Northern Michigan FruitNet 2018
Northwest Michigan Horticultural Research Center

Weekly Update

FruitNet Report – July 3, 2018

CALENDAR OF EVENTS

8/23 **NWMHRC Open House**

What's new?

- **Northwest Regional Report – July 3, 2018**
- **Concerns about High Temperatures and Spray-Induced Phytotoxicity**
- **Spotted Wing Drosophila Update – July 3, 2018**

New articles

Northwest Regional Report – July 3, 2018

Fruit is ripening quickly in hot temperatures; growers have concerns about making spray applications in the hot weather.

Nikki Rothwell and Emily Pochubay, MSU Extension

Weather Report

There is little need to report the recent warm temperatures, but conditions have been hot across the region. The daytime high recorded at the NWMHRC Enviroweather station on Saturday, 30 June was 94.5 degrees F. Sunday was also a warm one, and the temperature hit a high of 92.6 degrees F. Monday, 2 July seemed cool comparatively when the daytime high was only 83.7 degrees. We have accumulated 1514GDD base 42 and 983GDD base 50. We did receive variable amounts of rainfall on Sunday evening into Monday (1 July); the NWMHRC Enviroweather recorded 0.33" of rain. Most other stations in the region received less rainfall. Rain is needed, particularly with the hot conditions.

Crop Report

Crop ripening has hastened with the recent hot temperatures. The hot weather has also brought windy and stormy conditions. Some wind whip has been observed in tart cherries. The hot weather has contributed to small cherry size. Growers have inquired if there are potential options to increase fruit size, and irrigation is the best option at this point in the season. Growers will begin hand harvesting some early varieties of sweet cherries, and local cherries are available at the National Cherry Festival. Growers are also weighing decisions to start ethephon applications with the recent heat wave. Many growers anticipate beginning sweet cherry harvest in the next week. Tart cherry harvest is likely two+ weeks away, but fruit seems to be coloring quickly.

Apples are sizing, and some growers have been hand thinning. Many growers seem pleased with crop load as a result of natural thinning and chemical thinning strategies this season. The apple crop is looking good at this point in the season.

Pest Report

In anticipation of harvest, growers have been challenged with deciding when to apply ethrel in recent hot temperatures in conjunction with protecting fruit from pests and diseases. Additionally, growers have been cautious with applications of some products and formulations in these hot conditions (please refer to article: *Concerns about High Temperatures and Spray-Induced Phytotoxicity*). Conditions have been mostly dry with the exception of Sunday's storm; in some areas, wet weather continued into Monday. Many areas seemed to dry quickly following the rain, but several Enviroweather stations: Bear Lake, Benzonia, East Leland, and Kewadin remained wet long enough for disease infection periods.

In areas that received stormy weather, trauma blight caused by the **fire blight** pathogen was a concern, particularly in orchards that have ongoing fire blight infections. Growers with infected blocks have continued efforts to mitigate the spread of this disease. At the station, Honeycrisp are almost at terminal bud set – hence, disease progress should be

slowing down. We received results from our first set of samples that were tested for streptomycin resistance. New detections of streptomycin resistant fire blight bacteria were found in Benzie and Grand Traverse counties.

Codling moth was flying again this week, and we found an average of one moth per trap in our apple blocks. We have accumulated 651 GDD base 50 degrees F since our initial biofix on 28 May and second-generation moths are estimated to begin flying ~1000 GDD base 50 after biofix. However, in past seasons, distinct codling moth generations have been difficult to differentiate at the station due to relatively low pressure. **Apple maggot** traps were deployed at the station this week.

Cherry harvest is fast approaching, and cherry diseases have been a concern as fruit are ripe and we have had some wet weather. **Cherry leaf spot** infection periods were a possibility in some areas during rain events Sunday-Monday. Although leaf spot incidence has continued to remain low in most orchards, some orchards under minimal management programs have noticeable leaf chlorosis and some defoliation at this time. We have received reports of active **American brown rot** in commercial sweet cherry orchards. Wet weather in the forecast could be conducive for cherry diseases, particularly brown rot, if we receive consecutive days of rain and if the relative humidity remains high.

Obliquebanded leafroller (OBLR) activity is ongoing. Since biofix 18 June, we have accumulated ~430 growing degree-days base 42 and egg hatch is underway. Although several growers have counted on organophosphate or pyrethroid materials for OBLR control, we remind growers that previous data suggest that OBLR have reduced sensitivity to organophosphate and pyrethroid insecticides.

We are cautiously optimistic that **spotted wing drosophila** (SWD) numbers have remained low since our first detection nearly a month ago. Last week, we detected a total of six flies in our trap line, and three of the flies were in traps at the station. We anticipated that we would see an increase in detections within the last week; it is possible that hot temperatures slowed SWD activity. Because cherries are susceptible, many growers have started SWD management despite low catches. For recent applications, growers have chosen material(s) to target multiple insect pests that may have been active within the last week (i.e. scale crawlers, late plum curculio, etc.). We encourage growers to recover following rain events to ensure that the fruit are protected from this challenging pest.

