to adequately control these pests without spending a small fortune. The choice of which insecticides is even more pressing for growers that have few apples in their orchards as a result of the spring frost. Resistance is also a playing a role in the decision-making process as we have documented organophosphate (OP) resistance in codling moth (CM) in northwest Michigan and obliquebanded leafroller (OBLR) in other parts of the state. This article is meant as a review of these major summer apple pests in northwest Michigan, OBLR, CM, apple maggot (AM), and mites, and the available product options.

***Obliquebanded leafroller*.** OBLR moths are flying now in the northwest, and we biofixed (catch on two successive dates) at the NWMHRS on June 26$^{th}$. We predict that this first flight will last approximately six weeks ~ through the first week of August. These female moths are laying eggs, up to 900/female, and the hatched larvae can be found feeding on both leaves and developing fruit. These

larvae will pupate, and the resulting moths will be flying from mid-August to late September. The larvae produced from the second generation adults will overwinter on the apple tree and will feed on the opening buds in the spring. Therefore, we will have to contend with OBLR from now until the snow flies.

Obliquebanded leafroller have a large active space, and the traps potentially catch moths that originate from within the trapped orchard, neighboring or more distant orchards and native habitats. Thus, high moth catches may or may not indicate that the monitored orchard has an OBLR problem. Very low catches of less than five per week strongly suggest that OBLR is not a problem, but checking for larval activity is highly recommended.

Degree day models are essential for timing insecticide sprays, and optimal timing for summer sprays varies according to the life stage or stages targeted by the product of choice. For conventional insecticides, like organophosphates (OP's), pyrethroids and carbamates, the first sprays should be targeted between 400 and 450 GDD after biofix; these sprays are intended to control hatching larvae before they can damage fruit. Although OBLR are resistant to OP's in some apple growing regions of the state, we do not have any confirmation of resistance in the northwest. However, many growers have expressed 'difficulty' in controlling OBLR in recent years, which may be indicative of OP resistance. We have also observed failure of OP's to control OBLR in some cherry orchards. Therefore, if a grower suspects OP resistance in his or her orchard, these materials are not the best options for control.

Bt products are effective at controlling OBLR when applied under warm conditions—above 70 F in the daytime. Later timings (450 GDD) are often the best choice because these products have a short residual, and Bt must have good coverage where the larvae are feeding as these products must be ingested to kill the insects. Four or more sprays may be warranted to keep the active ingredient on the foliage throughout the long period of larval activity. Bt products are generally more effective with a lower tank pH. SpinTor, a spinosad product, has a similarly short residual (seven to ten days), but provides some contact efficacy; this activity will help kill larvae as they move to the terminals. Entrust, the OMRI-listed formulation of spinosad, is another good choice for OBLR control. Entrust and SpinTor are the only products that receive an 'excellent' in the *Michigan Fruit Management Guide* for OBLR summer control.

Proclaim, a new material (Avermectin class), has also shown very good activity against OBLR. This product works best when larvae are small (1/4 inch in length), and it must be ingested by larvae. Although we have little data on Proclaim, initial results have shown that this product provides between 74%-98% control at 14 days after treatment in a season-long OBLR program (John Wise, 2005 Trevor Nichols Research Complex Fruit Insecticide Evaluation Studies). Warrior plus

Complex Fruit Insecticide Evaluation Studies). Warrior plus Proclaim was the only combination in the trials to achieve 100% control. The optimum rate for Proclaim is 4.5 oz/acre. The label recommends using a penetrating spray adjuvant to improve coverage and penetration, and university has found Proclaim works well when mixed with Damoil at 2 qts/100gallon. A sticker/binder type should not be used as these types of products may reduce the translaminar movement of the product into the plant. The label also suggests that Proclaim is compatible with most insecticides, fungicides, and foliar nutrients, but DO NOT tank mix Proclaim with Dithane, Rainshield or other similar sticker type materials. Proclaim shows erratic activity against codling moth.

