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Michigan Blueberry IPM Newsletter

MICHIGAN STATE UNIVERSITY EXTENSION

CONTENTS

Van Buren County
Jersey in Covert is at the green fruit stage. In Grand Junction, Blueray is at green fruit and Bluecrop is at late green fruit.

Ottawa County
Blueray in Holland, and Rubel and Bluecrop in West Olive are all at green fruit. The berries in all fields that were scouted appear to be sizing up well

BLUEBERRY NEWS YOU CAN USE...

Disease management: Twig blight symptoms are apparent; if disease incidence is high consider applying a fungicide to manage new cane infections later in the season. Also, continue monitoring aphid populations to prevent the spread of the blueberry shoestring virus to new plantings.

Insect management: Growers should be setting traps for blueberry maggot in the next week.

Special thanks to Jim Getzoff for hosting our weed control meeting on June 18! We had a great turnout!

MSU virus survey. The MSU Small Fruit Pathology Lab is conducting a survey of the current state of 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. THANK YOU to all the growers who have participated so far. We are still looking at more farms. If you would like someone to visit your farm and take samples to test for viruses, please contact Jerri Gillett at gillett@msu.edu or 517-355-7539.

GROWING DEGREE DAYS

From March 1

	2009		Last Year	
	Base 42	Base 50	Base 42	Base 50
Grand Junction, MI				
6/15	1238	718	1251	771
6/22	1445	869	1398	863
Projected for 6/29	1651	1019	1584	993
West Olive, MI				
6/15	1075	590	1081	629
6/22	1275	734	1221	714
Projected for 6/29	1491	894	1401	838

See MSU Enviroweather website for more information

INSECT MANAGEMENT

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

Insect activity continues to increase at all four farms that we sampled. Aphid populations are still rising, especially at farms that were sampled in Ottawa County. Cranberry fruitworm flight is declining in Van Buren County, and flight of this pest appears to be just past its peak in Ottawa County. The flight of cherry fruitworm is nearly finished at all the sites we sampled. Fresh egglaying 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 85% of new shoots have aphids on them, and aphids were seen on new growth in the bush canopy. The observed aphid colonies ranged in size from 1 to 20 individuals. Parasitized aphids (mummies) were found on 5 % of the shoots at the West Olive farm. Continue to check for blueberry aphids and mummies on new growth.

In general, cranberry fruitworm flight decreased over the past week at sampled sites in Ottawa and Van Buren County. Moths were caught in traps at the four sampled farms and the number caught ranged from 1 to 40 per trap. Cherry fruitworm was trapped only at the Holland farm (1 moth). All four farms were scouted for the presence of fruitworm eggs, and the number of eggs found is still increasing. Cherry fruitworm and cranberry fruitworm eggs were seen at the Covert and Grand Junction farms, and cherry fruitworm egglaying was detected at the Holland and West Olive farms. 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. Most of this damage is from cherry or cranberry fruitworm larvae feeding in a single berry (Fig. 1, left). However, webbing together of multiple berries, indicating cranberry fruitworm feeding, was seen at the Covert farm (Fig. 1, right). The forecast is for more warm nights in the next few days so we should see cranberry fruitworm egglaying continue over the next week. Cherry fruitworm flight should end over the next week, but we still expect to see some cherry fruitworm egglaying this week.

Figure 1. Early fruitworm feeding in a single berry (left), multiple berry feeding indicative of cranberry fruitworm damage (right). Note webbing and frass between berries.

Follow the link to the model for fruitworm control to see cranberry fruitworm egglaying predictions based on the MSU Enviroweather weather stations in your area, and see the article in last week's newsletter about post-bloom fruitworm control.

A small number of leafroller larvae were observed at the Holland farm, and tussock moth larvae were not observed at any of the sampled farms. Insecticides that are applied for fruitworm management should also control leafrollers, spanworms and tussock moth larvae.

Growers and scouts should hang blueberry maggot traps in the next week. 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 flies. Change the charger or trap when the smell weakens, and replace traps every 3 to 4 weeks to maintain effectiveness. For more on blueberry maggot see this Blueberry IPM Update.

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	6/15	0	116	15%	--	--
	6/22	0	40	15%	set	--
Grand Junction	6/15	1	38	70%	--	--
	6/22	0	26	40%	set	--
			Ottawa County			
Holland	6/15	3	92	20%	--	--
	6/22	1	22	60%	set	--
West Olive	6/15	7	2	65%	--	--
	6/22	0	11	85%	set	--

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

Blueberry aphid management

Rufus Isaacs, Department of Entomology, Michigan State University

Blueberry aphid is the vector for blueberry shoestring virus which can cause bush decline and significant yield reductions. Because of this, aphids should be managed to minimize the spread of the virus and its transmission to susceptible plantings.

