



Newsletter

Extension

Fruit ICM News

Volume 6, No. 11
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Calendar

April 27: High Tunnel Workshop at the Penn State High Tunnel Research and Education Facility, Rock Springs, PA.

May 23: Plasticulture Strawberry Field Night, Southern State Community College, U.S. Rte. 62 North, Hillsboro, Ohio. The agenda is listed later in this newsletter. For more information contact Brad Bergefurd at 740-289-3727 or bergefurd.1@osu.edu.

July 10: Ohio Fruit Growers Society Summer Tour, Hirsch Fruit Farm, Chillicothe, OH. For information about the Ross County/Chillicothe area check out <http://www.visithistory.com>. For more info about the summer tour, call Tom Sachs at 614-249-2424.

Apple Scab Management Advice

Mike Ellis, OSU/OARDC Plant Pathologist provided the answer to this situation I outlined:

Situation:

One of the chemical representatives is visiting growers and suggesting that we have had and are experiencing heavy scab pressures. He is urging the full rate of Rubigan whenever weather conditions allow for application. Our monitoring device (Spectrum Technology based on the Mills chart) has recorded only light infection periods on April 8, 9, 13, and 14. Any comments for the growers?

Answer:

Here in Wooster we had a moderate infection period on April 12 and a heavy period on the 14th. In my orchard the early varieties were at least at half inch green on the 14th. It is early and there may not be a lot of mature ascospores, but we have no way of knowing what is out there. Here in Wooster, I would agree with the recommendation he or she has made. It depends on where you are and the weather.

What is a "light" infection period? This has always bothered me a bit. Those were infection periods, so do we ignore them when they are light? To me they are infection periods, and I wouldn't recommend not spraying or only using a protectant because they were light. The fact is we had infection periods and we had unprotected susceptible tissue in the orchard.

Another problem is that the rain hit at half inch green and it rained and blew for at least 3 days. Therefore, most orchards went several days before a spray could be put on. In orchards where scab has a tendency to be a problem, I would recommend coming in with a high rate of Rubigan or Nova plus a protectant in these situations, followed by my next scab spray in no more than 7 days. This spring is at the very least abnormal in that we had so much growth in such a short period of time. I would try to maintain a very good scab program. On the 12th we were at half inch green on Red Delicious. On the 23rd (11 days later) we are at full bloom. So far this appears to be one of those years where I would pay very close attention to apple scab. Hopefully, things will dry up a bit and get back to at least a little more normal. In summary, I would make the following suggestions for **emergency scab sprays**:

What is an EMERGENCY?

I would call it an emergency when you have unprotected tissue in the orchard and you have an infection period. The stronger or longer the infection period the greater the emergency. Often we have periods such as this when the weather remains wet and/or windy and it is not possible to spray for several days. In situations such as this, it is an **emergency**, and you know you're in trouble. In some years, I have seen it remain impossible to spray for up to five days after the initiation of an infection period. Obviously, this is a **bad** situation. So what can we do?

- We should always try to use our fungicides in a protectant program as much as possible. Always watch the weather very carefully. I'm sure you do. Try to get fungicides on in front of a big wetness period or storm front as much as possible. Going into the infection period with some level of protection should help you sleep a lot better and just makes good sense all the way around.
- If you are caught without protection, the only thing you can do is to rely on fungicides with curative activity. At present, we have the Sterol-inhibiting fungicides (Nova and Rubigan), and the Strobilurin fungicides (Sovran and Flint). The sterol-inhibiting fungicides have a track record of good to excellent curative activity (3 to 4 days). If you do not have scab resistance to Nova or Rubigan in your orchard, I would recommend using them. I have seen no indication of high levels of resistance to these materials in Ohio. I'm sure we have some reduced sensitivity in the scab fungus to these materials, but they continue to do a very good job of scab control. Traditionally, most growers have only used these materials two or three times (at most) during the season, and we usually use them in combination with a protectant material such as captan or mancozeb. This has probably helped to keep resistance development low.