Rimon, an IGR, acts by suppressing development within the egg, as well as larvae that consume it. Rimon will also reduce egg hatch when adults are treated with the product. Eggs are particularly susceptible to these products when laid on top of sprayed residue, thus sprays should be applied at 100 GDD after biofix. Current data suggests that Rimon at 20oz/acre controls spring OBLR larvae much better than summer generation larvae, but further experimentation with higher rates of Rimon is currently under investigation. Esteem applied at oviposition timing will provide some OBLR control, though this product is typically used for the overwintering generation.

Treating the summer generation of OBLR with SpinTor, Rimon or Proclaim would also provide some control of codling moth, Oriental fruit moth and spotted tentiform leafminer. Intrepid applied at the earlier summer obliquebanded leafroller timing would also assist in controlling codling moth and tufted apple budmoth. Esteem will provide control of San Jose scale crawlers and some added control of codling moth. Bt's can also be expected to control other leafrollers when applied in the summer for OBLR control.

| **Compound Trade Name** | **Chemical Class** | **Life-stage Activity** | **Optimal Spray Timing for OBLR** | **Residual Activity** | **Mite Flaring Potential** |
|---|---|---|---|---|---|
| Guthion, Imidan | Organophosphates | Larvae | Biofix + 400-450 DD | 10-14 days | L - M |
| | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Lannate, Sevin | Carbamates | Larvae | Biofix + 400-450 DD | 5-7 days | M - H |
| Asana, Warrior, Danitol, Decis | Pyrethroids | Larvae | Biofix + 400-450 DD | 7-10 days | H |
| Deliver, Dipel, Crymax | *Bt's* | Larvae | Biofix + 450 DD | 5-7 days | L |
| Spintor, Entrust | Spinosyn | Larvae | Biofix + 400-450 DD | 7-10 days | L |
| Rimon | IGR (chitin inhibitor) | Eggs, Larvae | Biofix + 100-200 DD Residue under eggs | 14+ days | M* |
| Proclaim | Avermectin | Larvae | Biofix + 400-450 DD | 7-10 days | L |
| Intrepid | IGR (MAC) | Eggs, Larvae, Adults (sublethal) | Biofix + 350 DD Residue over eggs | 14+ days | L |
| Esteem | IGR (juvenoid) | Eggs, Larvae | Biofix + 100 DD Residue under eggs | 10-14 days | L |

***Codling Moth***. Codling moth trap counts continue to bounce all over the board this year, and setting biofixes has presented many difficulties. In 'normal' years, we set our biofix for the first generation on the first date at which moths are caught in traps; moths must be captured on two successive dates, hence, the first sustained catch of moths. The biofix date for first generation CM at the NWMHRS was May 26$^{th}$. We set biofix for second generation flight when our trap counts decline to zero (aka. the end of first generation flight) and when we sustain captures for the flight of second generation moths. However, this year we have not seen CM trap counts go to zero or even close at the NWMHRS. In the past four weeks, we captured 29.5, (June 19), 5.5 (June 26), 23.5 (July 3) moths, and 5 moths (July 24) and none of the counts are below the old threshold of five moths/trap. Therefore, we will not be able to set a new biofix for second generation; instead, we will use the first biofix date (May 26) and add 1000 GDD

generation; instead, we will use the first biofix date (May 20) and add 1000 GDD. In other words, when the insecticide application timing is 250 GDD for first generation, use 1250 GDD for second generation timing. At the NWMHRS, we are currently at 1043 GDD (July 23), and we expect that the second generation moths are now flying. Predicted egg hatch for second generation larvae will be at 1250 GDD.

As we have now documented CM resistance to organophosphates (OP's) in northwest Michigan, growers may have to begin thinking of alternative ways to manage CM populations. Below is a general list of CM insecticides that could be used if a grower suspects resistance in his/her orchards. However, these spray programs are not written in stone as they will depend on pest pressure, past populations, and weather conditions as with any other orchard insect management strategy.

