



Michigan Blueberry IPM Newsletter

MICHIGAN STATE UNIVERSITY EXTENSION

CONTENTS

Page

- 1 Blueberry news you can use...
Growing degree days
- 2 Insect management
- 3 Using the MSU CBFW degree day model
- 4 Disease management



Van Buren County

Jersey in Covert is at bud break; Blueray and Bluecrop in Grand Junction are at bud break and leaves are unfolding.

Ottawa County

Blueray in Holland and Rubel and Bluecrop in West Olive are at early bud break.

BLUEBERRY NEWS YOU CAN USE...

Disease management. Continue to scout for Mummy berry and consider fungicide treatment if leaf buds are at green tip and apothecia are found.

Insect management. Hang cherry fruitworm traps ASAP; cherry fruitworm flight should begin soon. Keep checking for early season pests: leafrollers, spanworm, cutworm, and flower beetles.

The Michigan Blueberry IPM Newsletter will be published on a weekly basis from now through the end of the season. Send all inquiries to Paul Jenkins: jenki132@msu.edu

MSU Blueberry IPM Meetings. Note date change for May!

Wednesday, May 13 (6–8PM), Cornerstone Ag, 01240 57th St., Grand Junction, MI.

Thursday, June 11 (6–8PM), Carini Farms, 15039 Port Sheldon Rd., West Olive, MI.

GROWING DEGREE DAYS

From March 1

	2009		Last Year	
	Base 42	Base 50	Base 42	Base 50
Grand Junction, MI				
4/20	236	95	215	99
4/27	354	173	353	188
Projected for 5/4	423	199	429	230
West Olive, MI				
4/20	112	32	172	73
4/27	255	110	286	141
Projected for 5/4	330	140	344	169

See [MSU Enviroweather website](http://MSU_Enviroweather_website) for more information

INSECT MANAGEMENT

Rufus Isaacs & Keith Mason, Department of Entomology, Michigan State University

Some spanworm feeding was observed at the West Olive farm (see Fig. 1), but in general, insect activity has been low at all four farms. Growers and scouts should keep looking for [leafroller](#), [climbing cutworm](#) or [spanworm](#) feeding. The flower feeding beetle, *Hoplia trifasciatus* has not been seen yet but it may be found at sandy sites if drier and warm weather occurs in the next week. Read more about this pest in this [past issue of the Michigan Blueberry IPM Update](#). A working threshold for control of these early season pests at this point in the season is 2% of the buds removed. Count 10 flower buds randomly selected from 10 bushes spread through the field to pick up any hot-spots.



Fig 1. Spanworm feeding damage.

No cherry fruitworm moths have been caught yet, but we expect the flight of this pest to begin in the next week in southern counties (Berrien and Van Buren). Growers and scouts should **set traps for cherry fruitworm as soon as possible** and cranberry fruitworm traps should be set in the next week to 10 days. Cherry fruitworm traps indicate the presence and relative abundance of this pest in fields, and it is usually active a week or so before cranberry fruitworm. To use the cranberry fruitworm degree day model, check traps twice weekly from early bloom onwards until the moths start being caught. You can then set the biofix to start counting growing degree

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	4/20	0	--	--	--	--
	4/27	0	--	--	--	--
Grand Junction	4/20	0	--	--	--	--
	4/27	0	--	--	--	--
Ottawa County						
Holland	4/20	0	--	--	--	--
	4/27	0	--	--	--	--
West Olive	4/20	0	--	--	--	--
	4/27	0	--	--	--	--

CFW=cherry fruit worm; CBFW=cranberry fruit worm; BBA=blueberry aphid; BBM=blueberry maggot; JB=Japanese beetle

days, which can be used to identify when egg laying by cranberry fruitworm is predicted to start. See the article below for a how-to guide on using the cranberry fruitworm degree day model.



Fig 2. Cherry fruit worm (left) and the 'contaminant moth' found in cherry fruitworm traps (right).

We are still catching a "contaminant" moth in cherry fruitworm traps. This moth is **NOT** cherry fruitworm. The contaminant moth, *Pseudexetra vaccinii* reportedly may feed on blueberry, but we have never found it to be a pest of any economic consequence in Michigan. The contaminant moth is $\sim\frac{1}{2}$ inch long which is much larger than cherry fruitworm which is $\sim\frac{1}{4}$ inch long. Cherry fruitworm also has an iridescent banding pattern while the contaminant moth has darker markings on a light gray body. See Fig. 2 to help with identification.