The Strobilurin fungicides do have some curative activity, but are not as effective as the Sterol-inhibitors are or were when they were first introduced. The verdict on just how much curative activity they have is still out. Many researchers that I have talked with claim that they have good activity up to about 48 hours after the initiation of the infection period. I agree with this and would not recommend using them after 24 to 48 hours. In general, I do not recommend using them in after-infection or curative programs (especially if you know you're in trouble). As more research is conducted I may be able to change this recommendation. At present, for Ohio I would recommend using Nova or Rubigan in combination with a protectant fungicide (captan, mancozeb, or polyram) in an emergency spray.

- The spray should be made as soon as possible after the initiation of the infection period. **Get in there as soon as you can.** Use the high label rate of Nova or Rubigan, plus a contact fungicide mentioned above. If this is a serious emergency (3 to 5 days or more without protection) a second or follow-up spray should be made at 5 to 7 days after the first emergency spray using the same material as in the first spray. Hopefully, you can get back to your "normal" 7 to 10 day schedule after this. I think it would be a good idea to come in with a Strobilurin fungicide after the emergency sprays. They are excellent fungicides, and if some lesions did get through, they should help in reducing sporulation on them. If you do use a Strobilurin fungicide in an emergency or after-infection spray, always use the highest label rate.

Finally, I realize that these emergency sprays are expensive, and costs are very important in today's environment. However, if apples represent your income, the losses that can occur from a bad scab infection can be devastating. Hopefully, we can all avoid these emergency situations.

If you have questions, contact Mike Ellis at 330-263-3848 or e-mail ellis.7@osu.edu.

Ohio Strawberry Plasticulture Advisory Newsletter, Vol.1 No.4

Source: Brad Bergefurd, Editor & Extension Agent, Horticulture, Ohio State University South Centers

Frost Warning April 22, 2002

Most areas in Ohio are under a frost warning for the night of April 22 with lows forecasted to be in the low 30's. Northern Ohio growing areas are under a freeze warning with temperatures forecasted into the 20's. With the high temperatures of the past 10 days, the plants have grown out of any winter dormancy protection they may have had, and are very susceptible to frost/freezing injury. We are reapplying row covers in Hillsboro and Piketon this afternoon (4/22) and making sure the overhead sprinkler irrigation is working.

Kathy Demchak from Penn State University (University Park, PA) sent me this update as to their preparation for the cold nights ahead; "I (with my 6- and 8-year old's help!) reapplied my row covers yesterday afternoon (Sunday 4/21) trying to hold in whatever soil heat might be there. What a mess; we were slipping and sliding around in the mud. I'll be putting out the sprinklers this afternoon. Our forecast low is 30, but it typically gets about 5 degrees colder than the forecast low at the research farm. So, I'm a little concerned."

Many Southern Ohio area plasticulture strawberry fields are at about 10% bloom, some more some less, variety and location dependant. A Chandler field I saw over the weekend had thimble-sized fruit and about 20% bloom present. A grower in Bainbridge, Ohio began picking Sweet Charlie 10 days ago

under high tunnels.

If you have 6 blossoms open now with each blossom having the potential to make a 20 gram berry, this could amount to about a 1/4 lb. of premium early fruit per plant that can be lost if not protected, about 4500 lbs. per acre! Thirty degrees F has been noted as the critical temperature for a (dry) open blossom, whereas 28 degrees F is the critical temperature for a (dry) popcorn stage blossom. The critical temperatures of open blossoms and unopened buds are changed as these plant tissues are wetted. The lethal temperature of the strawberry bud or blossom is raised when wet (Berry News, Jan/Feb., 1993 , Volume 3, No.1).

Best advice is to keep a close watch on your fields with digital thermometer in hand. Best place to monitor temperature is in an open blossom. Insert the two twisted together thermocouple wire leads from your digital thermometer directly into the blossom receptacle. These temperatures mean the most. That is what we will be doing at our Hillsboro site tonight besides keeping the coffee pot a-brewing!

