



Blueberry Newsletter

A newsletter from Michigan State University for the Michigan blueberry industry

May 18, 2010

Volume 4, Issue 7

News you can use

Timely information for growers.

Page 1

Disease management

More mummy berry shoot strikes observed.

Page 2

Anthraco nose fruit rot prediction model

More mummy berry shoot strikes observed.

Page 3

Virus symptoms showing up

Page 4

Insect management

Insect activity held in check due to cool temps.

Page 5

Fruitworms and scale

Keep a lookout for these insect pests.

Page 6

Calendar

Mark your calendars for upcoming events.

Page 6

Growing degree days

GDD are reported for the primary blueberry-producing regions of Michigan.

Page 1

MICHIGAN STATE UNIVERSITY

News you can use

Disease management. At bloom, blueberry plants are susceptible to mummy berry, Phomopsis twig blight, Botrytis blossom blight, and anthracnose fruit rot. Consider using a broad spectrum fungicide at this time if weather conditions and scouting results warrant it.

Insect management. Consider bee-safe insecticides for cherry fruitworm control in high pressure sites. Cranberry fruitworm catches have been low. Gall wasps are emerging. Look for scale during scouting.

Crop development. In Van Buren County, Jersey in Covert is beginning petal fall, and Bluecrop and Blueray are finishing petal fall in Grand Junction. In Ottawa County, Blueray in Holland, and Rubel and Bluecrop in West Olive are beginning petal fall.

Frost damage. There was some damage from last week's freezes. Damage occurred mainly in fields where sprinkler and frost fans were not used. The observed damage includes; black singed leaf tips and margins, brown petal tubes and bluish fruit. The extent



Jersey at early petal fall in Covert



Bluecrop at early petal fall in West Olive

of the damage will become more apparent as the fruit set and begin to

grow. Most damaged fruit and flowers will fall off the bush.

GROWING DEGREE DAYS

From March 1

	2010		Last Year	
	Base 42	Base 50	Base 42	Base 50
Grand Junction, MI				
5/10	692	370	545	276
5/17	779	410	634	324
Projected for 5/24	912	491	796	434
West Olive, MI				
5/10	588	285	422	194
5/17	661	316	499	232
Projected for 5/24	809	410	656	336

See <http://enviroweather.msu.edu> for more information.

More mummy berry shoot strikes observed

This week all scouted sites were between bloom and petal fall. Mummy berry shoot strikes were observed at all scouted fields in Southwest Michigan, and the incidence increased again this week. At the West Olive site the average number of shoot strikes per bush increased from 39.5 (May 10) to 49.6 (May 17). At the Grand Junction site the average number of shoot strikes per bush increased from 13.8 (May 10) to 27.2 (May 17), and the shoot strikes ranged in appearance from recent (Figure 1A) to more advanced (Figure 1B and C).

Due to warm weather in early spring this year, we are almost two weeks ahead for mummy berry symptoms compared to last year. On average in 2010, the peak number of apothecia was seen on April 12th compared to May 5th in 2009. Also, we have already approached similar numbers of shoot strikes about two weeks earlier than last year (Figure 2). If shoot strikes are present in your field and blossoms are still open, there is a risk of mummy berry fruit infection. Blossoms are most susceptible to mummy berry infection right after they open, and susceptibility decreases over time. Consider protecting the blossoms with a fungicide application, e.g., Pristine or Indar (+ Captan or Ziram). The use of Pristine (broad-spectrum fungicide) or the addition of Captan or Ziram to Indar will protect the blossoms from a broad spectrum of pathogens, since blossoms are also susceptible to Phomopsis, Botrytis, and anthracnose at this time.

For more information about mummy berry symptoms, biology, and management practices, check out the Mummy Berry Fact Sheet (<http://web2.msue.msu.edu/bulletins/Bulletin/PDF/E2846.pdf>).

Tim Miles & Annemiek Schilder
 Department of Plant Pathology
 Michigan State University



Fig 1. Shoot strike symptoms observed near Grand Junction (A), Nunica (B), and West Olive (C) on 17 May 2010; Photo: T. Miles.

Fig 2. Mummy berry progression so far this season in 2010 in comparison to 2009. Averages are among all 4 scouted plots looking at apothecia (solid line) and shoot strikes (dashed line).

