

Northern Michigan FruitNet 2017

Northwest Michigan Horticultural Research Center

Weekly Update

FruitNet Report – May 16, 2017

CALENDAR OF EVENTS

- | | |
|--------------------|--|
| 5/19 | Save the Date: Apple Thinning Meeting
NWMHRC, 10 – 1 PM, RSVP by May 17 |
| 5/9 – 6/27 | Leelanau IPM Updates
Jim and Jan Bardenhagen’s Farm, 12PM – 2PM |
| 5/9 – 6/27 | Grand Traverse IPM Updates
Wunsch Farms Packing Shed, 3PM – 5PM |
| 5/10 – 6/28 | Antrim IPM Updates
Jack White Farms, 10AM – 12PM |
| 5/10 – 6/28 | Benzie IPM Updates
Blaine Christian Church, 2PM – 4PM |

What’s New?

- **Requests Comment on Extending the Timeline for Pesticide Applicators Rule**
 - **Immigration Concerns in Benzie County – Panel Discussion**
 - **Northwest Michigan Fruit Regional Report – May 16, 2017**
 - **Forecasted weather is a concern for fire blight during bloom**
 - **Apogee Application Time**
 - **A primer for Streptomycin, Kasumin, and Oxytetracycline use for fire blight management**
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Northwest Michigan Fruit Regional Report – May 16, 2017

Growers are assessing damage from last week's cold events, and with warm and wet conditions in the forecast, growers are making applications to prevent diseases

Nikki Rothwell and Emily Pochubay

GROWING DEGREE DAY ACCUMULATIONS AS OF MAY 15, 2017 AT THE NWMHRC

Year	2017	2016	2015	2014	2013	2012	27 Yr. Avg.
GDD42	356	346	370	241	325	636	384.7
GDD50	146	142	167	90	174	321	176.8

2017 Growth Stages as of 5/15/17

Bartlett Pear – Full bloom
Potomac Pear – Full bloom
Mac – Open cluster
Gala – King bloom
Red Delicious – King bloom
HoneyCrisp – King bloom
Montmorency – Full bloom
Balaton – Full bloom
Hedelfingen – Petal fall
Gold – Ear. petal fall
Napoleon – Petal fall
Riesling – Early bud swell

Weather Report

Daytime temperatures were mostly pleasant for the past week although the northerly wind made it seem colder than the thermometers recorded. Nighttime temperatures have been cool, and there was even some frost reported on farms on the morning of 15 May. Some growers ran their frost fans overnight on 15 May. We have accumulated 356GDD base 50 and 146GDD base 42, and these accumulations are behind our 20+ year averages. Conditions are quite dry across the region, and we could use rain. We had a small amount of rainfall on Saturday 13 May, and the NWMHRC Enviroweather station recorded only 0.08" of rain. Rain is in the forecast for this week.

Crop Report

Growers are still evaluating the impacts of last week's frost/freeze events. Growers that had frost fans and/or irrigation fared better than growers without these technologies. Some areas of northwest Michigan are reporting more damage than other regions. The more southerly areas of the region were harder hit than orchards to the north. Orchards in Manistee and Benzie Counties recorded low temperatures, and in some cases, the lows hit 21 and 22 degrees F. Growers in that area weighed their options for Promalin/Perlan applications, but the window for a Promalin/Perlan application has passed following last week's frost/freeze.

In most situations, the amount of damage seems less than we anticipated last week. Apples in low spots have obvious damage, but apples on higher sites fared well. Growers are still optimistic they will have a good apple crop despite the freeze damage. Tart cherries seem to have come through the cold events with less damage than we estimated last week, and growers in northwest Michigan feel they will likely have an average size crop for 2017, although it is early to make this determination. Tart cherries are just hitting full bloom at the NWMHRC, and we had excellent pollination weather on 15 May. Warm conditions are expected today, so we anticipate bees to fly if the rain holds off. There is a varying level of damage in sweet cherries throughout the region with the most significant damage primarily in orchards on marginal fruit sites. Sweet cherry bloom seems to be hanging around for a long time this year, so we are hoping they were pollinated even though we had cool conditions last week.

Pest Report

We received spotty light rains that were not predicted in parts of the region on the morning of Saturday 13 May. Fortunately, temperatures were cool, we had very little rainfall accumulation, and the moisture dried up quickly enough that no apple scab or cherry leaf spot infections resulted from this short wetting event. Although we do not have models on Enviroweather for the brown rot pathogens, it is unlikely that conditions were wet or humid for long enough to cause blossom blight.

Although wet conditions did not last long enough for an infection, apple scab spores discharged at a relatively higher rate than we have previously observed (Table 1). While these numbers seem low overall, we remind growers that it is not the numerical value or volume of spores that are released, but the relative pattern of release that is applicable. In other words, this pattern of spore release is typical, and we should continue to see an increasing trend of spore counts until petal fall as long as wetting events occur during daylight hours (i.e. spores have a tendency to release more readily in late morning/afternoon rains) and have enough rain (i.e. 0.01") to

Table 1. Apple Scab Spore Discharge, 2017		
Date	Total # Spores	Avg. # Spores
4/15/17	6	3
4/16/17	2	1
4/20/17	10	5
4/27/17	1	0.5
4/28/17	4	2
4/30/17	12	6
5/1/17	12	6
5/2/17	7	3.5
5/13/17	30	15

discharge spores. We had a few scab infection periods in late April, and symptoms should be visible this week if tissue became infected at that time.

In apple varieties with open blossoms, fire blight is a concern this week in predicted warm and wet conditions. Many growers with open blossoms made their first fire blight spray on Monday prior to the predicted overnight rains. Following last year’s fire blight challenges, it will be critically important to be proactive with fire blight management this season. As a reminder, in areas with streptomycin resistance, Kasumin is the only effective option to kill the bacteria and knock back fire blight populations. Additionally, Kasumin is unlike streptomycin as it does not have systemic activity and this material needs to be applied prior to rain. Please see the following articles for more information on fire blight management: *A primer for streptomycin, kasumin, and oxytetracycline use for fire blight management*, *Forecasted weather is a concern for fire blight during bloom*, and *Apogee application time*. Additional information can also be found in the Michigan Fruit Management Guide on pages 108 and 259.

Many growers made their first cherry leaf spot applications last week or early this week depending on location. As mentioned previously, Saturday’s rain likely did not result in an infection period as temperatures were cool and period of wet weather was brief. Enviroweather will not report infection periods until after bloom time, but there is susceptible leaf tissue

present in most orchards at this time. Growers should consider leaf spot protection this week as the current conditions are predicting warmer temperatures with several days of wet weather that could result in a long infection period if areas do not receive adequate drying time between wetting events.

