Northern Michigan FruitNet 2003
Weekly Update

NW Michigan Horticultural Research Station

Jim Nugent, District Horticulturist
Gary Thornton, District Fruit IPM Agent
Bill Klein, Farm Mgr, NWMHRS
Duke Elsner, Agricultural Agent
Jim Bardenhagen, Leelanau Extension Director

May 6, 2003

GROWING DEGREE DAY ACCUMULATIONS as of May 5, 2003 at the NWMHRS

Year	2003	2002	2001	2000	1999	13 yr. Av. ('90-2002)
GDD42	239	225	312	352	366	250
GDD50	97	114	157	153	171	109

WEATHER

An inversion freeze event occurred on Saturday, May 3, causing some flower bud damage on tart and sweet cherries. Much needed rain fell on May 5th.

GROWTH STAGES at NWMHRS

Apple: Red Delicious--1/2" green
Pear: Bartlett – swollen bud
Sweet Cherry: Napoleon – bud burst
Tart Cherry: Montmorency – bud burst
Apricot – bud burst
Plum: European type – bud burst
Grapes: Chardonnay – scale crack

COMMODITY REPORTS
By Gary Thornton & Jim Nugent

Apple growers need to keep the foliage protected against **apple scab**, particularly during the critical high spore release period of tight cluster to petal fall. Until **mildew** needs to be controlled, the protectant EBDC fungicides or Captan are good options, assuming they can be applied prior to infection periods. On blocks where mildew control is critical, Rubigan, Nova, Flint or Sovran should be used as apples approach the pink stage. Peak flight for **spotted tentiform leaf miner** typically occurs between tight cluster and pink. **European red mite** eggs continue to mature, but no hatch has been reported. It is an ideal time to apply oil sprays. Oil should be applied at a 2% concentration by volume.

Sweet Cherry will be coming into bloom, and growers need to start thinking about **brown rot** and consider spraying if conditions warrant. First bloom is coming out on Napoleons in warm sites. Some additional bud damage has occurred with frost events, but most damage occurred as winter damage on March 3. Many flower buds damaged in the March 3 event will never produce flowers. Some blocks that depend on a badly damaged dark variety for pollenizing may find a shortage of pollen.

Tart Cherries – Frost conditions on May 3 caused some damage to tart cherry buds. Preliminary assessment of damage indicates that crops are probably reduced in low areas and on colder sites.

Grapes and newly planted trees -- **Climbing cutworms** are becoming active. Newly planted trees are the most susceptible to serious injury, but second leaf trees are susceptible, too. Grapes are also very susceptible. Lorsban can be used on grapes for control but is limited to one spray per season. The trunks of tree fruits may be treated with an appropriate insecticide, or place a barrier on the trunk.

BEE REQUIREMENTS FOR EFFECTIVE POLLINATION

***Part of the following article was written by Dr. Nick Calderone, Entomology, Cornell University, and published in the* SCAFFOLDS Fruit Journal, Geneva, NY, Volume 12, No. 8, May 5, 2003 and modified and expanded by James E. Nugent, District Horticulturist, MSUE, to include recommendations for cherries and small fruits**

Tree fruits, small fruits, and many vegetable crops, especially many of the vine crops, all require pollinating insects for a successful harvest. Remember! Not only is pollination important for a high yield, it may also affect fruit size, shape and sweetness. A number of insects pollinate crops, but, for several reasons, the honeybee is the most versatile, all-around pollinator. Honeybees are available in large numbers throughout the growing season, they pollinate over 90 commercial crops, they are easily transported by truck, and they can be easily distributed throughout large plantings. Compared with other pollinators, honey bees are very cost effective. A single strong, two-story colony provides 15-25 thousand foragers.

How Many Colonies?

Several factors have changed in recent years that have resulted in the need for higher numbers of honeybee hives to adequately pollinate fruit crops. Fewer hives per acre were needed in small orchards visited by feral honeybees, solitary bees and bumble bees from adjacent hedgerows and woods. However, feral honeybee populations have been greatly reduced in recent years, and modern agricultural practices have eliminated many natural nesting sites for solitary bees and bumble bees. In addition, the flight range of solitary bees is not generally sufficient to ensure coverage of the center portions of large plantings. If fruit set has been lower than expected in the past, or apples are lopsided or misshapen, you probably need to use more bees. Remember, if your fruit set in apples or pears is too high, you can always thin, but if it is too low, you are just out of luck. Also, modern orchards with high blossom densities, such as trellised apples, require more pollinators than traditional plantings.

Apples: Generally, apples can be adequately pollinated with one strong hive per acre. However, **Red Delicious** apples have flower structures that are different from most other common varieties. Their anthers are widespread, and bees learn to insert their mouthparts between the anthers to obtain nectar. Consequently, the bees do not contact the flower's sexual parts and pollination does not take place. Since it takes time for bees to learn to obtain nectar in this way, you can counteract this problem by using more colonies per acre to increase the number of inexperienced bees present. Up to two colonies per acre may be needed in large stands of Red Delicious apples.