First, a word about OP's: if a grower does not suspect OP resistance or the block has not had any past CM problems, OP use is still acceptable. Although OP use has been minimized in most crops and eliminated in others, these compounds are still valuable tools when they are used appropriately. Remember that Guthion or Imidan® (the most commonly used OP's) affect the egg, larval, and adult life stages, and they should be applied 250 GDD after biofix if a second generation biofix date is set or at 1250 GDD if growers are using first generation biofix. OP compounds are generally not effective against OBLR.

To control CM in an OP resistant orchard is a more difficult and complex situation, but here are some suggestions:

**1.** Calypso and Assail, two chemicals in the neonicotinoid class, are good options for summer insecticide applications. These chemicals target both CM and apple maggot (AM). Calypso is better than Assail for CM control during the summer. These chemicals are not recommended for OBLR control.

**2.** Codling moth virus, *Cydia pomonella* granulovirus, is an effective control that is highly specific to CM. Each virus particle is contained within a protein occlusion body (OB). These tiny particles must be ingested by the CM larva to be effective, but it only takes a few to cause death. Upon ingestion, OB's are dissolved by the insect's alkaline gut lining, releasing the viral particles. The virus replicates itself within the gut cells and rapidly spreads to other organs. Within a few days the larva stops feeding, becomes discolored and swollen, and melts into a mass of billions of viral OB's.

Based on research at Trevor Nichols, three virus sprays at 2oz per application 5-10 days apart is very effective for first generation CM, and most growers have used it for second generation CM to lower their overall population. Because these products are living organisms, repeated applications are needed if there is adequate rain or scorching sunshine. Although CM virus is extremely efficacious, it is slow acting. The fruit will be stung if used during this first generation timing, but these fruits will likely drop by harvest time. If virus is used for second generation CM, the injured fruit **will** be present at harvest. Virus can also be used in conjunction with alternate Calypso or Assail sprays, and this approach may have added benefit than just repeated virus sprays. Lastly, one very late virus application (late August through September, or the last spray of the season) will help reduce overwintering populations of CM for the following spring.

**3.** Rimon applied at 1100 GDD and another application 10-14 days later is rated 'good' for second generation control. However, Rimon seems to work much better on first generation than when applied to combat summer generation CM. Rimon is also very effective against OBLR in the spring, but summer results are not as impressive. We currently recommend the 20 oz/acre rate for spring generation pests, but ongoing studies will determine if we need to increase the rates for summer generations for better control against both CM and OBLR.

**4.** The following products are also labeled 'good' (2006 Michigan Fruit Management Guide) against second generation CM: Lannate, Warrior, and Intrepid. Intrepid is also a good product for OBLR control. Warrior will work against CM in orchards that do NOT have OP resistance. Pyrethroids, such as Warrior, show cross resistance with OP's. Pyrethroids also flare mites, which may be another critical pest at this time of year. Diazonon, another OP that is sometimes used in apple, will obviously not be effective in OP resistant orchards but is still labeled 'good' in the *Management Guide*.

***Apple Maggot***. Apple maggot (AM) is strictly a summer season pest. This pest spends the winter in the pupal stage, and the flies emerge from late June through September. Just as with cherry fruit fly, AM begin to lay eggs 8-10 days after emergence. During this preoviposition period, the flies feed and rest. When this period is over, the flies mate, and females begin to lay their eggs in the developing fruit. Maggots hatch and tunnel through the fruit, and when they have finished eating, they leave the fruit and enter the soil to spend the winter.

Apple maggots can be monitored with yellow sticky traps or red sticky spheres. Red spheres need to be cleaned periodically as they lose attractiveness as bugs build up in the sticky material. An ammonium based lure will add to the attractiveness of the traps. A minimum of four yellow sticky traps per orchard should be used, and the best placement is on the south side of the trees a few rows in from the edge of the orchard.

The most practical method of control is to target the adult flies before the females lay their eggs. Guthion and Imidan are excellent products against AM, and if an orchard has not noticed reduced effectiveness of OP's against CM, then this product would target both pests. Assail and Calypso, also two good chemicals against CM, are very efficacious against AM.