Table 2. NWMHRC Insect Trapline Data, 2017				
Cherry - NWMRHC	25-Apr	2-May	9-May	16-May
Green Fruitworm	14	1	6	2
American Plum Borer				2
Apple - NWMHRC	25-Apr	2-May	9-May	16-May
Oriental Fruit Moth	0	0	0	0
Spotted Tentiform Leafminer				52

For growers that are thinking about American Brown Rot management in sweet cherries: if warm and extended wet conditions that are predicted do occur, this weather could be conducive for blossom blight. Some growers made an application for American Brown Rot on Monday 16 May.

Insect activity continues to be relatively slow with a little activity of spotted tentiform leafminers in apples and green fruitworm and American plum borer in cherries at the station (Table 2). We will continue to look for small green fruit worm and leaf roller larvae at this time. It is also time to put up traps to monitor for the first male flight of San Jose scale; we have been getting more reports of this pest in older sweet cherry orchards this season. The next timing to manage scale is during the crawler stage which typically occurs ~2 weeks after peak male flight. If not already done, mating disruption tools should be in place soon. It is not too early for growers approaching petal fall in cherries

to consider their early season insect pest spray strategies in the context of season-long pest management.

Wine Grapes

Duke Elsner

A week of relatively cold weather really slowed the development of grape buds. Riesling at the research vineyard is mostly in the late bud swell stage. No pest insect activity has been reported from commercial vineyards. Wild vines in our area are more advanced, with some bud break. This is the time that grape flea beetle adults appear on wild vines, an occasionally these show up in commercial vineyards. The injury from this insect is usually of minor importance. Climbing cutworm activity may pick up soon if we get some warm evening temperatures. Vineyards with a history of this pest should be monitored for symptoms of feeding injury.

Saskatoons

Duke Elsner



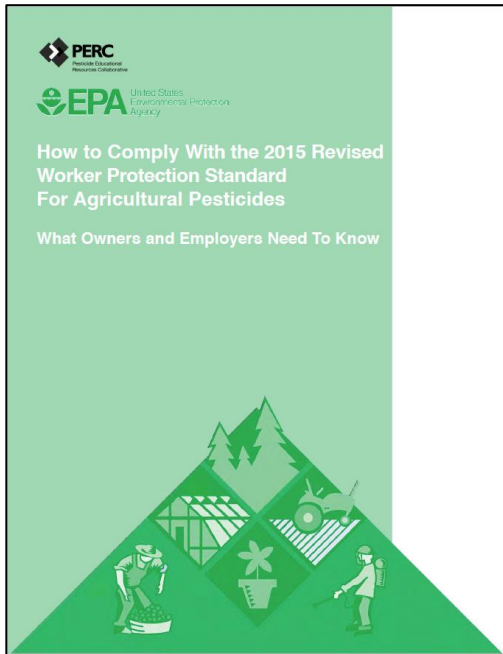
Above – Saskatoon Sawfly

Local plantings are at about 50% bloom. The first adult apple curculio and saskatoon sawflies have been taken in sweepnet samples in the Traverse City area. These insects will not lay eggs until after fruits are set. We are not certain of the prime infection periods for Entomosporium leafspot or saskatoon-juniper rust, but these fungal diseases may now be releasing spores if rainy weather occurs.

Special Announcements Regarding May 16th and 17th IPM Updates and May 23rd and 24th IPM Updates

Emily Pochubay, MSU Extension

May 16th and 17th:



MSU Extension will host Eric McCumber of Michigan Department of Agriculture and Rural Development (MDARD) at next week's IPM Update meetings on May 16th in Leelanau and Grand Traverse counties, and in Antrim and Benzie counties on May 17th. The focus of Eric's presentation will be on Worker Protection Standards (WPS) with the focus of this discussion on respirator requirements and central posting location information. The NWMHRC and Eric will provide examples of 'central posting locations' to demonstrate how WPS required information and optional information can be displayed for farm employees. We plan to provide at least an hour of our two-hour meeting time for Eric to cover these topics and answer questions. We will also cover timely pest/disease management strategies for the week to come.

May 23rd and 24th:

The following week, Gillison' Variety Fabrication will be on hand during IPM Updates to demo their new GB-34R 500 Narrow Variable Air Orchard Sprayer. Below are the dates and locations of the demos.

May 23, 2017 – Jan and Jim Bardenhagen's Farm, 12PM – 2PM

May 24 – Jack Whites Farm, 10AM – 12PM

May 24 – Blaine Church, 2PM – 4PM

Forecasted weather is a concern for fire blight during bloom

Following severe fire blight conditions and widespread infections last season, apple and pear growers should be prepared to manage fire blight.

Emily Pochubay, Nikki Rothwell, and George Sundin, MSU Extension

Last season's bloom time conditions were optimal for fire blight development in northwest Michigan, and as a result many apple orchards had some level of fire blight infection. We also had many orchards that had moderate to severe levels of infection. In 2016, warm temperatures during bloom were ideal for the growth of fire blight bacteria on flower pistils. Sunny, warm, and relatively calm conditions were favorable for pollinator activity, and pollinators readily spread the fire blight bacteria to open blossoms.

Although growers maintained good fire blight management programs, conditions were so ideal that the bacteria were able to grow rapidly, which compromised fire blight management strategies. Warm weather was followed by rain that washed the bacteria into flower nectaries and initiated infection. The region also had windy conditions that contributed to trauma blight. Infected shoots collapsed (resembling a Shepherd's crook), and these shoots produced bacteria containing ooze that continued to pose management challenges for several weeks after bloom. In orchards with moderate to high levels of fire blight symptoms, growers removed infected shoots and in some cases used Apogee or copper programs to minimize the spread and severity of shoot infection. Despite last season's management efforts, there is the potential for a high level of inoculum in orchards that were infected with fire blight last season. Furthermore, temperatures in the 70s and 80s are forecasted for this week, which will be ideal for rapid growth of the fire blight bacteria in orchards with open blossoms. These predicted warm temperatures will be coupled with rain/possible thunderstorms, which will be a serious concern for flower infection and possibly trauma blight. Forecasted conditions are highly conducive for significant fire blight infection.