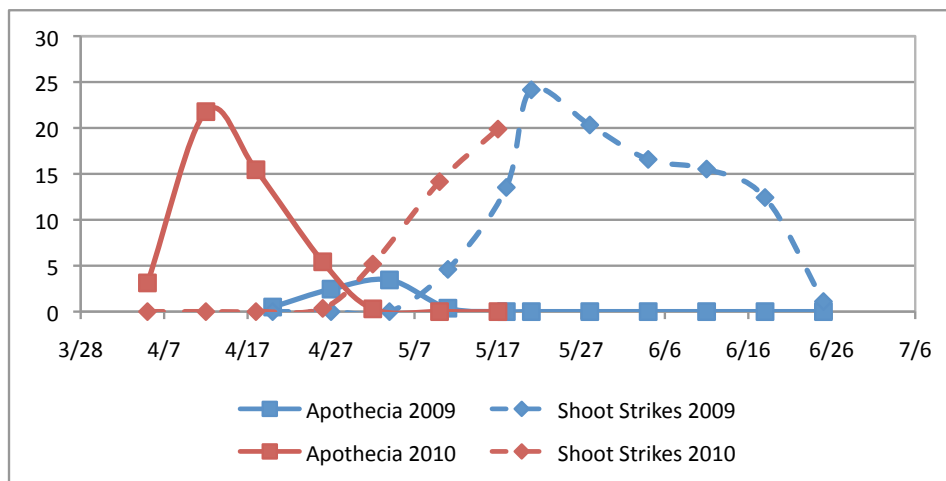


Table 1. Disease scouting results.					
Farm	Date	% Germinated mummies**	Avg number of apothecia on the ground*	Max apothecia cup diameter (mm)	Avg number of shoot strikes per bush*
VAN BUREN COUNTY					
Covert	5/10	0	0	n/a	1.0
	5/17	0	0	n/a	1.1
Grand Junction	5/10	0	0	n/a	13.8
	5/17	0	0	n/a	27.2
OTTAWA COUNTY					
Holland	5/10	0	0	n/a	2.3
	5/17	0	0	n/a	1.6
West Olive	5/10	0	0	n/a	39.5
	5/17	0	0	n/a	49.6

*Average of 10 bushes; **Number of germinated mummies divided by the number of total mummies.

Anthracnose fruit rot prediction model

A disease prediction model for anthracnose fruit rot infection will be available soon on the Enviroweather website (<http://www.enviroweather.msu.edu/homeMap.php>). The model was developed at Michigan State University and is based on leaf wetness and temperature requirements for fruit infection. Wetting of plant tissues can be caused by rain, dew or overhead irrigation (if you use overhead irrigation, you need to take that into account, because the model does not include wetness due to overhead irrigation). The model is currently under field validation and should be considered as providing an indication of relative infection risk. It will determine the risk of infection using weather data

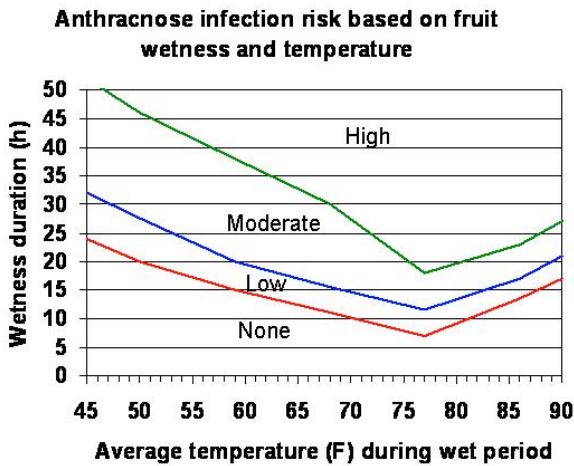
collected by weather stations in the Michigan Automated Weather Network (<http://www.agweather.geo.msu.edu/mawn/>) which is linked to Enviroweather. Weather stations are present throughout much of Michigan's main blueberry-growing area, including Grand Junction, South Haven, Fennville, West Olive, Watervliet, and Benton Harbor. Environmental conditions are recorded every 5 minutes and are updated on the website every 30 minutes. Recorded weather data can be freely accessed online by clicking on the appropriate weather station location. If your farm is located between weather station locations, it is advisable to look at the weather data recorded by both weather stations. Always remember that weather conditions are variable so local observations on your own farm are the most accurate, particularly where rainfall and leaf wetness are concerned.

infection period has occurred and the plants were not protected by a fungicide, a systemic fungicide (Cabrio, Abound or Pristine) should be applied within 24 hours (at most 48 hours) to stop the infection in its tracks, particularly if the indicated risk is moderate or high. On ripe fruit, the infection is already well-established after 24 hours, so if a curative spray cannot be applied immediately following the infection period, protectant sprays are a better bet. Once a fungicide has been applied, consider the plants covered for 10-14 days before you need to consult the model again to decide on your next spray.