***Mites.*** Apples are often afflicted by three different mite species: apple rust mites, European red mites (ERM), and two spotted spider mites (TSSM). All mites feed on the foliage of the tree, and if populations are high, the result is a bronzing of the leaves.

Scouting for mite eggs can begin as early at green tip. At petal fall, growers should be looking for egg hatch and continue through September. In orchards with high mite populations the previous summer, an early start to mite monitoring can alert growers to population increases requiring pre-harvest treatment with enough time to avoid conflicts with a miticide's PHI. In a droughty year, a good practice is to begin monitoring earlier than usual. One method of monitoring

populations consists of sampling 25 leaves at each of 3-5 sites within a block, using 50% spur leaves and 50% shoot leaves.

table

Conservation of predator mites in an orchard is critical to control plant parasitic mites. The three predaceous mites commonly found in Michigan are *Amblyseius fallacis* (Phytoseiidae), *Agistemus fleschneri* (Stigmaeidae), and *Zetzellia mali* (Stigmaeidae). Predaceous mites are even smaller than TSSM, but these predators can be detected with a hand lens. Predaceous mites also move very quickly across the leaf surface. All three mite predators are sensitive to the lethal toxicity of carbamate and pyrethroid insecticides. These chemistries should be avoided if an orchard has elevated mite populations. Phytoseiid mites (*A.fallacis*) respond more quickly (reproductively) to increasing populations of TSSM or ERM, but stigmaeid mites (*Z. mali*) can survive and are more effective predators at lower TSSM or ERM population densities. Herbicide sprays also affect the number of predator mites within an orchard. Clean, weed-free areas under the trees in fall and early spring eliminate optimal overwintering habitat for predaceous mites, and when predator mites are not present early in the season, mite populations can grow unchecked if conditions are favorable.

Mite infestations may be controlled with miticides. When using chemical control, good coverage of all tree surfaces is critical. Some miticides are active on eggs (ovicides) and should be applied before egg-hatch; Apollo and Savey are miticides with ovicidal properties. Savey also works on mite larvae. Other miticides are only active on motiles (adulticides) and should be applied after populations start to build: Nexter, Vendex, and FugiMite 5EC. Field evidence suggests Nexter is not as effective on TSSM as it is on ERM. FugiMite is effective against mites as well as leafhoppers. Envidor is newer product for mite control and is active by contact to all life stages. The active ingredient, spirodiclofen, controls mites by inhibiting lipid synthesis, and is active by contact to all life stages. Envidor has a novel mode of action and is not known to have risk of cross-resistance with other currently registered miticides. Envidor 2SC has a rate range of 16 – 18 fluid oz per acre, 7-day pre-harvest interval for pome fruits and is restricted to one

per acre, 7 day pre-harvest interval for pome fruits and is restricted to one application per acre per season for all labeled fruit crops. With so many control materials from which to choose, and because of concerns with the development of mite resistance to miticides, no miticide should be applied more than once per year. Please see the table below for more information on miticides.

| Compound | Fruit crop | Mites | Life stage target | Seasonal timing | Residual activity |
|---|---|---|---|---|---|
| Lime-Sulfur | pome, stone | RM 3 | motiles* | Early (delayed-dormant) | 4-6 weeks |
| Superior, Stylet Oils | all above | ERM, RM | egg/larvae | Early (pre-bloom) | 4-6 weeks |
| Savey | pome, stone | ERM | egg/larvae | Early*** | 8-12 weeks |
| 0 | pome, stone, caneberry, strawberry | TSSM | egg/larvae | Mid (or threshold)** | 6-8 weeks |
| Apollo | pome, cherry, peach | ERM | egg/larvae | Early*** | 8-12 weeks |
| 0 | 0 | TSSM | egg/larvae | Mid (or threshold) | 6-8 weeks |
| Zeal | pome | ERM | egg/larvae | Early*** | 8-12 weeks |
| 0 | pome, strawb, grape | TSSM | egg/larvae | Mid (or threshold)** | 6-8 weeks |
| Agri-Mek | pome, plum, grape, | ERM, RM | motiles* | Early**** | 8-12 weeks |
| 0 | strawb. | TSSM | motiles* | Mid (or threshold) | 6-8 weeks |
| Envidor | pome, plum, grape | ERM, RM | egg, motiles* | Early**** or thres. | 8-12 weeks |
| 0 | 0 | TSSM | egg, motiles* | Mid (or threshold) | 6-8 weeks |