It has been three weeks since the end of the first flight of **San Jose scale** males, and crawlers are active in both sweet cherry and apples at the station. Many yellow crawlers were noticeable on trunks, limbs, and spurs of trees with heavy infestations. Some of the crawlers had already selected new locations and adhered to the trees while others were mobile. We hypothesize that crawlers likely began emerging at the station in low numbers last week and that activity will continue through the week. After removing waxy covers on some female scales, we were able to find some crawlers that had emerged from their mother, but remained under the waxy cover. We have also received reports

that **lecanium scale** crawlers are emerging in the region at this time. Lecanium scale crawlers are lighter and beige in color compared with the bright yellow San Jose scale crawlers; adult lecanium scales are substantially larger, raised brown bumps on limbs and are more distinctive compared with San Jose scale adults. We often see lecanium scale in sweet cherry blocks adjacent to woodlots with maple trees.

Rose chafer activity is ongoing and it has been a surprisingly long period of chafer activity this season. **Cherry fruit fly** has not been detected at this time.

Table 1. Avg. number of cherry and apple pests in the NWMHRC trap line by date.

Cherry - NWMRHC	**7-May**	**14-May**	**21-May**	**28-May**	**4-June**	**11-June**	**18-June**	**25-June**	**2-July**
GFW	5	2	1	0	0	0	0	0	0
APB	0	0	5	6	7	7	6	0	1
LPTB			Set	4	11	11	3	1	12
GPTB				Set	1	0	1	0	0
SJS (sweet cherry)		Set	0	6	73	10	0	0	0
OBLR					Set	0	8	19	10
CFF					Set	0	0	0	0
Apple - NWMHRC	**7-May**	**14-May**	**21-May**	**28-May**	**4-June**	**11-June**	**18-June**	**25-June**	**2-July**
OFM	Set	0	0	0	0	0	0	0	0
STLM	Set	13	18	32	25	1	1	4	5
CM		Set	0	1	8	1	3	0	1
SJS		Set	0	6	24	1	0	0	0
OBLR					Set	0	2	3	1
AM									Set

APB = American Plum Borer

LPTB = Lesser Peachtree Borer

GPTB = Greater Peachtree Borer

SJS = San Jose Scale Adults

CFF = Cherry Fruit Fly

OFM = Oriental Fruit Moth

STLM = Spotted Tentiform Leafminer

CM = Codling Moth
AM = Apple Maggot

Concerns about High Temperatures and Spray-Induced Phytotoxicity

Nikki Rothwell, Emily Pochubay, and Bill Klein, NWMHRC

Growers should use caution when applying ethephon in this heat; preliminary data suggest that tank mixes of Merivon and Danitol did not result in phytotoxicity in Ulster sweet cherry.

As the temperatures remain high across the region, growers have been concerned about tank mixes and/or the use of certain materials that may cause phytotoxcity in this hot weather.

Ethephon

Ethephon is the first product of concern, particularly as many growers are planning to harvest sweet cherries in the next week to two weeks in northwest Michigan. In past seasons, we have observed considerable damage to sweet cherries when ethephon has been applied under hot conditions. The damage appears as severe gummosis and is worse on trees that are already stressed by other issues, such as San Jose scale infestations or drought.

Ethephon applications are typically applied 7-14 days prior to harvest. However, we have been recommending that growers delay ethephon applications until after the heat moves out of the area. However, Saturday's extreme heat has been followed by more hot weather, and the forecast is predicting continued hot conditions for the remainder of the week. Therefore, growers will need to weigh the decision when to apply ethephon in this warm weather. Crop load is also a factor when determining what rate to use. Heavy crop loads are typically more difficult to loosen compared with light crop loads. Growers should vary the ethephon rate depending on anticipated temperatures for 72 hours after application, days before harvest, tree stress and past experience. Lower rates decrease the likelihood of tree injury. Growers should reduce application rates when high temperatures are expected to exceed 80° F for the 72 hour period after application. Additionally, some growers have opted to make applications during times of day when temperatures are cooler (ex. evenings) to help lessen the risk of phytotoxic effects. Sweet cherries are more susceptible to ethephon-induced phytotoxicity, but we have observed damage in tart cherries in past years as well.