Pears: Pollination of pears will probably always be a problem because pear nectar contains only about 15% sugar versus 40% for apples, dandelions, and yellow rocket. The best suggestions are: 1) to control dandelions in pear blocks; 2) to move the bees into the center of the pear block; and 3) to use more colonies per acre, which will increase the number of bees foraging within the orchard. Consequently, pears should probably have 1 1/2 to 2 hives per acre.

Sweet Cherries: Non self-fruitful sweet cherries are more of a challenge to get adequately pollinated than apples. This is likely due to higher flower numbers per acre and the need for a much higher percentage of flowers to set fruit. Mature plantings should have 2 hives per acre.

Tart Cherries: ***Montmorency*** is self-fruitful, but will still benefit from honeybees. The greatest benefit occurs during seasons with cool weather conditions during bloom or when frost has killed significant numbers of buds, so getting a high percent of the remaining flowers to set is critical. Generally, 1 hive per 2 acres is adequate for Montmorency. ***Balaton***, which is also self-fruitful, has more problems than Monts setting fruit when conditions are cold during bloom. It is likely that additional bees will help reduce this problem. There is no research data to prove this hypothesis, but the Hungarians have noted this same tendency and they also use more bees in Balaton than for other tart varieties. Suggest using 1 to 2 hives per acre.

Other Fruit Crops

Blueberries: 2 to 4 hives/acre

Strawberries: Research has shown that good bee populations increase fruit size, but not fruit numbers. Hive rate unknown, but suggest trying 1 hive/acre.

Hive Placement

Always select good locations for the bees you rent to obtain maximum benefit for your pollination dollar. It's a lot like real estate -- location-location-location. A good location is protected from the wind, and has as much exposure to sunlight as possible. It is important that colonies of honeybees be kept in full sunlight in order to warm the hives rapidly in the morning and entice the workers out of the hives on chilly spring mornings. Entrances should face south to east, whenever possible. Keep colonies on pallets or cinder blocks to keep the bottom boards 3-6 inches above the ground. Hives with wet bottom boards will be cooler and have less foraging activity than dry colonies. A hive stand will also keep colonies above tall grass, which may shade or block the entrance. Place colonies in groups of 4 to 6 to take advantage of good locations. In large orchards and fields, groups of 8 to 20 hives can be used to take advantage of prime locations. It is best to locate hives near pollinizer rows where that consideration applies, such as with apples and sweet cherries.

Pesticides

Overall, pesticides are less of a problem to bees and beekeepers today than they were 10 and 20 years ago. Nevertheless, serious poisoning incidents still occur. It is important to read the pesticide label and to avoid using materials that are especially toxic to bees whenever there is a safer alternative available. Sevin, Provado, Actara, all organo-phosphates and pyrethroids are highly toxic to bees.

Honeybees are most often killed by pesticides when they ingest contaminated pollen. However, bees can also be poisoned by pesticides that have contaminated small pools from which foragers collect water to dilute the honey they feed their young. Bees will collect water from the closest available source, including standing water in wheel ruts and old tires in or near your fields. A problem exists if more than 10 dead bees are found in front of a hive in the morning. If too many bees die, your crops will not be adequately pollinated and it may be necessary to rent more bees. You can help the bees by providing them with a source of clean water by the hives. A small tub with a few wooden floats will work well. A lathe-strip top from a bushel basket is ideal. If you don't provide floats, many bees will drown.

You can eliminate most pesticide damage to bees, both managed and wild, by not spraying when flowers, including weeds, are open and attractive to bees. Also, do not spray when there is any risk of drift to non-target crops or flowers. Evening, about an hour before sunset, is usually a good time to spray because there is generally little wind at that time. Keep flowering ground-cover plants mowed if you are going to spray in an orchard during the summer. Clover and dandelions are common problem for bees on orchard floors -- keep it mowed or use a herbicide.

General Recommendations

Bees should be moved onto location at night, and once the hives have been set down for pollination, you should leave them at that spot until the job is done. Moving bees in the daytime and moving them short distances (less than 3 miles as the crow flies) will cause a serious loss of foragers and seriously damage the colony. Always contact the beekeepers if the need arises to move the bees. If you live in an area with known bear problems, use an electric fence to protect the bees. Keep nearby flowering plants mowed to reduce competition for the bees' attention.

Pollination Fees

Strong hives provide much larger populations of foraging bees than weak hives or new packages. Remember! The best deal may not always be the cheapest deal. Be clear up front with your beekeeper about your expectation concerning the strength of

the colonies you rent and satisfy yourself that you have received what you expected. This will eliminate misunderstandings down the road.

Expectations
Bees are an essential part of your crop production system, but they are only one part. In many ways, they are like the fertilizers and chemicals that you buy. Each is essential, but none of them, by themselves, can guarantee a crop. Many things influence the quantity and quality of your crop. One is the weather. Bees will visit flowers and pollinate only if they can fly. Cool, rainy, and windy weather will delay, slow, or stop flight.

TIP:
Planning a new orchard? Be sure to determine if your main cultivars are self-sterile -- like apples, or, worse yet, self-sterile **and** inter-incompatible like many popular cultivars of sweet cherries. If so, be sure to plant an adequate proportion of pollinizer cultivars. Be sure you select compatible pollinizers that bloom at the same time as your main variety. If you do not have

pollinizers in your self-sterile stands, you can often purchase compatible pollen and use hive inserts to distribute it to the blossoms, but this is not a good substitute for proper orchard layout.