Growers that will have orchards in bloom this week are encouraged to frequently monitor the Epiphytic Infection Potential (EIP) values on Enviroweather's Fire Blight of Apple Blossoms model, and growers should keep in mind that these values can change quickly when the forecast changes. The EIP value is an estimator of the risk of blossom blight infection based on predicted weather conditions. As of 15 May at 10:00 AM, the model is predicting EIPs nearing 200 for the Northwest Michigan Horticultural Research Center; an EIP value greater than 200 is considered a very high infection risk with epidemic potential. On the model output, red boxes appear on EIP values above 100 and in most situations, the red boxes indicate that management should be taken to prevent and minimize infection. However, this season we suggest that growers take action at an EIP value of 80+ in orchards that were impacted by fire blight last season. Additionally, an Apogee program should be used in orchards that had moderate to high levels of infection last season to further minimize the potential impact of fire blight this season. Please refer to Dr. George Sundin's article, *A primer for Streptomycin, Kasumin, and*

Oxytetracycline use for fire blight management, for additional management information. At this time, the station is at king bloom meaning that not many flowers have opened or will be open during the warm temperatures early in the week. As a result we are fortunate there has been little opportunity for fire blight bacteria to grow during this early timing of bloom. However, other areas have orchards with 50% or more open blossoms and the bacteria have had more time to develop making the concern for fire blight greater in these orchards. Temperatures are currently predicted to cool down by the end of the week, which will reduce the risk of fire blight later in the week for newly opening blossoms. Again, we encourage growers to continue to monitor the EIP values as more blossoms open and we approach full bloom.

Apogee Strategy

Apogee is a growth inhibitor that provides excellent control of shoot blight by making shoots less susceptible to infection through shoot growth inhibition. The first timing for an Apogee spray is at king bloom petal fall followed by two or sometimes three additional applications at two week intervals. The king bloom petal fall timing for the first application coincides with the beginning period of rapid shoot growth of the tree, and this timing is critically important for a good response from Apogee. If shoot growth exceeds 3", Apogee will not work as well. An Apogee program of three applications at a rate of 8 oz/A at two week intervals beginning at king bloom petal fall is suggested. However, some growers have used an alternative strategy with a higher rate for the first application of Apogee followed by a reduced rate for the second and third applications (ex. 12 oz/A for 1st application followed by 6 oz/A for second and third applications. As a reminder, Apogee must be used with an organosilicone surfactant, and in hard water (i.e. high levels of calcium carbonate), an equal weight of spray grade ammonium sulfate should be used per lb of Apogee. For more information on Apogee, please refer to the Michigan Fruit Management Guide (pages 108 and 259) and the article, *Apogee Application Time*.

Managing Fire Blight with Apogee in Frost/Freeze Damaged Orchards

In orchards that were damaged due to freezing temperatures last week, growers may still need to implement a fire blight management strategy under the forecasted conditions. Even in severely devastated orchards, some bloom may remain viable and is a concern for fire blight. Trees with few viable flowers will result in little fruit meaning that these trees will be very vigorous, putting energy into vegetative growth. If these trees have a few viable flowers that become infected with fire blight, the bacteria will be able to spread quickly as these trees grow. In these orchards, a straight Apogee program of three applications spread two weeks apart will not stop the bacteria from infecting flowers, but it will help prevent shoot blight symptoms as the trees grow.

Streptomycin Resistance Screening Update

The NWMHRC's and Dr. Sundin's labs sampled many orchards for streptomycin resistant strains of fire blight bacteria last season, and we have continued to find widespread resistance in northwest Michigan with a new detection in Manistee County last year. Growers located in areas with known resistance should use Kasumin as an alternative for fire blight management this season. If growers are planning to use streptomycin and

resistance is unknown, one strategy that could help to lessen the risk of an ineffective application is to incorporate oxytetracycline into the strep spray. Use full rates of both of the antibiotics in the tank mix. Oxytetracycline does not kill the bacteria, but it will inhibit bacterial growth, which will help to minimize the risk of infection if a streptomycin application is not effective against fire blight.

Apogee Application Time

Nikki Rothwell, NWMHRC
Phil Schwallier, MSUE

Apogee® is a plant growth regulator composed of prohexadione-calcium that can be used in apples with significant advantages to the grower. Prohexadione-calcium reduces terminal growth by inhibiting important enzymes that help form growth-specific gibberellins. In laymen's terms, Apogee helps control tree vigor. Controlling vigor can reduce the amount/intensity of pruning, decrease internal shading—a major proponent to properly color apples, and reduce canopy density for thorough pesticide coverage. This product has also been a reliable tool for minimizing impacts of shoot blight caused by the fireblight pathogen, *Erwina amylovora*. Shoots that have less growth are not as susceptible to fire blight, and Do. George Sundin's work has shown that Apogee greatly reduces the potential for shoot blight. When applying Apogee to apples, growers should consider the following: timing, rate per acre, and compatibility with other chemistries in the tank.

Timing

Apogee should be applied when vegetative shoot growth is less than three inches. To best time the application, there is a 7 to 10-day window beginning at king bloom petal fall. In recent years, we are recommending that growers apply slightly earlier than petal fall as most growers miss that king bloom petal fall timing and if there is more than three inches of growth, Apogee will not work as well. Growers should try and time these applications for less than 3" of shoot growth, which in many years coincides with king bloom petal fall. This timing applies to most varieties in most years. Two more applications should be made at two-week intervals following the bloom application. Sometimes a fourth application is needed when excessive rainfall or light crops increase vegetative growth.

Rate

The rate per acre is usually calculated on a tree row volume basis and can be adjusted to two-thirds of the full-rate. This suggested two-thirds rate per acre is a season-long rate. For example, if trees are at the 75% tree row volume, then 24 ounces per acre is the seasonal rate ($48 * 0.75 * 2/3$). Best results are achieved when the seasonal rate is split into three or four sprays. For example, Apogee applications should be applied at 8 + 8 + 8oz. per acre for a total of 24oz. per acre per season. When the fire blight risk is high, the

first application of Apogee is at or prior to king bloom petal fall timing should be increased to 12oz. per acre. If the first spray rate is increased, subsequent sprays (second and third sprays) should be reduced. The seasonal application would be $12 + 6 + 6 = 24$ ounces per season instead of $8 + 8 + 8 = 24$ oz. If temperatures continue to remain high with the potential for rainfall for many days this coming week, a higher rate of Apogee is recommended as the EIP for fireblight is high at all sites across NW Michigan.

Compatibility

Apogee is not compatible with calcium or boron in the tank. We also recommend that Apogee be applied after the thinner application. If the two-week timing interval is also the ideal time to thin, make the thinning application first and follow with Apogee a few days later. Growers should read the Apogee label carefully. Apogee must be used with an organosilicone surfactant, and an equal weight of spray grade ammonium sulfate should be applied. Don not use Apogee on 'Empire,' 'Stayman,' or 'Winesap' because of the potential for fruit cracking.

A primer for Streptomycin, Kasumin, and Oxytetracycline use for fire blight management

Streptomycin, Kasumin and oxytetracycline are registered for bloom blight control on pome fruit. Informational summaries and use patterns are explained.

Posted by [George Sundin](#), Michigan State University Extension, Department of Plant, Soil, and Microbial Sciences, MSUE News

The apple or pear flower is a critical site for multiplication of the fire blight pathogen *Erwinia amylovora*. When temperatures are conducive for growth (70s to low 80s optimal), *E. amylovora* populations can grow to one million cells per flower within one to two days. As these populations grow, remember they will also be very quickly disseminated among flowers by pollinators. Thus, warm and sunny days during bloom can very quickly lead to high percentages of flowers colonized with incredibly large fire blight populations.

