



Michigan Blueberry IPM Newsletter

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Covert

Van Buren County

Jersey in Covert are at early green fruit stage. In Grand Junction, Blue-ray is at green fruit and Bluecrop is at late green fruit stage.



Holland

Ottawa County

Blue-ray in Holland and Rubel and Bluecrop in West Olive are at green fruit stage.

BLUEBERRY NEWS YOU CAN USE...

Disease management: Continue to monitor for twig blight symptoms. If scouting reveals a moderately high incidence, consider a fungicide application to prevent new infections.

Michigan virus survey: You can still have your blueberry plant samples tested for viruses. See page 6 for details.

Insect management: Time to put up maggot traps maintain fruitworm control and scout for aphids.

Weed Control Meeting & Demonstration:

Thursday, June 18

6:00-7:30PM

Getzoff Farm

7093 116th St.

Fennville, MI.

Hot dogs, brats, and Italian sausage for dinner!

More information: Paul Jenkins, 517-432-7751.

Special thanks to Carini Farms for hosting the IPM meeting on June 11, and to Kent Hughes (DuPont) and Claudia Arkestyn (Wilbur-Ellis) for providing the food! Our largest meeting ever with over 70 attendees!

GROWING DEGREE DAYS

From March 1

	2009		Last Year	
	Base 42	Base 50	Base 42	Base 50
Grand Junction, MI				
6/8	1106	633	1039	615
6/15	1238	718	1251	771
Projected for 6/22	1411	834	1398	863
West Olive, MI				
6/8	933	504	888	492
6/15	1075	590	1081	629
Projected for 6/22	1254	713	1221	714

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

INSECT MANAGEMENT

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

Insect activity at all four farms that we sampled has steadily increased over the last week. Aphid numbers continue to rise, cranberry fruitworm is passing peak flight in Van Buren County, and flight of this pest is reaching its peak in Ottawa County. The flight of cherry fruitworm continues to decrease at the sites we sampled. Increased egg-laying by both fruitworm species was seen during scouting this week.

Aphids were found at all four sampled farms, and the percentage of infested shoots has increased. We are finding 5 to 70% of new shoots have aphids on them. The observed aphid colonies ranged in size from 1 to 20 individuals. We also found the first parasitized aphids (mummies) of the season at the West Olive farm (Fig. 1), where mummies were present on 10% of the shoots. Continue to check for blueberry aphids and mummies on new growth.



Fig 1. A parasitized aphid (mummy) from the West Olive farm.

Cranberry fruitworm flight increased in Ottawa County over the past week, but flight appears to be starting to decline in Van Buren County. Moths were caught at the four sampled farms and the number caught ranged from 1 to 116 per trap. Cherry fruitworm moths were caught at all of the farms that were sampled except the Covert farm. The number per trap (1 to 7 moths per trap) is still very low; especially at the farms in Van Buren County. All four farms were scouted for the presence of fruitworm eggs, and the number of eggs found is increasing. Cherry fruitworm and cranberry fruitworm eggs were seen at the Covert and Grand Junction farms, and cranberry fruitworm egg-laying was detected at the Holland farm. Low levels of early fruitworm feeding damage (less than 0.1% of berries with damage) was seen at the Covert and Grand Junction farms during scouting this week, and larvae of both species have been detected in blueberries in Berrien county. The forecast is for more warm nights in the next few days so we should see cranberry fruitworm flight and egg-laying increase over the next week. Cherry fruitworm flight should continue to decrease over the next week.



Fig x. Early fruitworm feeding damage. Note the darkening of the berry.

No leafroller or spanworm feeding was observed at any of the farms this week, and tussock moth larvae were not observed. Insecticides that are applied for fruitworm management should also control leafrollers, spanworms and tussock moth larvae.

As the fruit are ready to begin coloring, growers and scouts should hang blueberry maggot traps in the next two weeks. To monitor blueberry maggot flies, hang a yellow sticky trap in a "v" shape in the upper third of the bush canopy with the yellow (sticky) side facing down. Use odor-baited traps or attach an ammonium acetate charger to the trap. Check the trap at least every week, remove and record the number of captured blueberry maggot flies. Change the charger or trap when the smell weakens, and replace traps that are covered in insects (every 3 to 4 weeks or so). For more on blueberry maggot see the [Blueberry IPM Update from June 18, 2008](#).