ACTUAL AND PREDICTED DEGREE-DAY
ACCUMULATIONS SINCE MARCH 1, 2003

Please send any comments or suggestions regarding this site to:

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May 13, 2003

GROWING DEGREE DAY ACCUMULATIONS as of May 12, 2003 at the NWMHRS

Year	2003	2002	2001	2000	1999	13 yr. Av. ('90-2002)
GDD42	318	269	418	485	455	338
GDD50	133	127	217	233	214	157

WEATHER

Rainy, damp conditions have been common during the past week, with the exception of a warm, sunny day on Saturday, May 10. Degree day accumulation, base 42, is very close to a long term historical average, and hence the stage of tree development is "normal" at this time.

GROWTH STAGES at NWMHRS

Apple: Red Delicious—tight cluster
Pear: Bartlett – green cluster
Sweet Cherry: Napoleon – full bloom
Tart Cherry: Montmorency – early white bud
Apricot – full bloom
Plum: European type – green cluster
Grapes: Chardonnay – early bud swell

INSECTS & DISEASES
By Gary Thornton & Jim Nugent

Sweet Cherries: Recent cool weather has been ideal for developing populations of the **bacterial canker** pathogen, *Pseudomonas syringae*. Similar conditions in 2002 were followed by a hard frost on May 19, which led to the severe bacterial canker infections. Let's hope this year we do not see any frost conditions in the coming days. Bloom is generally very sparse due to the March 3 winter freeze event. Winter injury in wood is becoming more evident as spring progresses, particularly on young trees. Leaf tissue is exceptionally well developed compared to the stage of flower development in trees with few remaining flowers.

Trees with few flowers have more resources than normal for leaf development.

Tart Cherries: Spring frosts have damaged some buds, but at this point substantial bud damage is generally present only in low areas of blocks. The crop potential in NW Michigan appears to remain good. Balaton lost some flower buds to the March 3 winter freeze, and as in sweet cherry, we are seeing plenty of leaf tissue that is susceptible to **cherry leaf spot** (CLS) infection before the tree reaches bloom. Montmorency in some early sites also have fully expanded leaves, not just bract leaves. These leaves are susceptible to CLS infection. Spore release can occur during early bloom. Considering the early start that leaf spot had last year, growers that have trees with fully expanded leaves should protect for leaf spot from this time forward. **Brown rot** pressure is light with the cool temperatures.

Apples experienced a moderate **scab** infection period on Sunday and Monday, May 11 and 12. This occurred at a time when spore release is typically high. With early varieties nearing pink, **powdery mildew** should be controlled, particularly on susceptible varieties like Ida Red and Cortland. Insect activity remains low. **Rosy apple aphids** are difficult to find. **Spotted tentiform leaf miner** trap catches averaged 32 per trap. Populations of **European red mite** eggs are light, with no hatch reported so far.

Pear psylla eggs are easy to find on spurs and should be hatching out soon.

Climbing cutworms have not been very active with the cool temperatures, but as the nights warm, they will increase activity on newly planted tree fruit and grapes. Grapes that over wintered may have few live buds above the snow line, so in order to renew trunks, it may be

wintered may have few live buds above the snow line, so in order to renew trunks, it may be critical to manage this pest this year.

TREE REMOVAL ASSISTANCE NEEDED
By Jim Nugent, Station Coordinator

We need to remove 180 – 15 year old sweet cherries in the next 4 to 6 weeks to free up space for future research. If you are able to provide a loader and operator to assist us in the removal, please let us know. You could get a tax deduction for the charitable donation. Please give Bill Klein or me a call at 946-1510. Thanks!

WATER BILL PASSES MICHIGAN STATE SENATE
By Jim Nugent

On May 8, 2003, the Michigan Senate passed SB-0289, to amend sections of the Natural Resources and Environmental Protection Act that deal with ground and surface water use. The bill that passed the Senate is far different from the Senate bill first introduced last year and then reintroduced earlier this year. The original bill required a permit for new agricultural wells (above a certain size). The bill that passed the Senate no longer has a permitting requirement, and instead requires reporting of water use by agriculture.

For complete text of the bill visit this website: http://www.michiganlegislature.org/ and type in the bill number 0289, or contact the NW MI Horticultural Research Station and we'll send you a copy.

This bill will now go into conference committee with the House bill. The House bill is designed to help resolve water well conflicts. The Senate version plans to incorporate the House bill into the final bill. A synopsis of the bill that passed the Senate is as follows:

-- Require the Department of Environmental Quality (DEQ) to prepare a Statewide groundwater inventory and map within two years after the bill's effective date.

-- Increase water use reporting fees for industrial, processing, and irrigation facilities with a capacity to pump over 100,000 gallons per day from $50 to $100.

-- Require farms with a capacity to pump over 100,000 gallons a day, beginning one year after the bill's effective date, either to register with the DEQ, report annually to the DEQ, and pay the annual water use reporting fee, or to register with to the Michigan Department of Agriculture (MDA) by annually submitting a water use conservation plan (no fee). *Details below.*

-- Require the MDA to use water use conservation plan information to determine an estimate of water use and consumptive use data for each township in the State, and then forward the data to the DEQ for inclusion in the groundwater inventory and map.

