

Michigan Blueberry Facts

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CROP STAGES

Keith Mason

Department of Entomology, Michigan State University

In Van Buren County, Blueray and Bluecrop in Grand Junction are between first and second harvest, and Jersey in Covert is within 7 to 10 days of first harvest. In Ottawa County, Bluecrop in West Olive is in the middle of first harvest and Blueray in Holland, and Rubel in West Olive are within 7 to 10 days of first harvest.



Rubel ready for harvest in West Olive (left), and Jersey 7 to 10 days until harvest in Covert (right).

WEATHER NOTES

Mark Longstroth

Michigan State University Extension

Complete weather data for your area can be found at enviroweather.msu.edu.

Weather over the last two weeks has been seasonal with highs in the 80s and lows in the 60s. Several storms have left significant rainfall. Precipitation totals for the last few weeks are 1.5 to 3 inches. Soils are moist. The precipitation total for the Fennville station (since January 1) is 24 inches compared to 16 inches at the SW Station in Benton Harbor.

DEGREE DAYS

GDD (from March 1)	Base 42	Base 50
	Van Buren County	
7-14-08	2001	1290
7-21-08	2232	1465
Projected for 7-28-08	2420	1597
	Ottawa County	
7-14-08	1801	1118
7-21-08	2022	1283
Projected for 7-28-08	2217	1422

INSECT UPDATE

Keith Mason and Rufus Isaacs

Department of Entomology, Michigan State University

Cherry fruitworm and cranberry fruitworm flight is essentially over, no fruitworm moths were trapped at any of the four farms scouted. No fruitworm eggs were found during scouting, and fruitworm damage is becoming harder to find now that harvest has begun. Single berry damage (indicative of cherry fruitworm feeding or early cranberry fruitworm feeding) was observed only at the Holland farm, and cluster damage (characteristic of advanced cranberry fruitworm feeding) was not found. We expect fruitworm damage to decrease as infested berries drop from the bush or are removed during harvest.

No blueberry maggot flies were caught at any of the four commercial farms, but we have seen higher catches this week at the Trevor Nichols Research Station in an untreated planting. Growers and scouts should continue checking blueberry maggot traps at least once per week from now through harvest. [See the June 24th issue of the Michigan Blueberry IPM Update for more information on Blueberry maggot fly.](#)

All four farms were scouted for Japanese adults, and low numbers of beetles were observed in Holland, Grand Junction and Covert. Japanese beetle feeding on leaves and fruit was seen at all of these farms (see photos to the right. Maintain regular scouting for these beetles through harvest. [See the July 1st issue of the Michigan Blueberry IPM Update for more information including scouting methods for Japanese beetles.](#)



Aphids were found at all farms except in Covert, and mid-sized colonies (5 to 20 individuals) were seen. Parasitized aphids were seen In West Olive and Grand Junction. Continue scouting for aphids, particularly on farms with varieties that are susceptible to shoestring virus.

A leafroller larva was observed at the Holland farm, and growers and scouts should still be on the lookout for these pests. We are monitoring Obliquebanded leafroller (OBLR) with pheromone traps and we will report on the development of the late season generation of this pest. We have been catching low numbers of this moth in Covert, Holland and West Olive over the past two weeks.

Tussock moth larvae were not observed, but fields with a history of this pest should be monitored through harvest.

Van Buren County							
Farm	Date	CBFW moths per trap	CFW moths per trap	BBA % infested shoots	BBM adults per trap	JB per 20 bushes	OBLR moths per trap
Covert	7-7	1	0	0%	0	4	set
	7-14	1	0	0%	0	6	1
	7-21	0	0	0%	0	3	1
Grand Junction	7-7	11	0	50%	0	7	set
	7-14	1	0	20%	0	10	0
	7-21	0	0	25%	0	1	0
Ottawa County							
Farm	Date	CBFW moths per trap	CFW moths per trap	BBA % infested shoots	BBM adults per trap	JB per 20 bushes	OBLR moths per trap
Holland	7-7	4	0	25%	0	0	set
	7-14	0	0	0%	0	0	1
	7-21	0	0	15%	0	5	1
West Olive	7-7	0	0	40%	0	0	set
	7-14	0	0	35%	0	0	4
	7-21	0	0	30%	0	0	3

DISEASE UPDATE

Timothy Miles and Annemiek Schilder

Department of Plant Pathology, Michigan State University

At this point, all of our scouted plots are 75-100% ripe and the first harvest has taken place in Grand Junction (cv. Bluejay). Mummy berry shoot strike symptoms are no longer visible within the field. Twig blight symptoms have also decreased dramatically in many of our scouted plots. Additionally, Anthracnose or Alternaria fruit rot have not yet been seen in the field. Furthermore, mummy berry infected fruit were seen in all scouted plots.