Merivon

We have had many questions regarding the current Merivon label, which caution use with adjuvants, additives, and/or other products that may cause injury to fruit within two weeks of harvest. As we are in the two-week window prior to sweet cherry harvest and with the current heat, growers are also concerned about using Merivon with emulsifiable concentrates (ECs). One combination of particular concern is mixing Merivon with Danitol (an EC insecticide). From our recent resistance screening and efficacy trials, Merivon has been the best material for cherry leaf spot and it is also rated excellent for American brown rot. With reduced sensitivity in the brown rot pathogen to Indar, we have been recommending an SDHI use for this disease. Danitol has a three-day PHI, and is rated as excellent for spotted wing drosophila (SWD) control. Sweet cherries have fewer materials available for SWD management, and this combination of Merivon and Danitol may be a good tank mix application as we approach the harvest timing. However, with the Merivon label language and the heat, we conducted a small-scale trial to help guide decision-making about the Danitol-Merivon tank mix option. Additionally, in communication with BASF, the language on the label was written conservatively as they have no local data to guide tank mix options. The label does say not to use Merivon with emulsifiable concentrates, crop oil concentrates, methylated seed oil, organosilicone, adjuvants, and nonionic surfactants within two weeks of harvest in cherries; caution should be used if using other tank mixed products.

On 29 June at 8:50 am, we applied the following applications to 11-year old sweet cherries, var. Ulster: 1) Merivon (5.5oz/A) + Danitol (21.3oz/A), 2) Merivon (5.5oz/A) + Danitol (21.3oz/A) + R11 (0.125% v/v), 3) Merivon (5.5oz/A) + Danitol (21.3oz/A) + Sylgard (0.03% v/v), and 4) UTC. Materials were selected because they were readily available. We evaluated fruit and leaves for potential phytotoxicity on 2 July, and we found no phytotoxicity in any of the treatments. The evaluation was done after the weekend's extreme heat when daytime highs reached 95 degrees F on Saturday, 30 June at the NWMHRC. These results are preliminary, but they suggest that tank mix combinations of Danitol and Merivon, even with additives did not cause phytotoxicity in Ulster sweet cherries. We will continue to evaluate phytotoxicity of different materials in the future.

Other Products

Lastly, we remind growers to use caution with all EC materials as we have observed phytotoxicity in past seasons. Syllit is another material where we have seen damage when applied in hot conditions. Copper products also should be avoided when temperatures reach into the 80s; these products are better placed when conditions are cool.

Spotted Wing Drosophila Update – July 3, 2018

Spotted wing drosophila numbers are on the rise at the station.

We checked traps at the station today and found a total of 180 SWD in 40 traps; the tart cherry orchards where we trapped these flies have not been treated with insecticides. We will check traps at grower sites over the next few days and report those data as soon possible. With relatively low numbers in our regional SWD trap line since our first detection on 6 June and up to this point, some growers have been uncertain about when to begin SWD management programs. This decision has been challenging as growers are trying to balance available chemistries with PHIs, retreatment intervals, and expenses. Because our data have shown that SWD can lay eggs into ripening and ripe fruit, we suggested that programs should have begun when fruit were susceptible (i.e. straw-color). With rising numbers in untreated blocks, we encourage growers to keep ripe/ripening fruit protected through harvest. We remind growers to keep tight spray intervals, reapply after rainfall, and use full covers when possible. Additionally, we have previously observed that SWD larvae were detectable in fruit when a spray programs had a 7-day interval following the application of some pyrethroid materials during hot, sunny conditions. Hence, growers should be careful to keep tight intervals with pyrethroids in the current weather conditions. We highly suggest using full cover applications if materials rated 'good' rather than 'excellent' are used for SWD. Lastly, we have been collecting unsprayed sweet and tart cherries in the field and exposing them to male and female SWD flies in a no-choice laboratory test. We detected SWD larvae from sweet and tart cherry fruit collected on 25 June. This information indicates that the fruit of both sweets and tarts are susceptible to SWD infestation at this time. These results are another indicator that SWD management programs should be underway in commercial orchards at this time.

Articles featured in past FruitNet Reports

ETHEPHON ON CHERRIES

N.L. Rothwell, District Horticulturist
J. Nugent, Retired District Horticulturist
E.A. Pochubay, NWMHRC Fruit IPM Educator

Ethephon is a plant growth regulator (PGR), and results from its use vary with chemical concentration and time of application. As with many PGRs, ethephon = has systemic properties which allows it to penetrate plant tissue and is eventually decomposed to produce ethylene. In cherry systems, ethephon is used to promote fruit loosening to assist with mechanical harvest of fruit. Ethephon, sold under the trade name Ethrel, is a standard management practice in both tart and sweet cherry harvest.

Ethephon releases ethylene, which penetrates plant cells and binds to receptors that affect expression of various genes. In the case of cherries, ethephon affects the gene that controls the synthesis/activation of cell wall loosening enzymes, thus dissolving the

pectins between cells in the abscission layer. This chain-like reaction leads to cell separation in the developmentally-programmed abscission zone between pedicel and fruit or pedicel and spur. In short, ethephon loosens the cherries from the stem, which results in a gentler 'shaking' of the tree to remove the fruit.