-- Allow the DEQ to use money in the Water Use Protection Fund to prepare the groundwater inventory and map.

-- Create the Groundwater Advisory Council within the DEQ to study the sustainability of the State's groundwater use, monitor implementation of the Great Lakes Charter Annex 2001, make recommendations on statutory conformance with Annex 2001, and, within two years after the bill's effective date, report to the Legislature; and provide for the Council to disband six months later.

The bill is tie-barred to House Bill 4087, which would require the DEQ Director or the MDA Director to investigate and resolve complaints about groundwater withdrawal conflicts.

The water use conservation plan to be submitted annually to MDA shall include all of the following information:

a) The amount and rate of water withdrawn on an annual and monthly basis in either gallons or acre inches.

b) The type of crop irrigated, if applicable.

c) The acreage of each irrigated crop, if applicable.

d) The source or sources of the water supply.

e) If the water withdrawn is not used entirely for irrigation, the use or uses of the water withdrawn.

f) If the source of water withdrawn is groundwater, the static water level of the aquifer or aquifers.

APPLE SCAB: ARE THE SI FUNGICIDES USED UP, AND HOW DO THE STROBILURINS HELP OUT?
(Bill Turechek & Wolfram Koeller, Plant Pathology, Geneva)
SCAFFOLDS Fruit Journal, **NY,** Volume 12, No. 6, April 21, 2003

In the March 31 edition of *Scaffolds*, Dave Rosenberger covered the basic strategies for managing apple scab in 2003. His article emphasized the need for early scab protection because of the potential for high disease pressure in orchards that had foliar scab last year and because of poor scab control caused by SI fungicide resistance.

There are several reasons for concern about SI resistance in New York. Let us go back in history. The SI fungicides Rubigan and Nova were introduced in 1988; Procure was added later. It had been noticed early that the SI's had excellent post-infection performance in the

later. It had been noticed early that the SI's had excellent post-infection performance in the control of scab. These post-infection activities allowed the development of a delayed four-spray program for scab, with applications made at tight cluster, pink, petal fall and first cover. But it was clearly emphasized from the start that the delayed four-spray program should only be used in orchards with a low potential ascospore dose (PAD), and that the SI's should be mixed with a protectant at least for the last two of the four applications. The recommendation to mix had two reasons. One was to provide additional protection of fruits, because the SI's had shown some weaknesses in the control of fruit scab. The other reason was to add an anti-resistance component to the equation. The delayed four-spray program worked well for many growers and for many years.

Over the years, we have kept track of SI resistance through both research in experimental orchards at the Geneva Experiment Station and periodic testing of SI resistance in

commercial orchards. We found that the protectant mixed with an SI did not delay resistance in strict post-infection programs. SI resistance developed slowly but steadily, putting more and more pressure on the protectant partner. We also found that SI resistance developed faster in orchards where SI's were used at low doses, a statement deserving of a comment. Low doses are not only determined by low application rates. Low doses are also reached when spray intervals are long and when spray coverage is poor to begin with.

Where do we stand in 2003 with regard to SI resistance? We have monitored the development of SI resistance over the many years growers have used the SI's. We found that full-blown SI resistance could develop after a total of 30 applications in orchards where the PAD was high and where SI's were not always used in mixture with a protectant. On the other hand, we found orchards that have seen over 40 SI-plus-protectant sprays without any sign of resistance developing. Not surprisingly, we found that most of the orchards we tested were in between these two extremes: they were not fully resistant to SI's, but they also were no longer at baseline. This in-between status prompted us last year to make the statement that the "party for the original four-spray SI program is over" in the majority of our orchards. This warning does not imply that SI's are used up entirely. It means that more emphasis needs to be placed on using protectants in mixture with the SI's and on protection early in the season because the "delayed" part of the four-spray SI program is worn out.

In 2002, we were fortunate to have complete spray records as well as assessments of fruit scab at harvest for 17 commercial orchards located throughout the state. These growers were participants in the so-called "RAMP" project; a large, multi-state, federally funded project looking at the efficacy and economics of reduced-risk programs for insect and mite control. In NY, the RAMP project involves apple scab. Participating growers were asked to apply their standard scab programs, and the incidence of fruit scab was evaluated at harvest. Analyses of the 2002 data provided by Harvey Reissig and Art Agnello were revealing:

1. The 17 apple growers participating applied an average of eight scab fungicides, with a range of five to 11 applications. The table below summarizes the pattern of fungicide usage by the growers. The protectant fungicides mancozeb and captan, applied alone or in mixture, were the most widely used. Apparently, many growers trust the conventional protectants most. This is not a bad decision, because mancozeb and captan are quite reliable, if they are applied on a protective calendar schedule. We must remember though that they are quite unforgiving whenever post-infection activities are needed.

2. Three of the seventeen growers applied exclusively mancozeb or captan, with eight to 11 treatments made on a standard schedule. Three growers continued to apply the reduced-SI spray program. Scab control was excellent in 2 of these orchards. In the third, over 20% fruit scab was encountered; a failure most likely attributed to SI resistance. We will test this orchard in 2003.