The fire blight pathogen only grows well on flower stigmas, not on other flower parts. These bacteria do not need rain to grow on the stigma. They do, however, require free moisture, as little as 0.01 inch rain, to move from the stigma tip down the outside of the style to the base of the flower where infection occurs through the nectaries. Blossom blight infection can really kick start a fire blight epidemic because these infected flower clusters will ooze more inoculum out and bacteria will be spreading internally through the tree.

With the [full registration of Kasumin](#) by the [Environmental Protection Agency](#) (EPA) last fall, we now have three antibiotics available for fire blight management during bloom.

Below is information about these antibiotics and suggestions for best use. These suggestions will differ based on the occurrence of streptomycin resistance in the fire blight pathogen in your orchard or region.

Streptomycin

Streptomycin is an **excellent** fire blight material and provides forward control for two to four days prior to rain events and will be effective for blossom blight control if applied within 12-24 hours after a rain event. Streptomycin is used at a rate of 24 ounces per acre and should be applied with a non-ionic surfactant such as Regulaid (1 pint per 100 gallons). The use of the surfactant enhances deposition of the antibiotic on flowers and increases the chances that the critical stigma targets will be hit.

Note: If streptomycin is reapplied within three to four days after a previous application, Regulaid can be omitted to avoid phytotoxicity – usually viewed as yellowing of leaf margins. Streptomycin is partially systemic and can reach fire blight bacteria that have entered flower nectaries.

Kasumin

Kasugamycin is an antibiotic related to streptomycin. There is no cross-resistance between Kasumin and streptomycin as Kasumin controls streptomycin-resistant strains of *E. amylovora*.

Kasumin is an **excellent** fire blight material and provides forward control for two to four days prior to rain events and will be effective for blossom blight control if applied within 12 hours after a rain event. Kasumin is used at a rate of 2 quarts (64 fluid ounces) per acre in 100 gallons of water per acre and should be applied with a non-ionic surfactant such as Regulaid (1 pint per 100 gallons). Read the Kasumin label carefully as there are some specifications, including:

- Do not apply Kasumin in orchards in which the soil has been fertilized with animal manure.
- Do not apply after petal fall.
- Do not use alternate row applications.

The main difference between Kasumin and streptomycin is that Kasumin is not partially systemic like streptomycin is. Thus, Kasumin will not penetrate into the nectaries and will not be able to control an infection once the fire blight pathogen reaches the nectaries.

Oxytetracycline

Oxytetracycline is a **good** fire blight material and should be applied within one day prior to a rain event for best results. Oxytetracycline is bacteriostatic and does not kill fire blight bacteria, it only inhibits their growth. Thus, it has to be applied prior to rains where it can prevent growth on stigmas, but it can't eliminate existing populations.

Oxytetracycline is also highly sensitive to degradation by sunlight and much of the activity is lost within one to two days after application. Oxytracycline is best used as a 200 ppm solution (1 pound per 100 gallons) and should be applied with a non-ionic surfactant such as Regulaid (1 pint per 100 gallons). Per the label, a maximum of 1.5 pounds per acre can be applied, using 150 gallons water in this case.

Two slightly different formulations of oxytetracycline are sold: Mycoshield (OxyTc-calcium complex) and FireLine (OxyTc-hydrochloride). The FireLine formulation is a bit more soluble than Mycoshield and has performed slightly better for blossom blight control in head-to-head comparisons.

Antibiotic use for blossom blight management

Fire blight predictive models such as MaryBlyt or Cougar Blight should be used as guides for timing management decisions. The output of the MaryBlyt model, for example, is the epiphytic infection potential (EIP) number, which is an estimator of the risk of blossom blight infection. The higher the number, the larger the infection risk. I would place forecasted EIP numbers into four categories of risk:

1. Low to moderate ($50 < \text{EIP} < 75$)
2. Moderate to high ($75 < \text{EIP} < 100$)
3. High ($\text{EIP} > 100$)
4. Epidemic potential ($\text{EIP} > 200$)

When the infection risk is moderate to high, high or of epidemic potential, only streptomycin or Kasumin can be expected to provide adequate blossom blight control. These two antibiotics provide the best blossom blight control and also reduce or eliminate most of the fire blight inoculum from flowers. During these types of high-risk conditions, the spray interval for streptomycin or Kasumin is usually predicated by the occurrence of rainfall. Very high EIPs (greater 200) also necessitate additional antibiotic applications at shorter intervals. Finally, remember the overall risk increases as bloom progresses as the fire blight pathogen is building up populations on flowers over time. In addition, the more open flowers there are increases fire blight risk, provides more sites for pathogen growth and increases the number of unprotected flowers (flowers opening since the last spray).

Firstly, when the EIP is high (greater than 100) but conditions are dry for several days, remember inoculum is building up rapidly on flower stigmas. Growers should apply streptomycin or Kasumin strategically in the middle of a period such as this to reduce inoculum potential. The outcome of enabling several days of population buildup by doing nothing will make blossom blight much more difficult to control if rain events follow. Controlling diseases under high inoculum situations is always more difficult than controlling diseases in a lower inoculum situation.

When the EIP is high and rain events are forecasted, the application of streptomycin or Kasumin would be best about 24 hours before the rain event and then followed up about

one to two days after the rain event. Subsequent spray applications will be based on current and future conditions. For example, if temperatures cool significantly and EIPs are reduced to low to moderate risk values, sprays can be held off. If EIPs remain high, a third application should be made within two to four days based on the occurrence of wet or dry conditions.

Oxytetracycline is best used when the infection risk is low to moderate (EIP less than 75). Under warmer conditions when *E. amylovora* is capable of very rapid growth on flower stigmas, oxytetracycline can be overwhelmed by the pathogen and fail to provide adequate control. In addition, the incidence of shoot blight infection is typically higher in oxytetracycline-treated trees compared to streptomycin- or Kasumin-treated trees because the innate activity of this antibiotic is the lowest of the three and its effect on inoculum reduction is the lowest.

In the absence of streptomycin resistance, streptomycin is the best choice for fire blight management. While the effectiveness of streptomycin and Kasumin are essentially equivalent in the inoculated blossom blight control tests that I have conducted over a seven-year period, the partial systemic nature of streptomycin gives it an advantage in that it can reach internal populations of *E. amylovora* that Kasumin cannot. Streptomycin is also significantly cheaper than Kasumin. Long-term evidence from around the Midwest and eastern United States suggests that if streptomycin use is limited to a maximum of three to four applications per season, and only used during the bloom period, then the chances of streptomycin resistance development are very low.