You can also apply a protectant or systemic fungicide (Captan, Ziram, Omega, Switch, Pristine, Abound or Cabrio) before a predicted rain event based on the local weather forecast. This is a good idea if several days of rain or windy conditions are predicted, such that it will be difficult to get into the field to apply a spray within the limited time frame after an infection period has occurred. In addition, it is important to alternate different chemistries because using strobilurins repeatedly can increase the risk of fungicide resistance development.

*Annemiek Schilder
Department of Plant Pathology
Michigan State University*

How to use the anthracnose prediction model. The model can be used from bloom until harvest. Since the model will use recent weather data, it will indicate if an infection period has occurred. An infection period is recorded when minimum wetness and temperature conditions for infection have been met, which is reached at 100% progress towards infection. This will represent a "low" risk of infection. The percentage value continues to increase with prolonged wetness duration, eventually reaching "moderate" risk and "high risk". If an



None: 0% infected fruit
Low: 1 - 10% infected fruit
Moderate: 11 - 40% infected fruit
High: 41 - 100% infected fruit

Table 2. Example of output from anthracnose fruit rot infection model.

Date	Location	Wetness duration	Time span	Avg temp (F) during wet period	Precipitation (inches)	Anthracnose fruit infection risk
5/18/2010	Grand Junction	1h 50min	19:15-21:05	62.0	not measureable	none
	South Haven	5h	19:15-21:05	56.7	0.01	none
	West Olive	none	n/a	n/a	none	none
	Benton Harbor	11h 55min	18:00(5/17/10) until 5:55 (5/18/10)	55.1	0.02	none

Virus symptoms showing up

Symptoms of blueberry viruses are becoming apparent and will continue to increase. May and June are good times to scout for virus symptoms. Blueberry shoestring virus can be identified by the red streaks or blotches on the stems, red-discolored and malformed leaves, and pink discoloration on flowers (keeping in mind that some varieties naturally have pink flowers). Generally, all symptoms are present on bushes. Tomato or tobacco ringspot viruses can be identified by necrotic spotting and curling/twisting of leaves and general unthrifty growth and decline of bushes.

Some bushes that were still alive last year may have died. In addition, symptoms of blueberry bronze leaf curl disease are showing up again – the cause of this disease is still under investigation but is thought to be viral in origin.

Bloom is also the time when blueberry shock and blueberry scorch viruses manifest themselves by sudden blighting of flowers and young leaves on one or more canes per bush. The presence of blighted flowers on one or a few bushes surrounded by healthy bushes is characteristic of virus diseases. If all or most bushes are showing symptoms, it is more likely to be a fungal or bacterial disease or weather-

related problem. If you have concerns about possible virus infections in your blueberries, contact Jerri Gillett (517-355-7539) at Michigan State University to arrange for a free diagnostic test.

Annemiek Schilder

*Department of Plant Pathology
Michigan State University*

MDA Statewide virus survey

This spring the Michigan Department of Agriculture (MDA) will conduct a statewide survey of Michigan blueberry fields to determine if blueberry scorch and shock viruses are present in commercial blueberry fields and to mitigate them where practical and feasible. Blueberry scorch and shock have the potential to cause significant losses to the Michigan blueberry industry if they are allowed to become established in the state. Both viruses were detected in Michigan in 2009, but due to swift action by affected growers, the viruses appear to have been eliminated. However, further monitoring is needed to be sure.

In an effort to protect this important industry, MDA requested and was awarded funding under the 2008 Farm Bill to conduct the statewide blueberry virus survey. The survey will be conducted over a 6-week period from May 17 to June 25, 2010, during which nearly 35,000 flower, shoot, and foliage samples will be collected from commercial blueberry fields and tested

at MDA's plant pathology laboratory, at no cost to the growers. This survey is separate from the virus diagnostic survey that the Small Fruit Pathology program at Michigan State University is conducting for all blueberry viruses. The latter is meant to provide free diagnostic support for blueberry growers in the state. For more information on general blueberry virus diagnosis, contact Jerri Gillett (517-355-7539).