3. The benzimidazole Topsin M, dodine and the anilinopyrimidine Vangard were part of the scab management equation. Avoidance of Topsin M is a good choice, because benzimidazole resistance persists in most of our orchards. The situation with dodine resistance is not as clear cut, and the value of Vangard is still debatable.

4. Seven growers replaced some or all of their former SI-plus-protectant applications with a strobilurin fungicide. Three of these seven growers experienced more fruit scab than commercially acceptable (5-20%).

Fungicide Class	% Usage
Mancozeb (Dithane, Penncozeb, Manzate)	34.6
Captan	29.4
SI's (Nova, Rubigan, Procure) mixed w/ protectant	18.4
SI's alone	5.1
Strobilurin (Sovran or Flint)	11.8
Benzimnidazoles (Topsin M)	0.7
Dodine (Syllit)	0.0*
Anilinopyramidines (Vangard)	0.0

* Two applications in mixture with a DMI

There are several concerns relating to the use of SI's and the strobilurins. One concern is that some growers still use SI's alone without a protectant added. This has become very

risky because of SI resistance. The data also show that the SI's are still very reliable in some of the orchards. This underscores our results that the level of SI resistance is by now very different from orchard to orchard but almost impossible to predict. One of our major concerns is that the strobilurins didn't fare too well. Why was this so? We should first answer the following question: Can we use the strobilurins in post-infection programs as we used the SI's in their good old days? We might be able to provide an answer.

The strobilurins are better protectants than the SI's ever were, but their post-infection performance is not as good as that of the SI's when SI's were first introduced. Just replacing post-infection SI's with a strobilurin is risky, in particular if the decision was made because of declining SI performance. First, the strobilurins will not have the same reach-back activity the SI's once had. Secondly, just replacing SI's with a strobilurin in a delayed four-spray SI program will undoubtedly drive strobilurin resistance. For example, we tested a Michigan orchard in 2001 where the grower had full-blown SI resistance and had used strobilurins instead of SI's without changing the application schedule. After only two seasons with four applications each season, scab became a problem. Our tests showed that strobilurin resistance was clearly on the march in that orchard.

We know by now how strobilurin resistance will develop. First, the strobilurins will succumb to the gradual emergence of SI-type resistance and a gradual loss of activity. This aspect of resistance can be managed with higher doses of strobilurins. Higher doses can be achieved using either higher application rates or shortened spray intervals or both. But this initial SI-type resistance will then be followed by the "all-or-nothing" benomyl-type of resistance. At that stage, high doses of strobilurins will have no impact whatsoever and scab will not be affected by strobilurin sprays.

Are the SI's used up? The answer is that they are not in many orchards. Will the strobilurins help out? Yes, they will. But we have to keep in mind that they will not provide the same reach-back activity the SI's once had and still have in sensitive orchards. The strobilurins are very potent protectants, and they provide powdery mildew control in addition. But if we use them in the same post-infection programs as we used the SI's before resistance was on the rise, we will drive strobilurin resistance and will lose these fungicides.

What are our recommendations? Most growers will still be able to use the SI's, but in many orchards, the "party" of the delayed four-spray SI program is over. Early protection and less reliance on post-infection programs will be the key. The strobilurins will be very effective, but we must keep in mind that they are less active in post-infection programs than the SI's were at the time we started to use them. We are currently working on an affordable test to determine orchard levels of resistance to all of our modern scab fungicides. This will help to design scab programs without the risk of being burned by fungicide resistance. In the meantime, we should play it safe.

Fruit scab has never been cheap. In a Cornell Bulletin published in 1946 and entitled: "Apple Quality and Its Effect on Price and Rate of Sales", it said that "In New York, apple scab is probably the most serious defect resulting from disease or insect." It also said: "These discounts are highly important to growers. One or two serious defects could reduce the value of marketable fruit by $100 or more per acre. Such an amount would have amply covered any ordinary costs of spraying." Although the dollar figures are much higher now for both the potential loss and the fungicides, the basic message has not changed much. The difference

is that resistance was not an issue in 1946. Now, we have to factor resistance in.

If the performance of SI's has noticeably declined over the past years, this was most likely caused by resistance. In many cases, the SI's will not be used up entirely, but it will be risky to continue with their post-infection use. The strobilurins will help out, but in strict post-infection programs they are just not as good as the SI's once were. They do have some post-infection activity, but this should be reserved for emergency situations. Just replacing a SI with a strobilurin without changing spray schedules will be risky, and it will drive strobilurin resistance. Has good scab control become more expensive? Perhaps it has, but the above 1946 statement is still true. If we look at the potential "discount" losses, then this "amount would have amply covered any ordinary costs of spraying".

ACTUAL AND PREDICTED DEGREE-DAY
ACCUMULATIONS SINCE MARCH 1, 2003

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May 20, 2003

GROWING DEGREE DAY ACCUMULATIONS as of May 19, 2003 at the NWMHRS

Year	2003	2002	2001	2000	1999	13 yr. Av. ('90-2002)
GDD42	428	295	535	550	581	425
GDD50	193	135	283	255	289	204

WEATHER

Conditions were dry this past week until Monday evening into Tuesday (5/19 & 20). Degree day accumulations base 42 and 50 are very close to the 13 year average.