On another weather note - Hail and Heavy Rainfall

Many of our southern Ohio growing areas experienced severe thunderstorms over the weekend (4/19 evening - 4/21) receiving **very heavy** rainfall (4 inches for the period at my house in Wilmington), high winds, and hail (a neighbor of mine had about 2 inches of hail at his farm; it looked like snowdrifts in his ditches). Many growers fear an increase in disease after being hit with a hail storm. If you experienced hail damage on your plantings, remember in most cases if disease was not present in the planting before the hail storm, you should not be too concerned that there will be increased disease outbreaks in the planting after the hail storm. If you had disease in your planting before the hailstorm, then these fresh plant injuries may provide open areas for disease pathogens to enter. Also any stripped leaves or other dead plant material in the plant canopy could increase chance of Botrytis Fruit Rot "Gray Mold" disease infection. If there are many dead leaves or plant parts in the canopy, it may be a good idea to remove those. It is critical to stick to the disease prevention program that you were on before the hail.

With the heavy rains experienced, some of the spray material being applied to our plants may have become washed off. Keep this in mind when deciding on your spray schedule. We have been using a spreader sticker in our spray program due to the rainfall we have been experiencing. Many fungicides have a spreader/sticker already in them; check the label or with your chemical dealer for more information. Also, check compatibility of the spreader sticker with the chemicals you are using **before** mixing up the sprayer tank.

Using Fungicides for Control of Anthracnose Fruit Rot on Strawberry in Ohio

Source: Michael A. Ellis, OARDC, The Ohio State University Department of Plant Pathology, Wooster

The incidence of Anthracnose fruit rot on strawberry, caused by the fungus *Colletotrichum acutatum*, appears to be increasing in many plantings across the Midwest. I recently spoke at the Wisconsin berry growers annual conference, and was surprised to hear that several growers had severe anthracnose outbreaks in northern Wisconsin. Anthracnose is generally considered as a warm weather or "southern" disease. Although anthracnose is not common in most Ohio plantings, when it does occur, it is generally

devastating. Of special concern is the increased interest in planting berries on plastic. The disease can spread more quickly on plastic and some of the varieties used in these planting (such as 'Chandler') are very susceptible to anthracnose.

The disease is favored by warm temperatures and wet weather. When I see temperatures approaching 80°F and above during bloom through harvest, I think "anthracnose", especially if the weather is wet.

The following information is taken from the December 2001 issue of *Berry Times*, a newsletter published by the University of Florida, Gulf Coast Research and Education Center at Dover, Florida. Anthracnose is a very serious disease of strawberry in Florida. The newsletter contains some good information related to the introduction and spread of the disease as well as ideas on chemical control.

"Mild to warm weather, combined with wet conditions favor the development and spread of anthracnose. The pathogen is most likely introduced into a field on infected transplants, having colonized plants in the nursery, although it can also be moved by contaminated equipment and field workers. The pathogen appears to spread throughout a field by first infecting the foliage of the plant without causing symptoms. The fungus then colonizes and sporulates on this foliage as it dies, and the spores (conidia) are splash dispersed or moved by harvesting operations to flowers and fruit where they cause anthracnose.

The best way to control anthracnose fruit rot is to prevent the introduction of the pathogen into the field by using pathogen-free transplants. Anthracnose resistant cultivars like 'Sweet Charlie' (and possibly 'Earlibrite') are extremely effective at controlling the disease. Chemical control relies upon preventative applications of a protective fungicide like Captan or Thiram, although captan appears to be slightly more effective. These regular (weekly) applications prevent or reduce pathogen colonization of the plant and prevent fruit infection. In Florida, epidemics of anthracnose fruit rot typically develop as the weather warms in mid and late January, and become serious in February and March. To prevent epidemics of anthracnose in Florida, we recommend supplementing the regular fungicide program with applications of Quadris 2.08F fungicide (azoxystrobin) from late January to March or when anthracnose fruit rot is observed. Alternate applications of Quadris with your regular weekly schedule so that Quadris is applied every 14 days. Benzimidazole fungicides like Benlate or Topsin-M are not effective for controlling anthracnose fruit rot."

For Ohio growers that do not have a problem with anthracnose, the standard fungicide program is to apply fungicides during bloom for control of Botrytis (gray mold). Very few additional fungicide applications are required. When anthracnose comes into the picture, the fungicide program needs to be increased.

