

Michigan Blueberry IPM Newsletter



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Covert



Holland

Van Buren County

Jersey in Covert are a week or more from machine harvest; in Grand Junction, Blueray is between first and second harvest and Bluecrop is between 2nd and 3rd picking.

Ottawa County

Blueray in Holland, and Rubel in West Olive are ripening with 7 or more days until first harvest, and Bluecrop in West Olive is in the middle of 1st harvest.

BLUEBERRY NEWS YOU CAN USE...

Disease management: As blueberries are still ripening, continue to scout for fruit rots such as anthracnose and Alternaria fruit rot. Additionally, because we have seen significant increases in newly infected mummy berry fruits this year, growers should continue scout for mummies to identify “hot spots” for next year’s growing season.

Insect management: Keep monitoring for Japanese beetle. Aphid numbers are decreasing.

Harvest is in full gear!

GROWING DEGREE DAYS

From March 1

		2009		Last Year	
		Base 42	Base 50	Base 42	Base 50
Grand Junction, MI					
	7/13	2008	1263	1975	1272
	7/20	2173	1373	2202	1444
	Projected for 7/27	2354	1498	2394	1579
West Olive, MI					
	7/13	1814	1106	1775	1100
	7/20	1966	1202	1991	1259
	Projected for 7/27	2152	1333	2182	1395

See [MSU Enviroweather website](#) for more information.

INSECT MANAGEMENT

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

The period for controlling fruitworm is over in Van Buren and Ottawa counties. Aphid numbers continue to decline in response to recent insecticide applications. Japanese beetles are out, and numbers are increasing in some fields. There are reports of blueberry maggot fly captures at fields across southern Michigan.

Cranberry fruitworm flight remained very low over the past week at all sampled sites. Male moths were caught at the four farms we scouted, and the number caught ranged from 1 to 8 per trap. No cherry fruitworm moths were caught at any of the four farms, and traps for this pest should be removed from fields in preparation for harvest. The period for monitoring, and controlling fruitworm with insecticides is over in Van Buren and Ottawa counties. Growers and scouts should be sure to keep records of any fruitworm activity “hotspots” to guide control plans for next season.



Fig 1. Aphid mummies on the underside of leaves.

Aphids were found at all sampled farms except Covert, and the percentage of infested shoots has either decreased or remained consistent. Generally we are finding 0 to 15% of new shoots have aphids on them, but some fields have infestations with up to 25% of shoots with aphids. Parasitized aphids (mummies) are increasing and were found on approximately 10–20% of the new shoots at all of the farms we sampled (Fig. 1). Growers and scouts should continue to monitor blueberry aphids and mummies on new growth to help assess the effectiveness of aphid management programs.

Leafroller larvae and tussock moth larvae were not observed at any of the farms.

No blueberry maggot flies were caught at the four sampled farms; however, there are reports from growers, scouts and MSU Extension that flies are being trapped in hotspots in southern Michigan. Growers should continue to monitor blueberry maggot flies throughout the harvest period. Be sure to replace traps and ammonium baits as needed. [For more on blueberry maggot, follow this link to a previous article in the Blueberry IPM Update.](#)

Japanese beetles were observed at all sampled farms except in West Olive. Generally very few beetles were seen in fields because of recent insecticide applications. Low levels of beetle feeding damage can be seen on leaves and fruit in some fields where beetle are present. Growers and scouts should continue checking fields for Japanese beetles (JB) throughout the harvest period. [For more on Japanese beetle, click on this link to see an article from an earlier edition of the 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	7/13	0	1	0%	0	2
	7/20	0	0	0%	0	1
Grand Junction	7/13	0	0	20%	0	4
	7/20	0	3	0%	0	5
Ottawa County						
Holland	7/13	0	8	5%	0	69
	7/20	0	2	5%	0	35
West Olive	7/13	0	3	30%	0	0
	7/20	0	1	10%	0	0

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



Aphid control is critical for preventing bush decline and virus spread

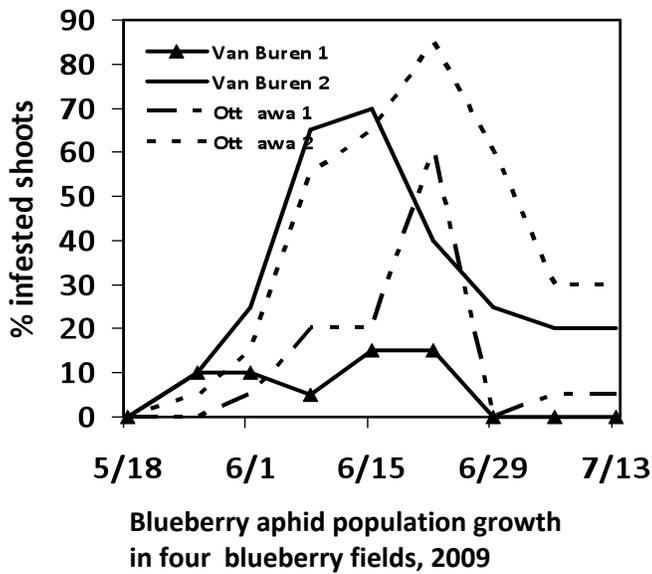
Rufus Isaacs & Keith Mason, Department of Entomology, Michigan State University
 Annemiek Schilder & Jerri Gillett, Department of Plant Pathology, Michigan State University