| | | | | | |
|---|---|---|---|---|---|
| Nexter | pome, stone 1, grape | ERM, RM | motiles* | Mid (or threshold)** | 6-8 weeks |
| 0 | 0 | TSSM | motiles* | Mid (or threshold) | 6-8 weeks |
| FujiMite | pome, grape | ERM, RM | motiles* | Mid (or threshold)** | 6-8 weeks |
| 0 | 0 | TSSM | motiles* | Mid (or threshold) | 6-8 weeks |
| Kanemite | pome | ERM | motiles* | Mid (or threshold)** | 6-8 weeks |
| 0 | pome, strawberry | TSSM | motiles* | Mid (or threshold) | 6-8 weeks |
| Acramite | pome, peach, plum | ERM | motiles* | Mid (or threshold)** | 6-8 weeks |
| 0 | pome, peach, plum, grape, strawberry | TSSM | motiles* | Mid (or threshold) | 6-8 weeks |
| Danitol | apple, grape | ERM | motiles* | Mid (or threshold)** | 4-6 weeks |
| 0 | apple, grape, strawberry | TSSM | motiles* | Mid (or threshold) | 4-6 weeks |
| Capture | pear | ERM | motiles* | Mid (or threshold)** | 4-6 weeks |
| 0 | pear, grape, caneberry | TSSM | motiles* | Mid (or threshold) | 4-6 weeks |
| Oberon | strawberry | TSSM | egg, motiles* | Mid (or threshold) | 4-6 weeks |
| Vendex | pome, stone | ERM | motiles* | Mid (or threshold)** | 4-6 weeks |
| 0 | pome, | TSSM | motiles* | Mid (or | 4-6 weeks |

| | | | | | |
|---|---|---|---|---|---|
| | stone, grape, cane-, strawberry | | | threshold) | |
| Endosulfan | pome, stone, blueberry 2 | RM 3 | motiles* | Mid (or threshold)** | 4-6 weeks |
| Sulforix | pear, blueberry | RM 3 | motiles* | Late (post-harvest) | 4-6 weeks |

Table by **John Wise, Rufus Isaacs and Larry Gut, Entomology**

** Optimally used petal fall through fifth cover when mites reach threshold.

*** Optimally used pre-bloom through first cover.

**** Optimally used petal fall through second cover.

1 300 day phi for cherry

2 post-harvest only for blueberry

3 including pear blister mite

**Post Harvest Control In Cherry**

Nikki Rothwell, District Fruit IPM Educator

Jim Nugent, District Horticulturist

George Sundin, MSU Plant Pathology

***Cherry Leaf Spot***. Cherry leaf spot (CLS) symptoms are variable around the state with some areas showing very few lesions while other regions have sustained significant defoliation as a result of the disease. Due to this variability, post harvest sprays will most likely be applied on an orchard by orchard basis. However, we have written some guidelines to help growers decide if a post harvest spray is warranted:

1. If an orchard has been clean for the majority of the season, with very few lesions and no defoliation, there is likely little need for a post harvest spray in this situation. This recommendation can be strengthened if a grower applied a fungicide application with his/her ethrel spray and because this block has made it through the majority of the season with little infection. A wet August, which is rare, will obviously increase the disease potential; a clean orchard now is less likely to have significant CLS infection even under wet conditions. However, as we have completed harvest much earlier this year than in years past, we have a longer post harvest interval. Growers should monitor the weather and alter the no post harvest spray decision as the weather dictates.