For the statewide blueberry virus survey, it is critical that as many fields as possible be sampled to assure that blueberry scorch and shock viruses have truly been eradicated from the state.

To participate in the survey, please contact the MDA as follows:

Growers in Berrien, Van Buren and Allegan counties - contact Crew Leader Becky Madsen at (517) 599-6716 or Regional Supervisor Mike Hansen at (269) 429-0669.

Growers in Ottawa and Muskegon counties - contact Regional Supervisor Jeff Zimmer at (616) 866-1486.

Growers in other parts of the state - contact Abigail Eaton at (517) 241-3933.

As the leading blueberry-producing state in the country, we can not afford to allow these damaging viruses to gain a foothold in Michigan. Do your part – participate in the statewide blueberry virus survey!

Insect activity held in check by lower temps last week

Cherry fruitworm moths were caught at the Covert, Holland and West Olive farms, but no cranberry fruitworm moths were caught at the farms we scouted. We expect the flight for these pests to increase over the next week, and with the warm weather and resulting degree day accumulations we expect egg-laying by cherry fruitworm to begin this week at the farms we monitor in Van Buren County. Cherry fruitworm egg-laying is likely to begin late this week or early next week at the farms we scout in Ottawa County. We are still waiting for consistent captures of cranberry fruitworm moths to set biofix and predict the start of egg-laying for this pest. Given the current state of bloom, it seems that the timing of fruitworm activity is running a little behind the rapid advance of the crop from this season's warm weather. Still, checking your own traps regularly will provide the best information on activity of these pests in your fields. We did not see the contaminant moth, *Pseudoxentera vaccinii* in cherry fruitworm traps this week, and we expect the flight of this insect has ended.

Growers and scouts should check traps for cherry fruitworm and cranberry fruitworm twice weekly until moths are caught consistently. This will identify fields with pressure from fruitworm pests, and will enable identification of

Table 3. Insect scouting results.

Farm	Date	CFW moths per trap	CBFW moths per trap	BBA % infested shoots	BBM adults per trap	JB per 20 bushes
VAN BUREN COUNTY						
Covert	5/7	3	1	0	--	--
	5/17	1	0	0	--	--
Grand Junction	5/7	0	0	0	--	--
	5/17	0	0	0	--	--
OTTAWA COUNTY						
Holland	5/7	0	0	0	--	--
	5/17	1	0	0	--	--
West Olive	5/7	1	0	0	--	--
	5/17	1	0	10	--	--

the start (biofix) of the [cranberry fruitworm model on \[enviroweather.msu.edu\]\(http://enviroweather.msu.edu\)](http://cranberryfruitwormmodel.onenviroweather.msu.edu). This model can be used for predicting optimal spray application dates for controlling cranberry fruitworm.

Leafroller larvae were not observed at any of the farms we visited, but activity of leafroller larvae has been seen on other farms with feeding on flower and leaf clusters. Small tussock moth larvae are still active and feeding was observed at the West Olive farm. The European snout beetle (Fig. 3) was observed at the Grand Junction farm. This insect can feed on blueberry flowers, but it is not considered to be a pest of economic significance. Large brown and hairy Eastern tent caterpillar larvae can be found in fields adjacent to woods. Temperatures are expected to get warmer this week and insect activity should increase. Growers and scouts

should continue to check fields for feeding damage by [leafroller](#), [tussock moth](#), and eastern tent caterpillars during the next week. These pests are generally more common in areas bordering woods. We are receiving reports of scale outbreaks at some farms in Ottawa county, so scale should also be included in scouting this week. See the more detailed article and photos in the [May 11 newsletter](#). Tiny gall wasps were seen emerging from galls this week (Fig. 4). Growers and scouts should check galls for wasps or small round emergence holes in fields with a history of damage from this pest.