Growers that have had problems with anthracnose fruit rot (especially growers using plastic culture) should consider a fungicide spray program for anthracnose control. Unfortunately, resistance to anthracnose is not available in most of our "Northern" varieties. 'Delmarvel' should be suitable for production in Ohio and has been reported to have good resistance to anthracnose. Prior to the registration of Quadris (azoxystrobin) fungicide, Captan was the main fungicide used for anthracnose control. Quadris provides a higher level of disease control than Captan, and if used properly, should provide a better level of anthracnose control.

The following are my thoughts on a fungicide program for anthracnose control in plantings where the disease is a problem or a high potential threat.

Suggested Guidelines for an Anthracnose Fungicide Program

Fungicide and Rate/A	Comments and Timing
Captan 50W (6lb) or Captec 4L (3qt)	When growth starts in the spring through initiation of bloom (7-day interval).
<p>A tank mix containing one of the following products: Topsin-M 70WSB (1 lb.) or Elevate 50 WG (1-1.5 lb.) or Switch 62.5 WG (11-14 oz.) or Quadris 2.08F (15 oz.)</p> <p>plus one of the following products: Captan 50 W (4-6 lb.) or Captec 4L (2-3 qt.)</p>	During bloom (primarily for Botrytis control). Captan and Quadris should aid in preventing anthracnose build-up on foliage during this period. Quadris will also provide some level of Botrytis control. Switch is highly effective against Botrytis and has been reported to have good activity against anthracnose. Topsin-M and Elevate have no activity against anthracnose; however, tank mixing Topsin-M and Elevate with Captan should aid in reducing the build-up of anthracnose during this period (7 day interval).
Captan 50W (4-6 lb.) or Captec 4L (2-3 qt.) plus or alternated with Quadris 2.08F (15 oz.)	End of bloom (green fruit present) through harvest. No more than two sequential sprays of Quadris can be made without alternating to another fungicide, and no more than 4 applications of Quadris can be made per acre per year. Fungicides should be applied on a 7-day interval. Quadris incorporated into every other spray would be applied on a 14-day interval.

The extensive use of Captan in this program could result in problems with visible residues on fruit. This needs to be considered, but under heavy disease pressure for anthracnose this high level of Captan usage is probably required. The Captec 4L (flowable) may result in less visible residue than the Captan 50W (wettable powder). Alternating Captan with Quadris rather than combining Quadris with Captan in every other spray should be helpful in reducing visible residues. The use of Quadris alone in the last spray or two before harvest should aid greatly in reducing visible residues.

In summary, if anthracnose is not a problem, growers should maintain their current disease management program. If anthracnose is a problem, growers can consider the suggestions presented here. Remember these are only suggested guidelines for an anthracnose control program. It is always the grower's responsibility to read and understand the label. For the most current pesticide recommendations in Ohio, growers are referred to Bulletin 506-B, *Ohio Commercial Small Fruit and Grape Spray Guide*. If growers have questions regarding the information covered here, they should contact Mike Ellis at 330-263-3849 and e-mail: ellis.7@osu.edu.

**Plasticulture Strawberry Field Night
Program for Thursday, May 23, at 6:00 p.m.**

- Winter protection trial for Plasticulture strawberries
- Date of planting study for Plasticulture strawberries
- Eastern and western Plasticulture strawberry cultivar trial
- Comparison study of two different bed shapers used for Plasticulture strawberry production
- View specialty equipment, overhead irrigation, and trickle irrigation used for Plasticulture strawberry production.

Location is Southern State Community College, U.S. Rte. 62 North, Hillsboro, Ohio. Admission is free. Light refreshments are provided. For more information, contact Brad Bergefurd at 740-289-3727 or

bergeford.1@osu.edu or Thom Harker at 740-289-3727 or harker.7@osu.edu.

Which Fertilizers for Blueberries?

Source: Eric Hanson, Horticulture, Michigan State Fruit Crop Advisory Team Alert, April 23, 2002

Fertilizer can be expensive, particularly if the nutrients being applied are not really needed. The only way to determine accurately what the real needs are is through tissue analysis (sampling leaves in summer for nutrient analysis). If this is not done regularly, choice of fertilizers is a "best guess" process. Basing fertilizer choices on soil tests is not reliable because soil nutrient levels don't accurately predict levels in blueberry bushes.