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	6/8	3	68	5%	--	--
	6/15	0	116	15%	--	--
Grand Junction	6/8	3	65	65%	--	--
	6/15	1	38	70%	--	--
Ottawa County						
Holland	6/8	6	51	20%	--	--
	6/15	3	92	20%	--	--
West Olive	6/8	2	4	55%	--	--
	6/15	7	2	65%	--	--

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

Post-bloom management of fruitworms in blueberry

Rufus Isaacs & John Wise, Department of Entomology, Michigan State University

With blueberry bloom finishing in much of Michigan and beekeepers removing colonies from fields, grower insecticide options for fruitworm control expand. Blueberries are at risk from infestation by cherry and cranberry fruitworm, two moth pests whose larvae have the potential to infest fruit at harvest and which can cause reduced yield if populations are high.

These two insects can be monitored with pheromone-baited traps and we have been trapping the moths over the past few weeks. Scouting of bushes this past week has revealed cranberry fruitworm eggs on clusters in SW Michigan, and the first small fruitworm larvae have been seen in Berrien county blueberries.

This emphasizes the need to maintain active management of these pests and continue monitoring in the coming weeks after bloom,

because fruitworm activity typically extends throughout June. Once bees are removed from the fields, broad spectrum insecticides become an option that growers can consider for protecting their berries from fruitworm infestation.

Guthion, Imidan, Lannate, Asana, Danitol, and Sevin are effective broad-spectrum insecticide options available to blueberry growers. With all these products, maintaining good coverage of the clusters is still important, to get residue to the parts of the berry where fruitworms eggs and hatching larvae are found such as in the calyx cup. Because the larvae move only a small distance before entering the fruit, it is important to use sufficient water and to consider spray additives (spreader-stickers) that will help spread the material across the berry surface.

EPA's phase-out of Guthion will remove this insecticide from blueberry production by the end of 2012. In 2009 there is a 2.5 pound per acre seasonal limit, with the 1.5 pound per application restriction and the 7 day re-entry and pre-harvest intervals remaining. Given the current reliance on this chemical for fruitworm control, it would be wise for growers to gain experience with alternative programs on a few fields this season, so that an effective fruitworm control program is in place when Guthion is completely restricted. There are many options for chemical control of fruitworms, including some recently-registered products such as Assail and Delegate that have performed well in our recent trials.

Research trials in Michigan have demonstrated that Intrepid applied at 12 oz/ac during this period after petal fall can also achieve control of these pests. This insecticide has the benefit of minimal negative impact on natural enemies such as parasitic wasps, ladybeetles and lacewings, plus long residual activity because of resistance to wash-off and ultraviolet breakdown. Intrepid provides increased performance over its sister-compound, Confirm.

In trials conducted at commercial blueberry farms over the past few years, a program that

used Confirm during bloom followed by Asana applied two weeks apart after bloom was as effective as a Confirm/Guthion/Guthion program against fruitworms. A program to test a program containing only new insecticides that employed Intrepid/Delegate/Assail was similarly effective. For organic growers, formulations of B.t. such as Dipel, Javelin, etc. and the spinosyn insecticide Entrust provide good control but they must be reapplied every 4-5 days and they are not known to be resistant to wash-off.

In fields with a history of high infestation by fruitworms and where traps continue to detect moths, a second post-bloom cover spray of insecticide may be required to protect fruit. The residual activity of the previous insecticide and the amount of rain since the last spray will be critical determinants of the need for reapplication. Residual control under dry conditions ranges from a few days for B.t. up to a few weeks for Guthion and Intrepid. It is important to maintain regular checking of fruitworm monitoring traps, to scout the bushes in hot-spots for eggs or larval entry-holes into berries, and to think about the amount of rain since your last spray to protect the fruit.



DISEASE MANAGEMENT

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

This week all scouted blueberry plots were at the green fruit stage. Mummy berry shoot strike symptoms have decreased in all fields (see below). Also, at three of the fields there was an increase in blueberry shoestring disease symptoms. Finally, twig blight symptoms have increased dramatically in all of our scouted plots with the highest incidence being seen at our site near Covert, MI averaging 19.1 twig blights per bush.