Aphids were seen at the West Olive farm, and we are still getting reports of aphid activity at other farms in southwest Michigan. Growers and scouts should be checking bushes for aphid colonies, particularly on farms where there are varieties that are

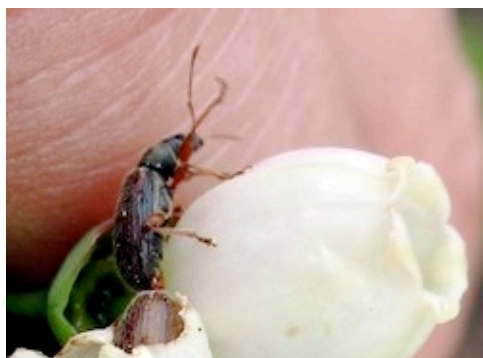


Fig 3. European Snout Beetle can be found feeding in flower clusters, but this pest rarely causes serious damage; Photo: K. Mason.



Fig 4. Gall wasps emerging from a blueberry gall; Photo: K. Mason.



Fig 5. Aphid colony on the underside of a leaf; Photo: K. Mason.

susceptible to shoestring virus.

To scout for aphids, examine the underside of leaves on two young shoots near the crown on each of 10 bushes and record the number of shoots where aphids are found (Fig. 5). Also record the number of shoots with parasitized aphids. Be sure to sample weekly from as wide an area in the field as possible to have a better chance of detecting whether aphids are present. Although natural enemies (parasitic wasps, lady beetles, lacewings, hover fly larvae) can keep this pest in check, aphids can transmit blueberry shoestring virus, so growers may want to consider using an insecticide to control aphids if there are blueberry varieties that are susceptible to shoestring on the farm.

Keith Mason & Rufus Isaacs
Department of Entomology
Michigan State University

Keep a lookout in blueberries for fruitworms and scale

This time of the season we start to see fruitworm moths in traps, and cherry fruitworm flight has started at a low level across southern Michigan this week. A few cranberry fruitworms have

been trapped at very high pressure fields, but generally there has been little catch of this pest. The warm weather later this week and into next week is expected to bring fruitworm moth flight along, with cherry fruitworm egg-laying expected to start this week in Van Buren and Ottawa county next week. These are general expectations based on degree days and trapping, but the best information most relevant to your farm will only come from monitoring on your own fields. For cranberry fruitworm which is usually the main insect growers are concerned about around bloom-time, consistent flight has not started, but the warm weather over the next week should bring along their development. Keep checking traps regularly to identify the biofix for this pest. For more detail of the options for fruitworm control please check out the article on cranberry fruitworm management in the [May 4 newsletter](#).

Lecanium scale has been found in blueberry farms in west Michigan over the past few weeks. This pest is in high densities in some fields, and so scouts should be looking for this pest in fields, especially near to woods where populations were high last year. This scale is different than the species that gets on blueberry fruit at harvest (Putnam scale), but the high populations are a cause for concern due to their

removal of sap from shoots and the honeydew that is deposited on foliage under the scale colonies. The Lecanium scales are mostly on last year's shoots and are 2-3 mm diameter oval bumps that contain the scale insect. Growers that find scale in their fields should wait until after bloom and select a fruitworm control product that also has activity on scale. See the article in the [May 11 newsletter](#) for more information on this pest and for management options.

Rufus Isaacs
Department of Entomology
Michigan State University

C A L E N D A R

2010 grower meetings

JUNE 10 6:00PM
Pre-harvest meeting - Van Buren County
Location: to be determined
Information: Mark Longstroth, 269-330-2790

JUNE 17 6:00PM
Pre-harvest meeting - Ottawa County
Location: Carini Farms
15039 Port Sheldon Rd., West Olive
Information: Carlos Garcia, 269-260-0671

JUNE 24 6:00PM
Weed Control Demo - Allegan County
Location: Getzoff Farm
7093 116th St., Fennville
Information: Paul Jenkins, 517-648-5099



Funding for this newsletter is provided by grants from the USDA, EPA and Project GREEN.

MSU is an affirmative-action, equal-opportunity employer. Michigan State University Extension programs and materials are open to all without regard to race, color, national origin, gender, gender identity, religion, age, height, weight, disability, political beliefs, sexual orientation, marital status, family status or veteran status. Issued in furtherance of MSU Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Thomas G. Coon, Director, MSU Extension, East Lansing, MI 48824. This information is for educational purposes only. Reference to commercial products or trade names does not imply endorsement by MSU Extension or bias against those not mentioned.