GROWTH STAGES at NWMHRS

Apple: Red Delicious—1st king bloom
Pear: Bartlett – full bloom
Sweet Cherry: Napoleon – petal fall
Tart Cherry: Montmorency – early petal fall
Apricot – petal fall
Plum: European type – full bloom
Grapes: Chardonnay – late bud burst

INSECTS & DISEASES
By Gary Thornton & Jim Nugent

Apples are now in the peak time of **apple scab** spore release. The 5/19 & 20 wetting period (in progress as of this writing) will be at least a low infection period for apple scab at the NWMHRS. **Fireblight** does not appear to be a concern this week, due to cold temperatures. **Spotted tentiform leaf miner** averaged 25-800 per trap in Leelanau County, and the eggs are easy to find on leaves. **Rosy apple aphids** are common, but still low in numbers. **European red mites** are now mostly hatched out.

Although **Tart Cherries** are just at full bloom, in many orchards some of the first leaves are

fully expanded and susceptible to cherry leaf spot infection. The leaves are pushing out quicker than in most years. This is likely occurring due to the lack of crop last year and an abundance of carbohydrates in the trees. Montmorency has a nice bloom. In general, significant bud damage from spring frosts is only found in the coldest locations. Overall crop potential is very good. There is some tree death in young trees (generally 2-4 years old) from the March 3 winter cold event. Balaton sustained some flower bud injury during the same event, so bloom was much lighter and crop potential is lower. Conditions for pollination have been good.

Sweet cherries had a light bloom due to the winter freeze event on March 3rd.

Brown rot is a threat in all stone fruit with bloom. **June beetles** have begun emergence. They feed on foliage of many plants, including young fruit trees, where damage can be an economic problem. They are attracted to grassy areas for egg laying. Their larvae, **white grubs**, cause much worse economic damage than do the adults, by feeding on the roots of strawberries and young fruit trees. **Cutworms** are still a threat to newly planted orchards and bearing and non-bearing grapes.

KEEP BEES SAFE
By Jim Nugent

Honey bees and other insect pollinators play a vital role in the production of fruit crops. Aphid

Honey bees and other insect pollinators play a vital role in the production of fruit crops. Avoid using any pesticide that's toxic to bees while crops are blooming and bee hives are in the area. **Generally the insecticides are most toxic to bees, while fungicides and herbicides are generally safe.** However, exceptions do occur. According to an Ohio State University fact sheet by Dr. James E. Tew, the following are some **exceptions to the general rule:**

Highly toxic to bees: **2,4-D** -- Should not be sprayed on flowering plants such as dandelion while bees are foraging in the orchard.
Moderately toxic to bees: **Herbicides** -- Dacthal, Poast, Touchdown

Fungicides – mancozeb (Manzate, Dithane)

Relatively non-toxic to bees: **Insecticides** – Bacillus thuringensis (several common names), Apollo (miticide), Nemacur, Omite

ACTUAL AND PREDICTED DEGREE-DAY
ACCUMULATIONS SINCE MARCH 1, 2003

Please send any comments or suggestions regarding this site to:

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Northern Michigan FruitNet 2003
Weekly Update

NW Michigan Horticultural Research Station

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May 27, 2003

GROWING DEGREE DAY ACCUMULATIONS as of May 26, 2003 at the NWMHRS

Year	2003	2002	2001	2000	1999	13 yr. Av. ('90-2002)
GDD42	504	346	642	645	657	524
GDD50	226	160	337	302	324	258

WEATHER

This was the second week of generally dry, mostly sunny, generally cool conditions. Rain at the NWMHRS the past two weeks has totaled 0.21. Degree day accumulations at the NWMHRS entered the week at the 13 year average, but are now slightly behind. Frost occurred on the mornings of 5/21 and 5/22. Temperatures were slightly colder on 5/22, resulting in some frost damage to fruit crops in colder sites.

GROWTH STAGES at NWMHRS

Apple: Red Delicious - Full bloom
Pear: Bartlett – Petal fall
Sweet Cherry: Napoleon – Shuck split
Tart Cherry: Montmorency – Petal fall
Apricot – Shuck split
Plum: European type – Petal fall
Grapes: Chardonnay – 4 - 8" shoots

INSECTS & DISEASES
By Gary Thornton & Jim Nugent

Dry weather gave apple growers a break from **apple scab**. **Fireblight** does not appear to be a threat the rest of the week. If the actual temperatures end up being higher than predicted, then protectant sprays of Streptomycin will be warranted. First catch of **codling moth** emerged early last week. Apple growers should put out their traps for codling moth, if they plan on scouting for this pest. **Spotted tentiform leafminer** averaged 106/trap. **European red mites** are commonly found. If they are above threshold at this time, it is only a temporary situation as the vegetation will dilute the current populations. Be careful to not rely entirely on Apollo or Savey as resistance can occur. Rotate with Agrimek, adulticides and oil. **Rosy apple aphid** populations continue to expand.