2. If an orchard had leaf spot symptoms during the season, even if the leaves

2. If an orchard had leaf spot symptoms during the season, even if the leaves look clean now, a post harvest spray should be applied. Lesions often lie dormant until fungicides are removed, and then have the potential to increase with low amounts of moisture in August—even a low amount of leaf spot in August will increase with fungicides removed from the system.

3. If an orchard has had any kind of defoliation, then a post harvest fungicide spray is mandatory.

Bravo is the best post harvest option, but a reminder that this product is a protectant and must be applied before a rain event. There is no back action activity with Bravo.

***Mites.*** Mites are another pest of concern post harvest, and in cherry two spotted spider mites (TSSM) can become particularly problematic under droughty summer conditions. As the groundcover vegetation becomes a poor food source for TSSM, they move up into the cherry trees in mid- to late-summer. Older, inner spur leaves are often first infested as the females move to those locations first. However, with warm dry weather, mite populations can increase dramatically in a short time, and the mites will move off these older leaves to all parts of the tree canopy.

Scouting for mites can begin earlier, but now is a good time to be monitoring orchards for TSSM. One method of monitoring TSSM motile populations consists of sampling 25 leaves at each of 3-5 sites within a block, using 50% spur leaves and 50% shoot leaves.

Treatment for TSSM should be based on the following thresholds (double the treatment thresholds for TSSM in tart cherry):

1) 2-3 mites/leaf from mid-May to mid-June
2) 5-7 mites/leaf from mid-June through July
3) 10-15 mites/leaf in August

Presence of predaceous mites (>1/leaf) may justify delaying a treatment and repeating the cycle the following week.

Two-spotted spider mite infestations may be controlled with a post-harvest miticide. When using chemical control, good coverage of all tree surfaces is critical. Some miticides are active on eggs (ovicides) and should be applied before egg-hatch; Apollo and Savey are miticides with ovicidal properties. Savey also works on mite larvae. An early application of superior oil does not work for TSSM as it does with ERM populations because first generation TSSM eggs are laid in the ground vegetation rather than in the tree. Other miticides are only active on motiles (adulticides) and should be applied after populations start to build: Nexter, Omite-CR (post-harvest only), and Vendex. Field evidence suggests Nexter is not as effective on TSSM as it is on ERM. Envidor is newly registered for mite control in cherries and is active by contact to all life stages. The active ingredient, spirodiclofen, controls mites by inhibiting lipid synthesis, and is active by contact to all life stages. Envidor has a novel mode of action and is not known to have risk of cross-resistance with other currently registered miticides. Envidor

2SC has a rate range of 16 – 18 fluid oz per acre, 7-day pre-harvest interval for pome and stone fruits (14 days in grapes) and is restricted to one application per acre per season for all labeled fruit crops. With so many control materials from which to choose, and because of concerns with the development of mite resistance to miticides, no miticide should be applied more than once per year.

**Attention NW Grape Growers!**

Rufus Isaacs, Entomology

Nikki Rothwell, District Fruit IPM Educator

EPA needs to hear from you regarding the REI for Imidan in grapes! The EPA has currently changed the REI for Imidan in vineyards to 14 days rather than the traditional 3 day REI. The Gowan company believes there is a chance to get the REI back to 3 days (see below), which would be a big help for mid-season use against Japanese beetles, grape berry moth, etc. This information is particularly relevant now that Guthion is to be phased out of grapes. If EPA does not hear from growers, vineyard managers, industry leaders etc. about why 14 days is restrictive, this longer REI will stand. **The deadline for comments is August 8th**.

***Submitting comments for Phosmet (Imidan) – grapes***

***Gowan's analysis of EPA's proposal to:***

1. Maintain the new 14 day REI
2. Require buffer zones around houses and occupied dwellings.

Grapes are somewhat problematic because back when EPA examined the risks for Imidan use in grapes (October of 2001) they determined that there were not significant benefits for the use of phosmet (Imidan) on grapes. As a result, they were not willing to consider any Margins of Exposure (MOE) less than 100. Because of several high contact activities –harvest, leaf pulling and cane turning – EPA determined that a 14 day reentry interval (REI) was necessary.