The main risk factor for streptomycin resistance development is an increased number of applications per season above four and regular use during the summer for shoot blight control. This use pattern increases the chances of mutation of the fire blight pathogen to streptomycin resistance or acquisition of a streptomycin-resistance gene from the indigenous microflora in orchards.

A resistance management strategy for streptomycin can be used; the best strategy would be to alternate applications of streptomycin and Kasumin. [Michigan State University Extension](#) advises that a tank-mix strategy of using streptomycin and oxytetracycline is not a resistance management strategy. Since the oxytetracycline is not killing bacterial cells, it would not kill any streptomycin-resistant cells that might arise; it would only temporarily prevent their growth.

In streptomycin-resistance situations, Kasumin is the antibiotic of choice and is best used in advance of moderate to high risk conditions. This is because where we have detected streptomycin resistance in orchards in Michigan, the incidence of resistant bacterial pathogen strains is usually very high to 100 percent. Thus, streptomycin should not be used in these situations because it will have no effect on the pathogen. If the disease risk is low to moderate, oxytetracycline is also an effective substitute for streptomycin in orchards where streptomycin resistance occurs.

Summary of antibiotic use for fire blight management

The target of antibiotic sprays for fire blight control is the stigma surface, style and base of the flower. Adding a non-ionic surfactant such as Regulaid to antibiotic sprays increases the chances of deposition on target surfaces. The best timing for all antibiotics is to arrive prior to the arrival of fire blight bacteria because these arriving populations are typically small and can be readily controlled if the antibiotic is already present. However, streptomycin and Kasumin can be used effectively after *E. amylovora* cells have arrived and started growing on stigmas.

When EIPs predict potential high risk to epidemic conditions, only streptomycin or Kasumin will be effective for blossom blight control. Under these conditions, the two most important considerations are very tight spray intervals and excellent spray coverage.

Dr. Sundin's work is funded in part by [MSU's AqBioResearch](#).

Clarifications on Worker Protection Standards: Central Posting for Pesticide Application Information versus Decontamination Station Requirements for Agricultural Workers

Eric McCumber, MDARD

Emily Pochubay and Nikki Rothwell, MSU Extension

Both MDARD and MSU have received recent questions about the requirements to display pesticide application information at a central posting area. Growers also have questions about what should be included at designated decontamination stations. This article is intended to clarify such questions because we have heard misinformation that pesticide application information should be posted within a ¼ mile of where agricultural workers are working in a treated block—this type of posting is *not* required to meet WPS regulations. This confusion may be related to regulations for decontamination stations; according to WPS, **decontamination stations** are required with ¼ mile from where agricultural workers will be working during the REI or for 30 days thereafter of the application of a WPS-labeled pesticide. Although we will cover the key points for these two issues in this article, more detailed information can be found in the How To Comply Manual (HTCM) at www.pesticideresources.org. In the HTCM, central posting location information is on page 21 and decontamination station information can be found on page 48. The information presented below is relevant to agricultural employers of agricultural workers. Supplies needed for handlers' decontamination sites are different and we encourage employers and handlers to review this information as needed (page 74-75 of the HTCM).

Central posting locations serve as the hub for pesticide application information, and this central posting location is the *only* location on the farm that is required to contain the information outlined below. *According to MDARD, central posting locations* are areas where all farm employees can find any information related to pesticide applications. If a WPS-labeled pesticide has been applied, or if a restricted-entry interval (REI) has been in effect within the past 30 days, then the agricultural employer must display the required information (see below) at a central posting location whenever any agricultural worker is on the agricultural establishment. The location of the central posting is determined by the agricultural employer, but it should be placed in a location where employees congregate such as the workshop, office, break room, or an area where they check in for work. Agricultural workers must be informed where the designated central posting location is located and must be allowed unrestricted access to the posted information during employment hours.

Agricultural producers are required to display at the central posting area the following information. Again, agricultural workers must have unimpeded access to the information during work hours.

- **Pesticide application information including:**
 - ✓ Brand name of the pesticide(s) applied.
 - ✓ Active ingredient(s).
 - ✓ EPA Reg. No.
 - ✓ REI.
 - ✓ Crop/site treated.
 - ✓ Location and description of treated area(s).
 - ✓ Date(s) and time(s) application started and ended.
- **Safety Data Sheets (SDS)** for each pesticide product.
- **Pesticide Safety Information.** Prior to the updated WPS, this information was required to be displayed in a poster format (known as pesticide safety poster). Agricultural employers are no longer required to display a poster, but must provide information about certain WPS safety concepts-about preventing pesticides from entering the body. The required 7 safety concepts include:
 - ✓ Avoid getting pesticides on your skin or into your body. Pesticides may be on plants, soil, irrigation water, equipment, or may drift from nearby applications.
 - ✓ Wash before eating, drinking, using chewing gum or tobacco, or using the toilet.
 - ✓ Wear work clothing that protects your body from pesticides, such as long-sleeved shirts, long pants, shoes, socks, and a hat or scarf.

- ✓ Wash or shower with soap and water, shampoo hair and put on clean clothes after work.
- ✓ Wash work clothes separately from other clothes before wearing them again.
- ✓ If your body is contaminated by pesticides wash immediately, and as soon as possible, wash or shower with soap and water and change into clean clothing.
- ✓ Follow directions about keeping out of treated or restricted areas.

In addition, the updated safety information that will be required in the future must include:

- ✓ Instructions for seeking medical attention as soon as possible after being poisoned, injured or made ill by pesticides.
- ✓ Name, address and telephone number of state or tribal pesticide regulatory authority. In Michigan, the agency is the Michigan Department of Agriculture and Rural Development, 525 West Allegan Street, P.O. Box 30017, Lansing, MI. The phone number is 800-292-3939.
- ✓ If pesticides are spilled or sprayed on the body use decontamination supplies to wash immediately, or rinse off in the nearest clean water, including springs, streams, lakes or other sources if more readily available than decontamination supplies, and as soon as possible, wash or shower with soap and water, shampoo hair, and change into clean clothes.
- ✓ Follow directions about keeping out of treated areas and application exclusion zones.
- ✓ The term “emergency medical facility” should be revised to “a nearby operating medical care facility.” Include name, address, and telephone number for the medical facility. This information should be clearly identified as emergency medical contact information on the display.
- ✓ The point that there are federal rules to protect workers and handlers is self-evident and is no longer required to be part of the safety information

NOTE: The updated pesticide safety information content is not required until 1/4/18, but employers can begin using the updated version immediately. Details are shown on page 23 of the How To Comply Manual. The EPA is in the process of developing a poster version of the pesticide safety information.