Pear psylla nymphs are easy to find on the young leaves. Populations vary from very low to very high. Blocks that struggled to control this pest last year generally have high populations of nymphs this year.

There were no infection periods for **cherry leaf spot** since early last week. **Brown rot** pressure remains low. Sweet cherries in early sites are starting to come out of the shuck. Once cherries are out of the shuck, they are susceptible to **plum curculio** egg laying activity. Plum curculio have already been found in area orchards, although no stings have been reported. **American plum borer** averaged 7/trap. Sprays for this pest should be applied in about two weeks.

Deer injury is already showing up in tart cherry.

CHERRY CROP INSURANCE UNDER REVIEW
By Jim Nugent, Jim Bardenhagen and Phil Korson

Meetings for cherry growers will be held on Thursday, *May 29, 2003*

Noon till 2:15 p.m. - Cottage Café, Traverse City.
Buffet lunch will be provided compliments of *April* ...

Buffet lunch will be provided compliments of *AgriLogic*
7:30 till 9:30 p.m. - NW Michigan Horticultural Research Station
Dessert and coffee compliments of *AgriLogic*
The meetings will have two objectives:

1. Solicit inputs on the sweet cherry crop insurance program for USDA
2. Discuss how we should proceed regarding the establishment of a crop insurance program for tarts.

USDA's Risk Management division has contracted with *AgriLogic,* a Texas firm, to conduct a review of the sweet cherry pilot crop insurance program. Details of this review can be seen on AgriLogic's website at *www.agrilogic.com/cherry.html*. The results of this review will determine the future for sweet cherry crop insurance.
Also we have been discussing options for getting crop insurance extended to tart cherries. A few options are possible, but the only alternative that has a chance of being developed in the near future is to convince USDA to extend the sweet cherry program to tart cherries. But before we can proceed further, we need your thoughts on this issue. First, should we pursue crop insurance for tart cherries? Would the fundamental concepts used for the pilot sweet cherry program work for tarts, or do we wish to see the development of a different program? No program will be developed without strong support and pressure from the industry.

Your input at one of these meetings could be very important to the future of crop insurance on cherries in Michigan. You are welcome to attend either session, which ever is most convenient. Please RSVP to the NWMHRS (946-1510 or 888-749-3019) to help us give a lunch estimate to the Cottage Café and to order enough pies for the evening. You are welcome to attend even if the RSVP is not made, but a response would help us out. Thanks!

WINTER INJURY IN NORTHERN MICHIGAN
By James E. Nugent
District Horticulturist, MSUE

The winter of 2002-03 will be remembered as one of the more severe for causing winter damage to several fruit crops. Why was the damage so bad and what can we learn from this event?

There are two particularly important factors that affect winter injury. First is the degree of acclimation of the plant to cold and second is the temperature.

In SE Michigan this year, Bob Tritten is seeing extensive winter injury in some crops that resulted from very cold temperatures in early winter following a fall when plants were slow to lose leaves and acclimate to cold. This same condition was seen in northern Michigan in 1987 following a November 1986 freeze event, and again in the early 90's.

As plants are exposed to extended periods of cold temperature, they acquire the ability to tolerate colder temperatures. During winter, temperatures above freezing result in some loss of hardiness, which is then regained with extended below freezing temperatures. However, hardiness is lost more rapidly than it is regained.

In northern Michigan this past winter, the event that caused the major problem occurred on March 3 when temperatures reached -10 to -20 F. The result was damage to buds and tissue that varies greatly by crop and site.

In February, 1979, the temperature in Traverse City reached a record low of -37 F at the airport. Many fruit sites experienced temperatures of -22 to -32 F, 10 to 14 F colder than in 2003. This caused severe winter injury but quite interestingly, some fruit crops have been damaged more in 2003 than they were in 1979. Why?

The difference is explained by what happened prior to the cold events. In 1979, there was a period of about 10 weeks prior to the record cold with temperatures never exceeding 32 F. By contrast, at the NWMHRS in 2003, highs were in the upper 30's February 28 and March 1. On the electronic weather instrument, the temperature dropped from 39 F at 4:00 p.m. on March 1 to -13 F at 5:00 a.m. on March 3. The loss of some degree of hardiness combined with the cold to cause significant damage to some crops.

The following are observations to date about winter injury from the 2003 event:

Grape - Vinifera grapes are generally dead to the snow depth on March 3. The best scenarios are generally where a cane or shoots were left below snow. Hybrids generally fared better, but of course injury varies by variety.

Cherry - Sweet cherries are generally damaged worse than tarts, and of course damage varies by variety and site. Trees that lost leaves early last year due to cherry leaf spot are more apt to have experienced winter damage. First year trees were more severely affected if damaged by deer last summer or were small, weaker trees at planting.

Of particular interest in 2003, we are seeing severe tree injury in some Montmorency tart cherries that are going into their third and fourth leaf. It occurs in relatively cold sites. When looking for winter injury, one generally cuts into the inner bark (phloem) area to check for browning. In the case of this age Monts, the injury is in the wood (xylem) tissue. Cutting limbs or the trunk with loppers reveals browning in the wood tissue. In cases where trees look weak but are partially leafing out, one may find good tissue only in the outer portion of last year's growth, ie, most of the xylem is injured but a little good tissue remains. I expect these injured trees that do survive will not put on strong growth for a couple of years.