Recently, we have received comments that Imidan does in fact have a role to play in an integrated pest management for grapes and that the 14 day REI is hampering Imidan's use. After analyzing what activities drive the worker risk assessment it is clear they are the high contact activities of harvesting, leaf pulling and cane turning. We believe the harvesting is already protected by the preharvest interval (PHI) – 14 days. We would need to have a 14 day preharvest interval for all use rates – currently the lower rate allows for a 7 day PHI. We would also add a statement to the label that reads "Do not conduct leaf pulling or cane turning activities for 14 days following an application of Imidan." With those high contact activities covered, we believe we can defend a much shorter REI – 3 days.

1) Gowan will make a scientific argument why our biomonitoring data should support MOEs that are protective at a 3 day REI. They don't quite reach 100 for the higher rate allowed on the label but they are close. EPA will allow them if there are documented benefits to the use of Imidan in grapes. We will also argue the MOE for the higher rate is protective because of the conservatisms

argue the MOE for the higher rate is protective because of the conservatisms built into the risk assessment, the fact that the endpoint used is a No Effect Level (NOEL) and that there is human data that very clearly demonstrates that an MOE of 10 is protective.

2) Buffer Zones – we believe that the current language on the label already instructs against any applications around houses and occupied dwellings – we do not believe any additional language is necessary.

***Our suggestion for comments for each of the proposals by point listed above.***

Keeping the REI at 14 days. Imidan use in grapes is becoming more important due to the loss of other materials. It is used for control of both grape berry moth and Japanese beetle. In addition to the loss of key products that used to control some of the more devastating pests in grapes the vine mealybug has become a bigger problem. Vine mealybug is unique because all stages of the pest are present so a broad spectrum material is critical for control of the pest. The newer alternatives are more timing and life stage specific and

therefore can't provide the same broad spectrum control. Due to the loss of other broad spectrum materials Imidan is much more important in an integrated pest management program. The current REI however is a huge barrier to use. It essentially makes the use of Imidan impossible in grapes. We can live with a restriction for specific activities but not a blanket 14 day REI.

1. The Imidan label already contains this language "Do not apply this product in a way that will contact workers or other persons, either directly or through drift." There is nothing in EPA's proposal that specifies what they are proposing in the way of buffer zones around houses and occupied dwellings. However, I would make the comment that the current language on the label is protective.

***Here is all the specific information for submitting comments.***

Due Date: ***Comments must be received on or before August 8, 2006.***

Must Include Docket ID: ***EPA-HQ-OPP-2002-0354***

Submit your comments, identified by docket identification

(ID) number by one of the following methods:

On Line: Federal eRulemaking Portal: **http://www.regulations.gov**.

Follow the on-line instructions for submitting comments.

In Writing: Mail to:

Office of Pesticide Programs (OPP) Regulatory Public Docket (7502P), Environmental Protection Agency, 1200 Pennsylvania Ave., NW.,
Washington, DC 20460-0001.

Hand Delivery: OPP Regulatory Public Docket (7502P), Environmental Protection Agency, Rm. S-4400, One Potomac Yard (South Building), 2777 S. Crystal Drive, Arlington, VA. Deliveries are only accepted during the Docket's normal hours of operation (8:30 a.m. to 4 p.m., Monday through Friday, excluding legal holidays). The Docket telephone number is (703) 305-5805.

