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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

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**

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

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

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

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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 26th. 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 26th. 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**

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MAES Home | **Field Stations** | **Station Home** | **Contact**
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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