Mummy Berry Fruit Infections

Mummy berry is one of the most economically important blueberry diseases in Michigan as there is usually a zero tolerance for mummified fruit in processed berries. In earlier issues, we have extensively covered the life cycle, symptoms, and effective management strategies for this disease. This week, we will focus on symptoms and scouting for the fruit infection stage of mummy berry. The first external symptoms of fruit infection are a tan-brown to pink discoloration of fruit. In the later stages, the fruit becomes shriveled with shallow ridges and may fall to the ground (Figure 1 and 2). When scouting for mummy berries, it is extremely important to not only scout on the bush but also on the ground as mummies tend to detach from the cluster prematurely. They are easier to see when the ground is clear of weeds and debris. The amount and location of the mummy berries gives us an insight into where the inoculum will be present next year and also into the efficacy of previous fungicide applications. In 2007 newly mummified fruits on a single bush were strongly correlated with the incidence of apothecia and shoot strikes on that same bush, illustrating that an earlier stage of the disease might be useful at predicting a later stage of the disease.



Figure 1. New mummies seen on a fruit cluster, turning the fruit tan and sometimes pink giving an overall “fleshy” appearance (observed on 7-11-08).



Figure 2. In a separate plot this year our lab has recorded infected fruits as high as 160 mummy berries per bush (observed on 7-11-08).

Van Buren County					
Farm	Date	Average number of mummy berry shoot strikes*	Average number of blighted twigs per bush**	Blueberry Shoestring Virus***	Average number of mummy berry infected fruit*
Covert	7-4	0.0	9.6	0	Present
	7-11	-	5.5	0	0.0
	7-17	-	-	0	0.4
Grand Junction	7-4	0.0	2.5	0	Present
	7-11	-	0.9	0	16.7
	7-17	-	-	0	13.0
Ottawa County					
Holland	7-4	0.0	2.7	3/50	Present
	7-11	-	1.3	3/50	2.4
	7-17	-	-	3/50	2.8
West Olive	7-4	0.0	2.1	0	Present
	7-11	-	1.4	0	3.5
	7-17	-	-	0	4.5

*Average number was calculated for ten bushes.

**Blighted twigs may be caused by various fungi, incl. *Phomopsis vaccinii*, *Colletotrichum acutatum* and *Botrytis cinerea*.

***Number of bushes showing blueberry shoestring virus symptoms (50 bushes were scouted)

PEST OF THE WEEK – BLUEBERRY GALL MIDGE

Annemiek Schilder

Department of Plant Pathology, Michigan State University

The blueberry gall midge, *Dasineura oxycoccana* (Johnson) (Diptera: Cecidomyiidae), is a pest of blueberries across the United States and Canada. This season, we have seen higher levels of damage from this pest than in recent seasons. Midge larvae have been reported to damage fruit buds and they can also injure vegetative growth. The vegetative growth seems to be the most commonly-injured tissues seen this year in Michigan fields, and this is most easily seen in the form of side branching by stems where the growing tip was killed back in late May and June. Distorted and blackened shoot tips are also a distinctive feature of the damage caused by gall midge.



Shoot tips killed by gall midge feeding cause side branching of stems

Adult flies of the blueberry gall midge overwinter in the soil and emerge in spring to mate and lay eggs. They are fragile and approximately 2 to 3 mm long. Mature larvae are about 1 mm long and 0.3 mm wide, legless, and yellow to red in color. The biology of the blueberry midge is poorly known in Michigan, but from the timing of initial damage, emergence seems to start in May which coincides with bloom in many fields. Adults are short-lived and probably last only from one to a few days. Under Michigan conditions we expect more than one generation through the summer, making control of this pest challenging.