Aphid population growth – 2009
Aphids hatch from overwintering eggs during early bloom and build their colonies through asexual reproduction. Aphids are limited by nitrogen, so they tend to grow fastest on the new young growth and especially on heavily fertilized bushes.

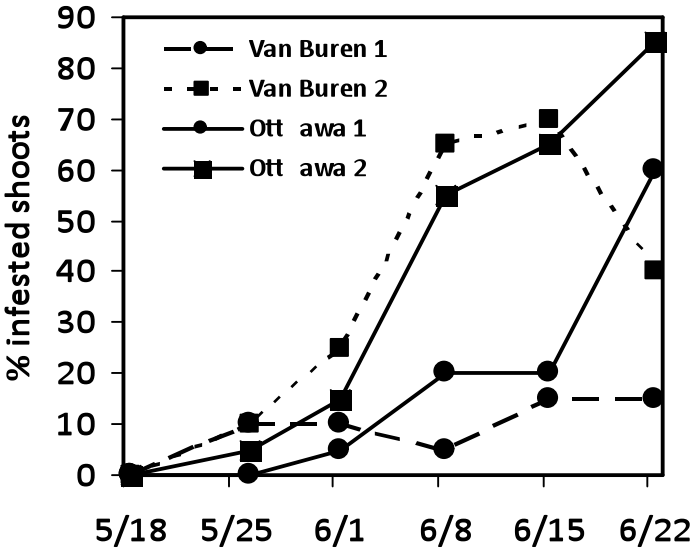
Populations can grow quickly through May and June. This trend has been seen this spring already, at two of the four fields scouted each week for the Blueberry IPM Project (see graph on right). Biological control agents such as ladybeetles, lacewings, and tiny parasitic wasps can often prevent or delay population growth, and we have seen much faster growth of aphid colonies on bushes where natural enemies were excluded. Growers should be monitoring fields for aphids and controlling this pest in fields where shoestring symptoms have been detected. The Van Buren 2 field in this graph has applied Provado this spring to control aphids in a Jersey field.

Growers should be monitoring fields for aphids and controlling this pest in fields where shoestring symptoms have been detected. The Van Buren 2 field in this graph has applied Provado this spring to control aphids in a Jersey field.

Scouting for aphids. Aphids are most often found on the undersides of young leaves at the base of plants. To scout for aphids examine two young shoots near the crown on each of 10 bushes in a field and record the number of shoots where aphids are found. Multiply by five to get the % infested shoots. It is also a good idea to record the number of shoots with parasitized aphids to get a measurement of the level of biocontrol present in your field. 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.

Varietal susceptibility to shoestring virus. Some varieties are resistant to shoestring virus. Resistant varieties include Bluecrop and Atlantic. Varieties with moderate resistance include Draper, Aurora, Liberty, Legacy, and Brigitta and aphid control should be considered in these fields, especially if there are symptoms of shoestring virus present. Aphid control is most important in fields containing varieties that are susceptible to the shoestring virus, such as Jersey, Blueray, Burlington, Earliblue, Elliott, Jersey, Rancocas, Rubel, Spartan, and Weymouth. If fields of these varieties contain symptoms of shoestring, aphid control should be a priority during the season and infected bushes showing symptoms should be tagged and removed in the late fall once aphids are not able to be spread through the field during removal.

Blueberry aphid population growth at four blueberry fields, Spring 2009



Aphicides for control of blueberry aphid
There are some excellent aphid control materials available to blueberry growers. These should be applied in June as aphid populations start to increase, with application by ground sprayers that ensure coverage of the lower part of the bush. Good coverage is essential for effective aphid control, and this will be more challenging in weedy fields. Controlling the aphids now will limit spread of the virus, thereby reducing the loss of yield or need for removing infected plants.

The most effective insecticides for aphid control are the systemic neonicotinoid insecticides Assail 30SG (2.5-5.3 oz/ac), Provado (4 oz), and Actara (3-4 oz). Foliar applications of these products will move in treated leaves, helping ensure that aphids receive a lethal dose. They also provide long-lasting control; because these insecticides are very effective and blueberry aphids do not readily form winged individuals, getting excellent control early in the season typically provides season-long control. Selection of an insecticide for aphid control may be made considering the other pests present, to get multiple insects controlled with one spray. For example, Assail and Provado are also labeled for blueberry maggot (check the rates!), and Assail is also labeled for fruitworms.

Soil-applied neonicotinoids Admire and Platinum can also be used to provide aphid control. These must be banded under the bush and watered in to allow them to get into the plant tissues.

Broad spectrum insecticides applied for control of other pests such as fruitworms can also provide some control of aphids. Lannate and the various pyrethoids registered for blueberry are active on aphids if applied to target the lower shoots. However, these can also be disruptive to natural enemies, so fields should continue to be monitored for aphids to ensure that the populations do not increase again later in the season.