Agricultural producers are only required to have *one central posting area*, but must provide unrestricted access to agricultural workers during work hours. It can be impractical for farms that are many miles apart to give unrestricted access, so agricultural producers may set up different central posting areas for distinctly different farm locations at their discretion. Agricultural employers may also provide the central posting information electronically, as long as content, accessibility, display, legibility, location, and retention requirements are met. Employers would need to ensure that agricultural workers have access to the information, such as through a smart phone or dedicated computer, and are instructed in how to access the information.

Decontamination sites

Agricultural employers must make sure that decontamination supplies are provided to workers doing tasks that involved contact with anything that has been treated with the pesticide including soil, water, or plants in a pesticide-treated area where, within the last 30 days, a WPS-labeled pesticide product has been used or a REI for such pesticide has been in effect.

Decontamination supplies that must be provided include:

- ✓ Water – the employer must provide at least 1 gal of water per worker at the beginning of the work period and at a quality and temperature that will not cause injury or illness if it contacts skin or eyes, or is swallowed.
- ✓ An adequate supply of soap and single use towels. Hand sanitizers or wet towelettes *do not* meet the requirement for soap or towels.

Duration of the Decontamination Site

If the REI of an applied pesticide is greater than 4 hours, decontamination supplies must be provided until 30 days after the end of the REI expires. If the REI is less than 4 hours, decontamination supplies must be provided until 7 days after the REI expires.

Location of Decontamination Sites

All decontamination supplies for agricultural workers must be located together and be reasonably accessible to where the workers are working (generally within $\frac{1}{4}$ miles of the workers) and be outside of any treated area or an area under a REI. For worker tasks performed more than $\frac{1}{4}$ mile from the nearest point reachable by vehicles or more than $\frac{1}{4}$ mile from a non-treated area, the decontamination supplies may be at the nearest vehicular access point outside any treated area or area under REI (page 48 of the HTCM).

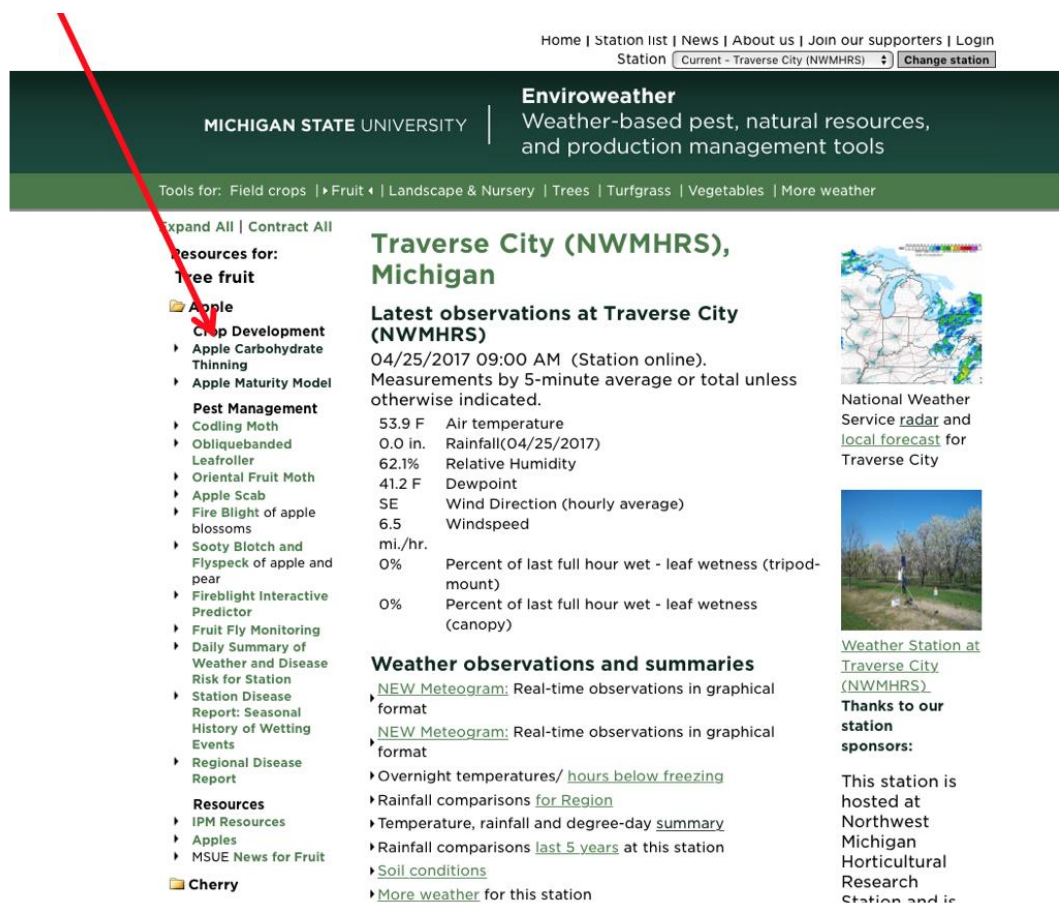
Remember that in addition, the Pesticide Safety Information (formerly referred to as the Pesticide Safety Poster) must be displayed at any permanent decontamination site, or any decontamination site that services 11 or more workers (page 21, HTCM).

In summary, central posting locations are the main hub for pesticide application information, and the information that must be displayed at the central posting locations is not required in other agricultural areas (i.e. $\frac{1}{4}$ mile from workers working in treated fields, or at decontamination stations). It is the responsibility of the employer to train employees on how and where to access the central posting information. Although not required, some growers may choose to provide additional pesticide application information to their workers by having additional posting sites or virtual access to this information. Potable water, and an adequate supply of soap and single use towels, and possibly pesticide safety information (if the decontamination site is a permanent location or services more than 11 workers) must be provided at decontamination

Apple Thinning Meeting: May 19th: Update

With the recent cold events, we are encouraging growers to sign up for the May 19th thinning meeting at the NMWHRC from 10AM – 1PM. Apple thinning is always a challenging time for growers, and with some potential damage in apple blocks, thinning strategies become even more critical. We will discuss these thinning strategies; products and rates to use; timing windows of thinners; how to determine crop load; and precision crop load management. We will also focus on how to use the carbohydrate model, which is now an added feature on the MSU Enviroweather site. [Michigan State University Extension](#) educators Phil Schwallier and Amy Irish-Brown will be our featured speakers.

Lunch will be provided and sponsored by Crop Production Services. Please RSVP by 5PM on May 17, 2017 to guarantee a lunch: Jenn Zelinski 231-946-1510 or goodr100@anr.msu.edu.