Each year between 100 and 300 blueberry leaf samples from Michigan are processed by the MSU Plant and Soil Nutrient Lab. The results of these give an informative picture of the nutritional status of Michigan plantings, and the likelihood of certain nutrient deficiencies. I just summarized the results of almost 2,000 samples that the lab has processed over the last decade. Here are some pertinent findings:

Nitrogen

About 40 percent of samples contained less than adequate levels (<1.65% N), and about two percent of samples contained excessive levels (>2.2% N). This indicates that many growers are applying either inadequate rates of N or applying N at inappropriate times. Rates of 60 to 70 lb N per acre are adequate for most mature plantings in Michigan. However, if this is applied too early in the season or in one application, bushes may not absorb enough of the N for optimum growth. An efficient program is to apply the first half of the N just prior to bloom (now) and the second half about petal fall time. This split, delayed timing should supply the plants all the way through the harvest season. Bushes can't absorb much N applied earlier in the season, so much of the fertilizer may be wasted. Use ammonium sulfate if the soil pH is above 5.0 and urea if the pH is below 5.0. Avoid fertilizers containing nitrate.

Phosphorus

Levels of P are a concern in many Michigan blueberry fields. Thirty-eight percent of leaf samples over the last ten years contained deficient P levels (< 0.08% P). There has been some trend indicating P deficiencies are becoming more common. When soil tests are taken from these deficient fields, results nearly always come back with adequate to excessive P. Leaves on deficient bushes develop a darker green, purplish color. This can be apparent early in the season. We need to test some strategies for correcting P shortages. At this point, a reasonable program for P deficient plantings is annual applications of modest rates (25-50 lb P₂O₅ per acre). Two fertilizers that may be useful in this situation are monoammonium phosphate or MAP (11-52-0) and diammonium phosphate or DAP (16-48-0). Although these are expensive, specialty fertilizers, they could be used as the N source for the first half of a split application. Consider using one of these fertilizers on specific areas to see how the plants respond.

Potassium

Only about 18 percent of plantings contain less than the deficient levels of 0.35% leaf K. Leaf K levels go up and down with crop levels. Since blueberry fruit accumulate K at the expense of the levels, leaf

levels will be particularly low when bushes are carrying a full crop. Acute deficiencies cause the margins of leaves to scorch and brown, similar to the effects of severe moisture stress. Rates of 50-75 lb K₂O per acre will correct most deficiencies. Use potassium sulfate (0-0-50) or muriate of potash (0-0-60). Don't apply more than 75 lb K₂O as muriate because the chloride content may injure bushes. Potassium-magnesium sulfate or Sul-Po-Mag (0-0-22-11) is a useful K source when magnesium is also needed.

Other nutrients

Several other nutrients occasionally become deficient. Magnesium deficiencies can occur but they are relatively rare. Only about two percent of leaf samples contain deficient Mg levels (<0.18% Mg). Iron chlorosis can be seen in various fields, but this is caused by alkaline soil conditions (pH>5.5) rather than a shortage of Fe in the soil. To correct chlorotic symptoms, reduce the soil pH with sulfur. Optimum leaf concentrations of micronutrients such as boron (B), copper (Cu), manganese (Mn) and zinc (Zn) are not completely understood. However, based on available information and field observations, shortages of these elements in Michigan blueberries appear to be rare. I suspect that growers need not worry about applying these elements if they are keeping the soil pH in the proper range.

Extending the Pick-Your-Own Berry Season

Monday, May 20th, 9:30 AM - 3:00 PM
Stacy Family Farm, Marietta, OH

Agenda

9:30 AM Registration

10:00 AM Plasticulture Strawberry Production and Field Tours - Bill & Janet Stacy and invited out-of-state Plasticulture Specialist

Noon Lunch

1:00 PM Pick-Your-Own Berry Farm Options: A list of Varieties to Get from May to October - Berry Industry Staff, South Centers at Piketon

2:00 PM Budgets -Difficulties with Perennial Crops and a Basic How-to and Needs Assessment at the County Level - Robert Moore, Enterprise Budget Specialist; Dave Apsley, OSU Extension South District NR Specialist

3:00 PM Adjourn

Registration

Registration is \$7 per person and can be charged to county accounts for OSU employees. (Please bring your account number or email to barrett.90@osu.edu.) Others should make checks payable to OSU Extension.