Look on the undersides of leaves, especially at the base of bushes, to find aphid colonies.

Harvest-time considerations. In mechanically-harvested fields, patterns of virus infection are often along the rows, indicating spread by harvesters. Aphid control prior to harvest is particularly important in fields with a history of shoestring infection to prevent this method of spread. Washing harvesters before moving to the next field is a simple strategy to further reduce the spread of BBSSV within and between blueberry farms.

New blueberry aphid and virus publication from MSU. We have produced a new bulletin titled "Blueberry Aphid and Shoestring Virus" which is MSU Extension bulletin E3050. This is available for purchase through the MSU Publications office, and can be downloaded as a printable version for free from this webpage web2.msue.msu.edu/bulletins/Bulletin/PDF/E3050.pdf

DISEASE MANAGEMENT

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

This week all scouted plots were at the green fruit stage. Twig blight symptoms remained relatively constant in our scouted plots as compared to last week. Remember twig blights can be caused by various fungi, including Phomopsis vaccinii, Colletotrichum acutatum and Botrytis cinerea (Figure 2). Also, infected mummy berry fruits were detected in all of our scouted plots for the first time this week by cutting open immature fruit.

Fig. 2. Blighted fruit cluster caused by twig blight seen on June 18 near Holland, MI.

Blossom blights

So far this season, all four scouted fields have maintained relatively low levels of blossom blight. Old infected tissues have started to dry down and fall off. Blighted blossoms can be easily seen in the field during this time of year by scouting for dead unopened blossoms. In Michigan, there are four different pathogens capable of causing blossom blight, Phomopsis vaccinii, Monilinia vaccinii-corymbosi (mummy berry), Colletotrichum acutatum (anthracnose), and Botrytis cinerea. Blossoms blighted by Phomopsis vaccinii, can be identified by a brown discoloration of the twig that bears the flower cluster (Figures 3A, and 3B). Initially, the discoloration is ¼-½ inch long (6-13 mm), but can expand to several inches long. In mummy berry, a layer of gray powdery spores can be seen, but is generally restricted to the flower and the cluster's stem (Figure 3C). Botrytis blossom blight may occur after very wet and cool weather and is characterized by fluffy grayish brown spores all over the blossoms (Figure 3D), while anthracnose may display tiny orange spore masses. Anthracnose blossom blight does not have very diagnostic features and often looks like Phomopsis twig blight. Incubation in the laboratory is necessary to identify the causal agent.

Fig. 3. A) Blueberry flower cluster killed by Phomopsis twig blight. Note brown discoloration of the subtending twig. B) Brown, spreading lesion on the stem, typical of Phomopsis twig blight (Photo by Phillip Wharton, MSU). C) Flower cluster killed by the mummy berry fungus (Monilinia vaccinii-corymbosi) with characteristic layer of gray powdery spores on cluster stem and flower stem (Photo by Peter Oudemans, Rutgers University). D) Flower cluster killed by Botrytis cinerea showing layer of grayish brown powdery spores (Photo by Bill Cline, NC State University).

Mummy berry fruit infection

Scouting for mummy berry disease during this time of year is difficult because immature blueberries are not showing any symptoms of infection. On the other hand, infections by the mummy berry

fungus (Monilinia vaccinii-corymbosi) are advancing within developing fruits as we speak (Figure 4), and are visible as a white discoloration of the ovaries within the green berry, which is only apparent upon cutting open berries. Some infections are now starting to also become outwardly visible, as infected berries turn a tan-brown color and develop shallow ridges.

During this time of year there is very little a grower can do about mummy berry infection. In the weeks to come, infected berries will turn whitish purple, shrivel up and fall to the ground, while some will still remain in the clusters. It is the latter ones that may be a problem during harvest as they end up in the lugs. Scouting for the mummified berries will give growers useful insights into whether this year's treatments were successful and where the inoculum will be located next year for management purposes.

Fig.4. Healthy green berries (left) and white mycelium of Monilinia vaccinii corymbosi in ovaries of outwardly symptomless green blueberries (right) observed near West Olive on 6-18-09.

Disease Scouting Results

Farm	Date	Avg number of mummy berry shoot strikes per bush*	Avg number of blighted twigs per bush**	Blueberry shoestring virus***	Presence of mummy berry infected fruit****
			Van Buren County		
Covert	6/11	0.6	19.1	7/50	not present
	6/18	0.7	19.0	6/50	present
Grand	6/11	42.9	2.2	10/50	present
	6/18	31.3	3.7	9/50	present
			Ottawa County		
Holland	6/11	1.1	3.4	8/50	not present
	6/18	1.0	6.9	7/50	present
West Olive	6/11	17.5	5.8	0/50	not present
	6/18	16.7	13.4	0/50	present

*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).
****Fruit were sampled by cutting open berries and checking for the indicative white mycelial star pattern.

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