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Station Current - Traverse City (NWMHRS) Change station

MICHIGAN STATE UNIVERSITY | **Enviroweather**
Weather-based pest, natural resources, and production management tools

Tools for: Field crops | Fruit | Landscape & Nursery | Trees | Turfgrass | Vegetables | More weather

Expand All | Contract All

Resources for:
Tree fruit

- Apple
 - Crop Development
 - Apple Carbohydrate Thinning
 - Apple Maturity Model
 - Pest Management
 - Codling Moth
 - Obliquebanded Leafroller
 - Oriental Fruit Moth
 - Apple Scab
 - Fire Blight of apple blossoms
 - Sooty Blotch and Flyspeck of apple and pear
 - Fireblight Interactive Predictor
 - Fruit Fly Monitoring
 - Daily Summary of Weather and Disease Risk for Station
 - Station Disease Report: Seasonal History of Wetting Events
 - Regional Disease Report
 - Resources
 - IPM Resources
 - Apples
 - MSUE News for Fruit
 - Cherry

Traverse City (NWMHRS), Michigan


Latest observations at Traverse City (NWMHRS)

04/25/2017 09:00 AM (Station online).
Measurements by 5-minute average or total unless otherwise indicated.


53.9 F	Air temperature
0.0 in.	Rainfall(04/25/2017)
62.1%	Relative Humidity
41.2 F	Dewpoint
SE	Wind Direction (hourly average)
6.5 mi./hr.	Windspeed
0%	Percent of last full hour wet - leaf wetness (tripod-mount)
0%	Percent of last full hour wet - leaf wetness (canopy)

Weather observations and summaries

- [NEW Meteogram](#): Real-time observations in graphical format
- [NEW Meteogram](#): Real-time observations in graphical format
- Overnight temperatures/ [hours below freezing](#)
- Rainfall comparisons [for Region](#)
- Temperature, rainfall and degree-day [summary](#)
- Rainfall comparisons [last 5 years](#) at this station
- [Soil conditions](#)
- [More weather](#) for this station



National Weather Service radar and [local forecast](#) for Traverse City



[Weather Station at Traverse City \(NWMHRS\)](#)

Thanks to our station sponsors:

This station is hosted at Northwest Michigan Horticultural Research Station and is

Apple Carbohydrate Thinning

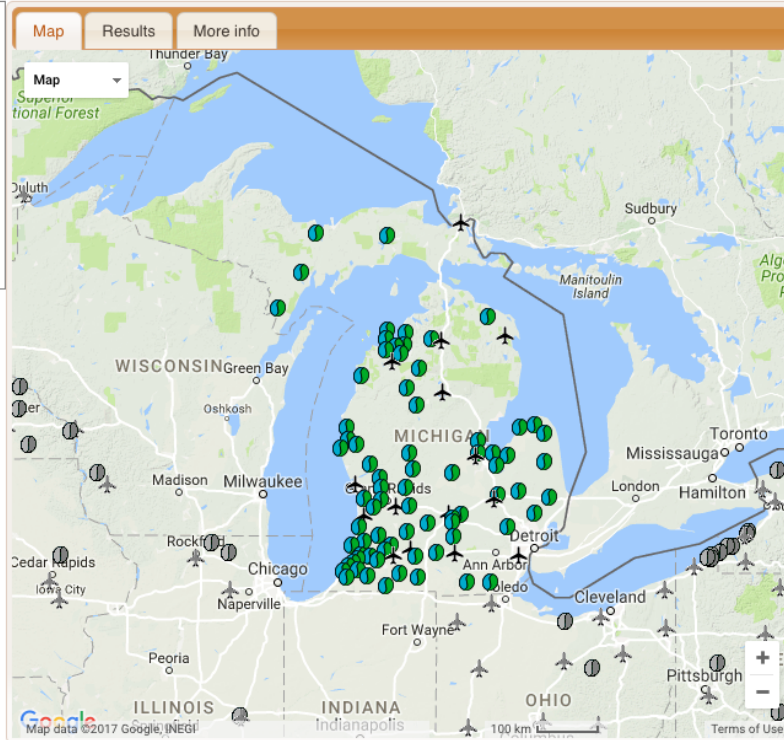
Cornell Apple Carbohydrate Thinning Model

State:
Michigan

Weather station:
Traverse City (NWMHRS)

Select Date:
4/25/2017

Continue



Accuracy of the weather data is the responsibility of the owners of the weather station instruments. NEWA is not responsible for accuracy of the weather data collected by instruments in the network. If you notice erroneous or missing weather data, contact NEWA and we will contact the owner of the instrument.



2017 IPM Update Schedule

Emily Pochubay and Nikki Rothwell
Michigan State University Extension

Tree Fruit IPM Updates beginning the second week of May through June will highlight management of the seasons current potential pest challenges dictated by weather and pest biology. Attendees are encouraged to bring examples of pests and damage found on the farm to these workshops for identification and discussion. Additionally, we are

planning to revisit some of the new Worker Protection Standards as well as host invited speakers from local organizations and MSU at this year's meetings. Workshops will be held weekly in Leelanau, Grand Traverse, Antrim, and Benzie counties. Tree fruit growers and consultants are welcome to attend meetings at any of the locations and times that are most convenient (see below). These workshops are free and do not require registration. Restricted use pesticide applicator recertification credits (2 credits per meeting) and Certified Crop Advisor credits will be available. We are looking forward to seeing you in a few weeks! For more information, please contact Emily Pochubay (pochubay@msu.edu), 231-946-1510.

Leelanau County

Location: Jim and Jan Bardenhagen, 7881 Pertner Road, Suttons Bay
Dates: May 9, 16, 23; June 6 (tentative), 13, 20, 27
Time: 12PM – 2PM

Grand Traverse County

Location: Wunsch Farms, Phelps Road Packing Shed, Old Mission
Dates: May 9, 16, 23; June 6 (tentative), 13, 20, 27
Time: 3PM – 5PM

Antrim County

Location: Jack White Farms, 10877 US-31, Williamsburg (south of Elk Rapids on the southeast side of US-31)
Dates: May 10, 17, 24; June 7 (tentative), 14, 21, 28
Time: 10AM – 12PM

Benzie County

Location: Blaine Christian Church, 7018 Putney Rd, Arcadia, MI 49613
Dates: May 10, 17, 24; June 7 (tentative), 14, 21, 28
Time: 2PM – 4PM

Respirator Guidelines to Meet New Worker Protection Standards

Growers will need a medical evaluation and respirator fit test to handle and apply some pesticides this season.

Emily Pochubay and Amy Irish-Brown, MSU Extension

Requirements for a medical evaluation, fit testing, and specific training for use of respirators and the associated record keeping became effective on January 2, 2017. At this time, most growers are aware of this revision to the Worker Protection Standard (WPS) regulation that requires pesticide handlers and applicators to wear a respirator during mixing/handling, spray applications, and potential other uses as outlined on pesticide labels. Additionally, those who use pesticides with respirator requirements must receive documentation from a physician or licensed health care professional (PLHCP) that has 'respirator evaluation' as part of his/her license to ensure that the pesticide handler is medically able to use a respirator. Not all PLHCPs are qualified to provide the respirator evaluation, but primary care physicians should be able to refer patients to appropriate medical personnel. Alternatively, growers can contact local occupational and environmental health professionals who are more likely to have the credentials needed to provide the appropriate respirator medical evaluation and documentation. Please review the following guidelines to help address some of the recent questions we have received from growers.