Using MSU's cranberry fruitworm degree day model

Rufus Isaacs

MSU Department of Entomology

&

Carlos Garcia-Salazar

MSU Extension

Cranberry fruitworm is an early season insect pest of blueberry with one generation per year in Michigan. Moths emerge during bloom, mate, and the female moths lay eggs on berries as the calyx cup becomes visible when the petals fall off. The activity of this insect during bloom means that growers are restricted in their control options because of the need to protect bees. In fields with low pest pressure, growers may be able to achieve sufficient control by relying only on post-bloom insecticides. However, in fields with high fruitworm pressure, use of a bee-safe insect growth regulator such as Intrepid or a *Bacillus thuringiensis* (B.t.) insecticide such as Dipel or Javelin applied during bloom can help reduce infestation by this pest. Because these bee-safe insecticides work best when timed for egg laying, i.e. before egg hatch, it is important to know when this pest starts laying eggs. It is particularly important to avoid being too late because once the larvae are in the fruit they are much harder to control.

To help predict when cranberry fruitworm egg laying starts, we have developed a degree day model for this pest in Michigan blueberry. This requires that monitoring traps are placed in the field and checked regularly, along with tracking of degree days that can be provided by the MSU Enviroweather website.

Monitoring to identify the biofix. In fields with a history of fruitworm infestation, deploy a large plastic delta trap baited with a pheromone lure. Traps should be placed in blueberry bushes near woodlots and previous hot spots, in the upper fruiting zone, and placed just before bloom. Moth flight starts during bloom, so put traps up in early bloom to ensure you don't miss the start of the flight. Keep records of the date and the number of new moths trapped, clearing the traps each time you check them. In large farms, a separate trap per field is recommended to detect differences in timing across the farm.

The first consistent appearance of moths is used to set the biofix, or start of the model, and this usually starts at about 350 GDD (base 50°F) after March 1. To set biofix, check traps twice a week during bloom and keep careful records of cranberry fruitworm captures. Once you trap moths on two consecutive checks, the biofix is set as the date before this sustained catch, which is the "0" catch before.

Tracking degree days after biofix. Once the biofix is set, keep track of degree days using base 50 °F. The Enviroweather system can automatically track the predicted start of egg laying and its progression using weather data from MSU's weather station network. Go to www.enviroweather.msu.edu and click on the weather station nearest to your farm. Next, click on the Fruit pages and then scroll down to Cranberry Fruitworm in the small fruit models section. This will bring up a page that provides the percent of cranberry fruitworm egg laying predicted to have occurred on today's date. It also includes a table with dates along the left side and the date of biofix along the top. Look along the top of the table to select the date of biofix you set using moth catches in the traps. Then look down the column for the date when the accumulated degree days exceed 85. The table cells will turn red when this point is reached and they stay red for 400 more GDD to indicate the period of fruitworm egg laying. The image below shows what the model showed during blueberry bloom in 2008. Note the red

sections that indicate the predicted start of egg laying by cranberry fruitworm. This illustrates how the timing of egg laying would be predicted to be later when the biofix is set later. In 2009, once the degree day accumulation progresses a little further, the table will be shown on the cranberry fruitworm model page.

Improved control of cranberry fruitworm using the model to time the first spray. Recent studies at a blueberry planting with high fruitworm pressure at the Trevor Nichols Research Complex in Fennville have shown that a first application of Intrepid (12 oz/ac) close to 85 GDD after biofix (applied during bloom), followed by a reapplication two weeks later, provided equivalent control to Guthion applied twice after bloom. Delayed applications were less effective, showing the importance of getting spray timing correct. Similar results have been found in trials at commercial blueberry farms in recent years.