Twig Blight

As discussed in last weeks issue, twig blights can be caused by various fungi, including *Phomopsis vaccinii*, *Colletotrichum acutatum* and *Botrytis cinerea*. Twig blight symptoms can be readily seen as brown to black lesions on green twigs or tip dieback. Another typical symptom of twig blight can occur throughout the season as a sudden wilting of leaves and a blighting of flower and fruit clusters. At this point it may be late to prevent new infections, but if fields have a lot of twig blight, it may be useful to prevent cane infections through wounds created during mechanical harvesting with fungicides such as Cabrio or Pristine.

Mummy Berry

Scouting over the past few weeks has shown a drop in the number of shoot strike infections. Old infected tissues have dried down or fallen off (Fig. 3). Although, shoot strike infections have dramatically declined immature fruit tissue will still have latent infections until later in the season. At this point, the risk for mummy berry fruit infection is minimal since pollination has come to a close and few blossoms still remain in the field. Infected berries are difficult to distinguish from healthy berries at this point, infections can be seen by cutting open berries: infected berries show a white, star-like shape in the center in place of the seed (Fig. 4).



Fig 3. Dried down shoot strike symptoms observed near Grand Junction on 6-11-09.



Fig 4. White mycelium of *Monilinia vaccinii corymbosi* in ovaries of outwardly symptomless green berries observed near Grand Junction on 6-11-09.

Disease Scouting Results

Farm	Date	Avg number of mummy berry shoot strikes per bush*	Avg number of blighted twigs per bush**	Blueberry shoestring virus***
Van Buren County				
Covert	6/4	1.9	3.7	1/50
	6/11	0.6	19.1	7/50
Grand Junction	6/4	43.6	1.1	4/50
	6/11	42.9	2.2	10/50
Ottawa County				
Holland	6/4	2.4	0.5	6/50
	6/11	1.1	3.4	8/50
West Olive	6/4	18.4	1.1	0/50
	6/11	17.5	5.8	0/50

*Average number based on 10 bushes.
 **Blighted twigs may be caused by various fungi, including *Phomopsis vaccinii*, *Colletotrichum acutatum*, and *Botrytis cinerea*.
 ***Number of bushes showing blueberry shoestring virus symptoms (50 bushes were scouted).

Michigan Virus Survey: Send your samples in to MSU for free virus testing

Annemiek Schilder & Jerri Gillett, Department of Plant Pathology, Michigan State University

The Small Fruit Pathology lab at MSU is conducting a survey of the current blueberry virus problems in Michigan. We are offering a free test, of blueberry plants that are exhibiting unusual symptoms that might be caused by a virus. **You are invited to mail samples from your blueberry planting that you would like considered for testing.** Samples need to be shipped OVERNIGHT to MSU at the address below so they arrive fresh.

Please do the following:

1. Make sure it is a fresh sample (sampled within 24 hours of the meeting) and keep refrigerated until mailing. Place each sample in a zip-lock bag with a moist paper towel in order to keep fresh.
2. Be sure to collect symptomatic tissue. If tissue is necrotic, be sure to also include green tissue taken from near the necrotic tissue.
3. Put samples from each bush in a separate bag. You can send as many samples as you wish.
4. Put your name and contact information, as well as the variety of blueberry, on EACH sample bag. Include any other information you think is pertinent (e.g. how long the problem has been seen, etc).

We are particularly interested in:

1. Blueberry leaf mottle virus: mottled and malformed leaves
2. Stunt: severely stunted, “bushy” bushes with shortened internodes
3. Scorch and shock: sudden and complete necrosis of flowers and leaves sometimes with twig dieback of 4–10 cm; necrotic, “scorched” blossoms are often retained over the summer. These two viruses have not been found in Michigan yet but they are in the U.S.
4. Anything unusual for a healthy blueberry such as a mottle, mosaic, distortion, discoloration, necrosis, die back etc.

This is a win-win situation! You are able to get some free testing, and we are able to assess any future research needs.

Questions? Please feel free to contact:

Jerri Gillett

Email: gillett@msu.edu

Phone: 517-355-7539

Overnight shipping to:

Jerri Gillett

MSU Plant Pathology

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

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