In years past, we have observed ethephon-induced damage in hot and dry weather. Ethephon can have excessive activity under hot and dry conditions, which can result in tree injury. We remind growers that we have observed ethephon damage under hot and dry conditions in the past, especially in sweet cherries. Of sweet cherry varieties, Golds were observed to be the most sensitive. If temperatures are in the high 70s to mid- or upper 80s and sunny during the 72 hours following application, this weather could be conducive for causing Ethrel damage; the magnitude of ethephon response is increased at higher temperatures following application. Tree vigor also influences the degree of response achieved by an ethephon application. Trees low in vigor or under stress due to drought, cold damage, San Jose scale infestation, disease, virus, phytotoxic injury, etc. will respond to a greater extent, and gumming and leaf abscission may result. Hence, growers may choose to reduce rates in orchards that are stressed, particularly if temperatures will be higher with the potential to cause injury.

Crop load is also a factor when determining what rate to use. Heavy crop loads are typically more difficult to loosen compared with light crop loads. Many orchards have a heavy crop load this season, and these growers may need to use a higher rate or leave extra time to achieve optimal loosening. Again, an increased rate could cause injury if temperatures are high following the application. Furthermore, growers should be prepared that if an orchard is taking a longer time to loosen, then the orchard may need to be treated with an insecticide that is effective against spotted wing drosophila to prevent larvae in fruit. Please review the 2016 Fruit Management Guide, the Managing Spotted Wing Drosophila in Michigan Cherry bulletin, and insecticide labels for additional information on efficacious insecticides and pre-harvest application intervals. Balancing SWD management and harvest will take increased consideration at the grower level and good communication between growers and processors.

The following recommendations should be used when applying ethephon to cherries:

1. **Rate:** Vary the rate depending on anticipated temperatures for 72 hours after application, days before harvest, tree stress and past experience. Lower rates decrease the likelihood of tree injury. *If temperatures 72 hours after application are predicted to be in the 80s, growers should reduce the Ethrel rates.*
    A. **Light sweets** -- When applied concentrate (80 gal water/acre or less), 1 to 2 pt/acre applied 10-14 days before anticipated harvest should provide adequate loosening. Rates up to 2.5 pt/acre may be necessary for harvesting in less than 10 days. When applied dilute, use no more than ¾ pt/100 gals or 3 pt/acre. Reducing rates in light sweet cherries, particularly Golds, is recommended if predicted temperatures are in the 80s after application.
    B. **Dark sweets** -- When applied concentrate, use 1.5 to 2.5 pt/acre applied 10-14 days prior to anticipated harvest. Rates up to 3 pt/acre may be necessary for harvesting in less than 10 days. When applied dilute, use no more than 1 pt/100 gal or 4 pt/acre.

C. **Tart cherries** -- When applied concentrate, use 0.5 to 1 pt/acre applied 7 to 14 days prior to anticipated harvest. When applied dilute, apply no more than 1/3 pt/100 gal or 1 pt/acre.

2. **Time of Application:** Apply approximately 7 to 14 days before anticipated harvest. Do not harvest within 7 days of application (Ethrel has a 7-day PHI).
3. **Temperature:** Avoid application when high temperatures are expected to exceed 80° F or remain below 60° F for the 72 hour period after application. Growers should use lower than normal rates when highs are expected in the 80s.
4. **Tree stress:** Do not spray trees that are low in vigor or under stress conditions.
5. **Do not** spray trees that had serious gumming the previous year.
6. **Crop load:** Heavy crop loads (i.e. low leaf to fruit ratio) are more difficult to loosen than lighter crops. There is a heavy crop load in many orchards this season, and growers may need to use relatively higher rates or expect a longer time to achieve desired loosening. In trees with a light crop, reduced rates are recommended and rate reductions in light blocks will still achieve adequate loosening while minimizing the potential for injury in hot conditions this season.
7. **Concentrate spraying:** Applying ethephon with concentrate sprayers (i.e. 80 gallons of water/acre or less) achieves the same level of loosening at lower rates per acre than does dilute applications. Uniform coverage is important.
8. **Tree size:** Suggested rates/acre are based on full-sized trees. Adjust rates downward when treating blocks with smaller trees.

Growers should pay particular attention to the temperatures after the time of ethephon application. As evident from past experiences, hot temperatures can do damage to cherry trees. Growers that have had problems in the past years should reduce rates, especially if the trees showed serious gumming and leaf loss.

WEB SITES OF INTEREST:

Farmer to Farmer – Connecting farmers, cultivating community
http://www.f2fmi.com

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://www.canr.msu.edu/nwmihort/nwmihort_northern_michigan_fruit_net

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