DISEASE MANAGEMENT

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

Mummy berry – apothecia are everywhere

The number of apothecia increased significantly this week, with more found in the wetter Grand Junction site (6.3 apothecia per bush). Warmer temperatures last week caused a majority of apothecia to mature this week, with cup diameters ranging from 1/8 to 1/4 of an inch (~3–7 mm) in most scouted plots (Fig. 3). At our Nunica location some apothecia had stipes (fungal stems) as long as 1 inch above the soil line (25.4 mm) (Fig. 4). The mushrooms start shooting spores when the cup is about 1/10 of an inch (~2–3 mm) in diameter. The spores get shot out when the mushrooms are disturbed or the air pressure changes, appearing like a little wisp of smoke. Over a



Fig 3. Mummy berry apothecia of various sizes seen in West Olive on 4-27-09.

million spores can be released per day by a single mushroom. These spores get picked up by the wind and carried to susceptible green tissue and cause infection. Prolonged cool and wet weather is conducive to infection. The optimum temperature for infection is 57°F (~14°C). Growers should continue to scout for mummy berry and consider fungicide treatment if leaf buds are at green tip and apothecia are found.

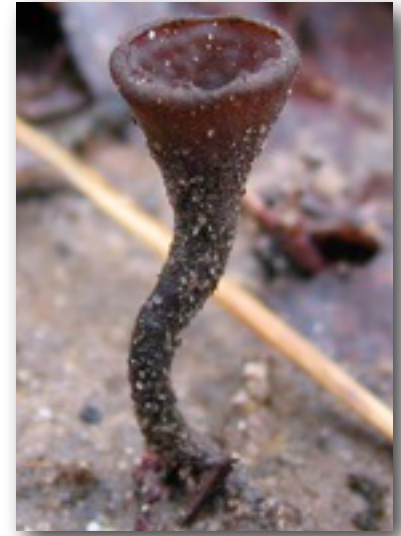


Fig 4. Mummy berry apothecium with long stalk (1 inch) seen near Nunica.

For more information about mummy berry, check out the new [Mummy Berry Fact Sheet](#). Infection is likely when young shoots remain wet for prolonged periods or when frosts occur which create microscopic wounds, allowing the fungus easier entry into the tissue. We have found that light frosts increase susceptibility to shoot strike infection. **IF** a frost occurs **AND** your last fungicide spray was more than 5 days ago, reapply a fungicide such as Indar or Orbit within 24 hours (preferably 12 hours) of the frost event. Then continue spray schedule on 10-day schedule unless another frost occurs.



Disease Scouting Results

Farm	Date	Avg number of mummies on the ground*	% Germinated mummies	Avg number of apothecia on the ground*	Max apothecia cup diameter (mm)
Van Buren County					
Covert	4/20	0.7	14.3	0.1	2
	4/27	1.2	25.0	0.3	5
Grand Junction	4/20	16.2	9.3	1.5	2
	4/27	18.7	21.4	6.3	6
Ottawa County					
Holland	4/20	1.9	15.8	0.3	2
	4/27	2.7	33.0	0.9	5
West Olive	4/20	4.0	0.3	0.1	1
	4/27	4.1	26.8	2.3	7

RISK CHART FOR MUMMY BERRY SHOOT STRIKE INFECTION

LOW RISK	MODERATE RISK	HIGH RISK
Resistant variety	Moderately susceptible variety	Highly susceptible variety
No mummies on ground	Between 1 and 5 mummies per bush	More than 5 mummies per bush
No apothecia seen	<1 apothecium per bush on average	>1 apothecia per bush on average
Apothecia killed by hard freeze or dried up/collapsed	Apothecia look unhealthy, shriveled, or slimy OR are freeze damaged	Apothecia look healthy, light brown in color and goblet- or trumpet-shaped
Apothecia tightly closed	Diameter of apothecial cup <1/8 inch	Diameter of apothecial cup >1/8 inch
No green tissue present	Very early green tip or shoots larger than 3 inches	Shoots between 0.5 and 3 inches
Dry weather	Leaves wet for less than 6 hours	Leaves wet for more than 6 hours (especially 12–24 hours)
Temperature below 35F or above 80F	Temperature between 35–45F or between 70–80F	Temperature between 50–60F
No frost	Very light frost	Light to moderate frost
Effective fungicide applied	Effective fungicide last applied between 5 and 7 days ago	No effective fungicide applied OR last fungicide applied more than 10 days ago

*Based on careful scouting of ground below at least 10 random bushes spread over 2 rows in the wettest area of the field.



Funding for this newsletter is provided by grants from the 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.