About the Farm

The Stacy family has been involved in the fruit and vegetable industry for over 100 years at their current location. Their main crop is now about three acres of plasticulture strawberries. They also raise sweet corn and other vegetable crops to sell at the River City Farmers Market and other locations in the Marietta area. They recently added test plots on brambles to extend their own season.

Critical Temperatures for Small Fruit

Source: Sonia Schloemann, UMass Extension Small Fruit Educator

Critical freeze temperatures for strawberries:

Stage of Development	Approx. Critical Temp.
Tight bud	25 F
"Popcorn"	28 F
Open Blossom	30 F
Fruit	28 F

Critical temperatures for freeze injury to blueberries:

Bud Development Stage	Avg. Temp.
1=buds swollen, but not open	21 F
2=flowers unopened	28 F
3=full bloom	32 F

Critical temperatures for freeze injury to grapes:

Bud Stage	10% kill	90% kill
1=dormant	varies	varies
2=1st swell	3 F	-13 F
3=full swell	21 F	10 F
4=bud break	25 F	16 F
5=1st leaf	27 F	21 F
6=2nd leaf	28 F	22 F

Also provided is a table indicating the amount of water per hour to apply under several sets of conditions in order to adequately protect your crop:

Inches of water per hour to apply at wind speed (in MPH) at the crop height, at 50% relative

humidity:

Air temp. (F)	Wind speed (mph) at crop height			
	0-1	2-4	5-8	10-14
27	0.10	0.20	0.30	0.40
24	0.10	0.30	0.35	0.45
20	0.15	0.35	0.45	0.60
18	0.20	0.40	0.50	0.65

One acre inch equals 27,154 gallons of water

Trap Reports

Site: Waterman Lab, Columbus
 Dr. Celeste Welty, OSU Extension Entomologist

Apple: 4/17 to 4/24/02
 Late bloom on April 24, 2002

RBLR: 7 (down from 57)
 STLM: 12 (down from 72)
 CM (mean of 3 traps): 0.0
 TABM: 0
 SJS: 0

Peach: 4/17 to 4/24/02
 OFM: 1 (up from 0)

Site: East District: Erie & Lorain Counties
 Source: Jim Mutchler, IPM Scout

Apple: 4/24/02 First Report
 STLM: 405
 OFM: 2
 RBLR: 6

Peach: 4/24/02 First Report
 OFM: 3
 RBLR: 4

Site: West District: Huron, Ottawa, & Sandusky Co.
 Source: Gene Horner, IPM Scout

Apple: 4/23/02 First Report
 Apples are at pink.

OFM: 2.8
 RBLR: 22.5

Peach: 4/23/02 First report
 Peaches are in full bloom.
 OFM: 3.4
 RBLR: 20.8

Pest Phenology

Coming Events	Degree Day Accum. Base 50F
Redbanded leafroller 1 st flight peak	65 - 221
Spotted tentiform leafminer 1 st flight peak	65 - 275
Apple grain aphid present	67 - 251
European red mite egg hatch	74 - 208

Thanks to *Scaffolds Fruit Journal* (Art Agnello)

Degree Day Accumulations for Ohio Sites April 24, 2002

Location	Degree Day Accumulations Base 50F	
	Actual	Normal
Akron-Canton	177	117
Cincinnati	267	226
Cleveland	161	111
Columbus	255	157
Dayton	223	161
Kingsville Grape Branch	146	78
Mansfield	161	115
Piketon	283	245
Toledo	181	94
Wooster	193	101

SkyBit® Apple Scab Prediction for North-Central Ohio

Observed:

April 8, 9, 12-15, 20, 22, 23 - Possible infection & damage

April 10, 11, 16-19, 21, 24 - Active, but no infection

Predictions based on weather forecasts:

April 25, 26, 30 - active, but no infection

April 27-29, May 1-4 - possible infection & damage

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Information presented above and where trade names are used, they are supplied with the understanding that no discrimination is intended and no endorsement by Ohio State University Extension is implied. Although every attempt is made to produce information that is complete, timely, and accurate, the pesticide user bears responsibility of consulting the pesticide label and adhering to those directions.

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