Information for this article was gathered from observations in Michigan and from University of Florida Fact Sheet, EENY-136. All photographs were taken in Michigan blueberry fields.



Typical blackened tip of a vegetative shoot infested by gall midge. Note the characteristic curled young leaves.



Gall midge larvae (small white specks) exposed after opening a damaged shoot tip.

MSU BLUEBERRY TEAM PROFILE

Rufus Isaacs

Associate Professor and Small Fruit Extension Specialist MSU Department of Entomology

As the MSU Blueberry Entomologist, I develop science-based information on management of insects of economic significance to blueberry production (pests, natural enemies, and pollinators). The Blueberry Entomology Program conducts research projects along a range of scales, from studies in the laboratory, to those in small plots at research stations, and on commercial farms. Having a research and extension appointment at Michigan State University also allows me the opportunity to deliver the results of our studies to stakeholders and get feedback that helps drive the next set of experiments. Through training of postdoctoral scientists, graduate students, and undergraduates in research and extension methods, our work helps solve grower's pest and pollination challenges while also preparing the next generation for future research, extension, and teaching roles. Former lab members are currently employed at Michigan State, Iowa State, Rutgers, and Oregon State universities, at the Environmental Protection Agency, and at Driscoll's Berries.



Our blueberry research and extension projects have four main themes, each of which has one or more current projects running, listed below.

Pest and natural enemy biology. Timing of cherry and cranberry fruitworm life cycle, blueberry pest phenology models and guidelines, effect of cultural methods on predation of key insect pests, conservation of natural enemies.

Pest control. Testing conventional, reduced-risk, and organic insecticides for control of fruitworms, blueberry maggot, Japanese beetle, and aphids, including on-farm evaluations. Life-stage susceptibility of key pests to new insecticides. Optimizing IPM systems for blueberry insect management.

Pollination. Evaluation of managed bumblebees, importance of native bees, safety of pesticides applied during bloom, and conservation of pollinators.

Extension. Delivery of information regarding insect management in blueberries to a diverse audience through print media, websites, and meetings. Continue to develop the www.blueberries.msu.edu website, the MSU Blueberry IPM Update, and help organize IPM workshops. Deliver information about blueberry pollinators and pollination.

As part of this overview, Paul Jenkins asked for some background on my history, so here goes.... I started life in London, England but grew up in St. Ives in the southwest of the country, a region with sandy beaches and palm trees that draws tourists each summer. After high school I studied Applied Biology at Imperial College for my undergraduate BSc. degree, and after short stints working for Texaco, ICI's Biological Division, and American Cyanamid's Herbicide Development Program, I returned to the same university for PhD studies. These were based at the University of London's Silwood Park and also at the Rothamsted Experiment Station where I focused on the chemical ecology of aphids. After graduation, the search for work took me from England to the desert southwest and to the University of Arizona in Tucson where I spent a few years studying whitefly migration behavior and ecology. As that position was ending, an opportunity to study pheromone mating disruption of apple pests at MSU came along, and I moved to Michigan in 1997. Two years later, I started working as the Small Fruit Entomologist and have been here in this position ever since.

MSU has a strong team of research and extension personnel working on issues related to the blueberry industry, and I value the close working relationship we have with growers, processors, and the industry

leadership. This is key to keeping the Michigan blueberry industry at the cutting edge of management practices, including how crop pollination and pest management are achieved. We strive to keep our focus on issues of economic importance to the Michigan blueberry industry, so if you have ideas or questions about any insect-related issues affecting blueberry, please don't hesitate to contact me at isaacsr@msu.edu.

MEETINGS AND ANNOUNCEMENTS

The next Blueberry IPM Update will be published on August 5.

MSU BLUEBERRY TEAM

Eric Hanson, Horticulture
Annemiek Schilder, Plant Pathology
Rufus Isaacs, Entomology
John Wise, Trevor Nichols Research Complex
Matt Grieshop, Organic Pest Management
Paul Jenkins, Small Fruit Education Coordinator
Mark Longstroth, Van Buren County Extension
Carlos Garcia, Ottawa County Extension
Bob Tritten, SE Michigan Extension

IN UPCOMING ISSUES...

Oriental beetle
Post harvest issues
Blueberry tip borer
Late-season diseases



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