Who needs to receive a medical evaluation and how often?

Employees that could be exposed to hazardous airborne contaminants may be required to wear a respirator; respirators and respirator use requirements will be outlined on individual pesticide labels. Some pesticides may require respirators for employees that mix spray material and/or require applicators to wear a respirator during applications of certain pesticides. Employers are responsible for ensuring that employees receive the appropriate equipment, evaluation, respirator fit test, training, and record keeping that conforms to OSHA standards.

According to the EPA, the medical evaluation is required one time per employee unless another evaluation is required due to one of the following reasons:

- The medical determination is only good for a specified length of time.
- The employee reports medical signs or symptoms related to respirator use.
- The PLHCP, supervisor, or program administrator recommends a re-evaluation.
- Fit-test or other program information indicates a need for re-evaluation.
- When changes in the workplace increase respirator stress on an employee.
- The initial medical examination demonstrates the need for a follow-up medical examination.

Who provides the evaluation? What kind of evaluation and documentation are needed?

A physician or licensed health care professional (PLHCP) with respirator evaluation as part of their license will provide the appropriate evaluation using a medical questionnaire or exam that conforms to the OSHA standard. Contact the PLHCP to determine whether a questionnaire or exam will be used and to receive appropriate paperwork. Prior to completing the questionnaire or exam, employers must provide employees with:

- The type and weight of the respirator that the handler will use.

- How long and how frequently the handler will use the respirator.
- How much physical work the handler will do while using the respirator.
- Other PPE the handler will use.
- The temperature and humidity extremes of the working environment.

Contact a primary care physician to receive a referral for a licensed professional, if necessary. Another low-cost (~\$25) and fast alternative for a medical evaluation is OshaMedCert (<http://www.oshamedcert.com/Default.aspx>), an online service that involves filling out a form and sending it for approval or denial by a PLHCP; individual's health information remains confidential throughout the process. A respirator fit test (see below) will be needed after receiving the medical determination from OshaMedCert.

A written medical determination of the respirator evaluation for each employee is required before the employee can use the respirator. The employer must keep the medical determination documentation for two years. According to the EPA, the required written information to be provided by the PLCHP to the employer must only include:

- Whether or not the employee is medically able to use a respirator.
- Any limitations on respirator use in relation to the medical conditions (if any) of the employee or workplace conditions.
- Need for any follow-up medical evaluations.
- A statement that PLCHP provided the employee with written recommendation; in some cases, this recommendations may simply state that the applicator/person that will use the respirator is capable of wearing a respirator.

Again, the information outlined above is the *only* information that should be provided in the PLHCP's recommendation to the employer to protect the employee's private medical information and avoid violation of HIPAA laws.

What's Next? Respirator Fit Tests.

After receiving a medical evaluation, a fit test is needed to ensure that the respirator forms an adequate seal with an employee's face to provide appropriate inhalation exposure protection. A new fit test is required annually or whenever there is a change to the respirator or a physiological change to the employee that could affect the seal between the respirator and the user's face. Furthermore, fit tests are required for each type of respirator that will be used as indicated by pesticide labels. Finally, employees must undergo the fit test using a respirator with the exact specifications of the respirator that will be used on the job.

Fit tests must follow OSHA protocols, and there are two methods for fit testing. The quantitative fit test (QNFT) requires special equipment and a trained person to conduct the testing. Fit test kits are also available to perform qualitative fit tests (QLFT) by a person that can accurately prepare test solutions, calibrate equipment, perform the test properly, recognize invalid tests and ensure test equipment is working properly. Sources for fit tests include pesticide suppliers or companies such as [Gempler's](#) or [Grainger](#).

A primary care physician may be able to provide additional options and referrals for fit test providers in the area. We confirmed that Munson Medical Center's Occupational Health and Medicine Clinic (550 Munson Ave. Traverse City, MI 49686; Ph: 231-935-8590) is equipped to perform the appropriate respirator exam (~\$80.00) and the fit test (~\$25.00) in one visit by appointment only. Spectrum Health Services in other areas of Michigan provide similar services. Patients that wish to only receive a fit test need to provide appropriate respirator exam result documentation prior to the test.

Additional information regarding respirator requirements and other WPS revisions can be found in the EPA's *How to Comply with the 2015 Revised Worker Protection Standards for Agricultural Pesticides* (<https://www.epa.gov/sites/production/files/2016-10/documents/htcmanual-oct16.pdf>).

Immigration Concerns in Benzie County – Panel Discussion

Tuesday, May 23, 2017

6:30PM at Grow Benzie

The Concerned Citizens of Benzie County are hosting a panel discussion with community members and leaders to explore the new immigration climate and its effects on the community, families, schools and the economy.

This panel will be a great way to have an open dialog about what the needs for growers are, and what rights migrant workers have when it comes to Immigration laws.

Leelanau County HOUSEHOLD HAZARDOUS WASTE & ELECTRONICS COLLECTIONS

NOW ACCEPTING A MAXIMUM OF 10 - ONE GALLON CONTAINERS OF LATEX PAINT

The collections are for Leelanau County Households and covered as part of the \$29 recycling fee on winter taxes. The collections are held from 8 AM – 2 PM and registration is required. Please call the Planning Dept. at 231-256-9812 to register.

2017 Saturday Collections

5/20 - Leelanau County Government Center

7/15 - Glen Lake School

8/19 - Peshawbestown

10/7- Elmwood Twp., Cherry Bend Park off Avondale Lane

We are always looking for volunteers to help with the collections, please let us know if you are interested.

Thanks,

Leelanau Planning Department

MSU Extension programs and material are open to all without regard to race, color, national origin, gender, gender identity, religion, age, height, weight, disability, political beliefs, sexual orientation, marital status, family status, or veteran status. Michigan State University is committed to providing equal opportunity for participation in all programs, services and activities.

WEB SITES OF INTEREST:

Insect and disease predictive information is available at:

<http://enviroweather.msu.edu/homeMap.php>

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

<http://agbioresearch.msu.edu/nwmihort/faxnet.htm>

60-Hour Forecast:

<http://www.agweather.geo.msu.edu/agwx/forecasts/fcst.asp?fileid=fous46ktvc>

Information on cherries:

<http://www.cherries.msu.edu/>

Information on apples:

<http://apples.msu.edu/>

Information on grapes:

<http://grapes.msu.edu>

Fruit CAT Alert Reports:

<http://news.msue.msu.edu>