**Welcome Karen Zinger!**

We have hired Karen as our new research technician here at the station. She began last week, and she will be with us year-round. We are really excited that she has joined our team, so if you have a chance, stop by and say hello.

| 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 |
| 6/13 | 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 |
| Totals | **5.87** | **-8.69** | **19.41** | **14.56** |

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

http://www.cherryboard.org/Week_4_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: 7-25-06

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Northwest Michigan Horticultural Research Station
6686 S. Center Hwy • Traverse City, Michigan 49684
Tel: 231/946-1510 Fax: 231/946-1404

Last Updated: May 24, 2006



# 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

**June 27, 2006**

### Growing Degree Day Accumulations as of June 26 at the NWMHRS

| Year | 2006 | 2005 | 2004 | 2003 | 2002 | 16yr. Avg. |
|---|---|---|---|---|---|---|
| **GDD42** | 1381 | 1380 | 1070 | 1144 | 1026 | 1202.4 |
| **GDD50** | 801 | 835 | 568 | 627 | 598 | 697.0 |

### WEATHER

Temperatures were fairly normal this past week with highs in the '70's. Rainfall varied in the region, but amounts were generally low. Rainfall at the NWMHRS totaled 0.1 inches for the week, bringing the total precipitation for the month of June to 1.7 inches. Base 42 degree day accumulation is the same as this date in 2005.

### GROWTH STAGES at NWMHRS (6/26/06; 8:00 a.m.)

**Apple**: Mac: 45 mm fruit, Red delicious: 37 mm fruit

**Pear**: Bartlett: 22 mm fruit

**Sweet Cherry**: Hedelfingen: 19 mm fruit, Gold: 18 mm fruit

**Tart Cherry**: Montmorency: 17 mm fruit; Balaton: 15 mm fruit

**Apricot:** 35mm fruit

**Plum**: NY 12: 22 mm fruit

**Grapes**: Chardonnay: Bloom

**Tree Fruit**

**Apples:** Most orchards are looking pretty clean in terms of **scab**, despite

**Apples:** Most orchards are looking pretty clean in terms of **scab,** despite regular rainfall this season. We have biofixed for **oblique banded leaf roller** on Monday, June 19th. Again this week we caught an average of 27.5 moths per trap in cherry, while apple traps at the NWMHRS only caught an average of 1.5 moths per trap. **Oriental fruit moth** and **codling moth** trap counts are down. Red sticky spheres are in the orchard, but no **apple maggot** adults have been caught.

**Cherry: Cherry leaf spot** symptoms can be found in most orchards at this time, and **powdery mildew** is showing up on inner branches as well as some terminal branches. **Brown rot** is starting to show up in **sweet** blocks around the region. We are observing heavy leaf drop from **cherry yellows virus** this season. We have picked up a few new **plum curculio** stings in a minimally sprayed block. **American plum borer** and lesser **peach tree borer** counts are down at the NWMHRS, but we are still catching an average of 5 **greater peach tree borer** adults per trap. Using the new method of high trapping for cherry fruit fly, we picked up four traps completely covered in our "Entomology" (aka unsprayed) block. Harvest of early dark sweets for the local fresh market is getting underway in warmer areas of NW Michigan.

**Small Fruit**

**Strawberries:** Berry size has been below normal this year, and harvest is expected to wrap up with below average yields.

**Grapes:** Bloom is finishing up for most cultivars; fruit set looks good at the NWMHRS. **Powdery mildew** continues to be very high in most sites. Potato leafhopper numbers are up significantly, with many nymphs present now. Treatment has been needed in many vineyards. **Rose chafer** numbers have increased slightly in the last week, but this insect should be nearing the end of its activity soon. Grape growers should be on the lookout for **Japanese beetle** in their vineyards, especially in Leelanau County. This insect was found in Leelanau County for the first time last summer. It can be a serious foliage feeder in vineyards. There is a similar looking native beetle called the **false Japanese beetle**, which will also feed on grape leaves. These are typically not numerous and are rarely a concern.

| **Seasonal Evaporation & Precipitation** | | | | |
|---|---|---|---|---|
| **Beginning May 1, 2006, at NWMHRS** | | | | |
| | | | | |
| 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 |
| 6/13 | 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 |
| | | | | |
| Totals | **4.80** | **-4.44** | **12.32** | **9.24** |

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**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: 6-27-06