Also of interest in 2003 is that flower bud damage in sweet cherries is more severe than occurred in the 1979 winter freeze

occurred in the 1979 winter freeze.

Peach - Showingsignificant fruit bud and wood injury, but probably not as severe as the injury it was in 1979.

Apricot - Severe damage to flowers, but most older trees appear to have survived.

Apple - So far winter injury appears quite minimal; not as bad as an event in the early 90's when the cold came earlier in the winter.

In summary, it appears that the deaclimation prior to the March 3 cold affected crops differently. In general, cherries and grapes seem to have been more negatively affected by the deaclimation than were apples.

POWDERY MILDEW

Dave Rosenberger, Plant Pathology, Cornell University
Scaffolds Fruit Journal, Vol. 12, No. 10, May 19, 2003

Powdery mildew of apples is caused by the fungus *Podosphaera leucotricha*. Mildew can cause significant damage to many apple cultivars if trees are not protected with appropriate fungicides between tight cluster and first cover. Mildew infections on fruit cause russetting, and most fruit infections occur between pink and petal fall. Furthermore, effective control of mildew on leaves is almost impossible if fungicide protection is delayed beyond petal fall. The best mildew control occurs when mildewcide programs are initiated at the tight cluster or pink bud stage.

Powdery mildew overwinters as mycelia in infected buds. When buds begin growing in spring, the mycelia in the infected buds colonize the new leaf and shoot tissue as it grows. These "primary infections" become visible about the time trees reach tight cluster. The powdery white deposits on leaves with primary infections consist of mycelia and conidia. The conidia are wind-disseminated to new leaves, where they cause secondary infections. Secondary infections often begin appearing when trees are near petal fall, and they can become painfully obvious if trees are left unprotected until first cover. If left uncontrolled, the secondary infections colonize entire leaves along with the axillary or terminal buds that are formed during summer. Those infected buds then provide the inoculum for the next year.

Powdery mildew is often worse in years following mild winters and in years when the weather between bloom and petal fall is relatively dry with moderate temperatures. Winter temperatures below 10 F kill some of the overwintering mildew in buds, and temperatures of -10 F will eliminate 95% of overwintering mildew. Dry springs favor mildew because, unlike most other fungi, powdery mildew does not require rainfall or dew for spore germination. Mildew conidia can germinate when relative humidity is above 70% (as commonly occurs at night or during early morning). Rainfall actually decreases the severity of mildew, both because spores germinate poorly in water and because rains wash conidia off of leaves. Optimum temperatures for conidial germination and infection are 68-72 F, but infection occurs readily at any temperature between 50 and 77 F.

Apple cultivars differ significantly in their susceptibility to powdery mildew. Braeburn, Cortland, Gala, Ginger Gold, Gravenstein, Idared, Jonathan, Mutsu, Paulared, and Rome Beauty are all highly susceptible to powdery mildew, whereas Delicious, Empire, and Fuji are much more resistant. Cultivars such as McIntosh and Golden Delicious can develop severe levels of secondary infection when they are planted adjacent to a highly susceptible cultivar that supplies inoculum. Mildew-susceptible cultivars should be protected with fungicides that have activity against powdery mildew beginning no later than the pink bud stage. On more resistant cultivars, starting mildew control at petal fall may provide adequate control.

The SI fungicides (Rubigan, Nova, Procure) and the strobilurin fungicides (Flint, Sovran) are very effective for controlling mildew, whereas Captan, Polyram, and the mancozeb fungicides are not effective. Mildew in most orchards is probably resistant to Topsin M. The SI fungicides have both post-infection and protectant activity against mildew, whereas Sovran and Flint seem to work more as protectants. When mildew programs are initiated at tight cluster or pink and continued through first or second cover, the SI and strobilurin fungicides provide similar levels of disease control. However, if no mildewcide is applied until mid-bloom or petal fall, then an SI fungicide should be used as the first mildewcide spray because post-infection activity will be critical for rapidly shutting down further spread of the disease.

Sulfur is also effective for controlling mildew, but it has only protectant activity and is more easily removed by rain than are the SI and strobilurin fungicides. Sulfur at rates of 3-5 lb/A provides adequate suppression of mildew on less-susceptible cultivars or on highly susceptible cultivars where inoculum levels are low. In many orchards, however, at least two or three sprays of SI or strobilurin fungicides are needed to stop spread of mildew when trees are at peak susceptibility between bloom and first cover. Additional cover sprays with sulfur can then be used to protect new leaves until trees stop growing in late June or early July. Mildew can only infect young leaves for several days after they unfold, so susceptibility of

trees to mildew drops off rapidly as terminal growth slows in early summer.

The bottom line on mildew control is to start the mildew program early (before bloom) and use at least three sprays of an SI or strobilurin fungicide before switching to less expensive alternatives such as sulfur. On mildew-susceptible cultivars, waiting until petal fall or first cover to apply the first mildewcide spray may result in unsatisfactory control and/or selection for fungicide-resistant strains of mildew.

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