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 in susceptible cultivars to minimize the spread of the virus and its transmission to uninfected bushes. The recent detection of blueberry scorch virus in Michigan also highlights the need for excellent aphid control, since this virus is moved by aphids.

Aphid population growth - 2009

Aphids hatch from overwintering eggs during early bloom and build their colonies through asexual reproduction. Aphids are most 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 with declining populations in July caused by the combined effects of post-bloom insecticide programs and natural enemies. This trend has been seen this spring already in our Blueberry IPM Project (graph). The field with the best aphid control (Van Buren 1) applied Provado when aphid numbers first started increasing in the spring. Two fields have not controlled aphids, even when using a spray program for fruitworms, maggot, and beetles. This shows how important it can be to focus a treatment for aphid control to ensure these insects are effectively controlled. Biological control agents such as ladybeetles, lacewings, and tiny parasitic wasps can often prevent or delay population growth. Aphid colonies grow faster on bushes when natural enemy populations are low, so conserving natural



populations are low, so conserving natural enemies should be considered as part of an IPM strategy for aphid control.

Scouting for aphids. Blueberry aphids are most often found on the undersides of young leaves at the base of plants, but in recent weeks, scouting has detected aphids on the upper canopy of blueberry bushes. Look for a sticky coating (honeydew) on the leaves that makes them look shiny. Looking on leaves above this will often reveal aphid colonies. To scout for aphids in spring, 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. Later in the season, this sampling should be spread through the bush. 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 aphid-vectored viruses. Aphid control is most important in fields containing varieties that are susceptible to the shoestring virus, such as Jersey, Blueray, Burlington, Earliblue, Elliott, 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. When managing shoestring virus, it is important to realize that some varieties (such as Bluecrop and Atlantic) are resistant to this virus. Because of this, aphid control is not essential in these fields unless susceptible varieties are planted nearby. 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.

The blueberry scorch virus that has recently been detected in Michigan has two strains, an East Coast and West Coast strain. These are moved through infected cuttings and by aphids. It is not yet determined which strain is present in Michigan. The New Jersey strain causes symptoms in all cultivars except Jersey and apparently Legacy, whereas the West Coast strain is symptomless in Bluecrop and Duke amongst other cultivars. Pale green leaves may be the only symptoms in Bluecrop and Legacy plants. There is an active eradication program underway by the Michigan Department of Agriculture, as described in last week's Blueberry IPM Newsletter.



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

Aphicides for control of blueberry aphid

There are some very effective aphicides registered for use by blueberry growers. Aphid control and prevention of virus spread will be most effective when these are used when aphid populations start to increase in the spring, using ground sprayers that ensure coverage of the lower part of the bush. Good coverage is essential for effective aphid control, and this is more challenging in weedy fields. Controlling aphids early limits spread of the virus, thereby reducing the loss of yield or need for removing infected plants.

If aphids are not controlled early in the season, later season control is still worthwhile in infested fields of susceptible varieties. This is because controlling aphid populations before the end of the season prevents formation of winged aphids that can fly between fields, thereby spreading virus. Additionally, controlling aphids before machine harvest of infected fields will prevent the harvester from moving aphids between bushes and between fields.



DISEASE MANAGEMENT

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

This week all scouted plots were continuing to ripen. Mummy berry symptoms of newly infected fruits again increased dramatically this week in all of our scouted plots on the bush and on the ground with the highest average of 120.6 newly mummified fruits being detected at the Grand Junction site. Furthermore, a dramatic increase was seen in our West Olive site with 39.0 newly mummified fruits being detected (Figure 2). Additionally, since fruits are beginning to ripen it is important to start scouting for fruit rots as they can occur in the field and post harvest.

Fruit Rots

During this time of year the diseases of concern at this time of the year in blueberries are fruit rots, such as anthracnose (gelatinous orange spore masses) and *Alternaria* fruit rot (green velvety layer of spores). *Botrytis* fruit rot (gray mold) is usually not a problem in Michigan, but can occur, especially in wet years (Figure 3). While fruit rot is usually not visible until the berries ripen, it is prudent to assume you will have a fruit rot problem if you had problems last year. Often, berries look healthy at harvest, but start to rot soon after in the lugs while waiting processing. Fruit rot levels tend to increase greatly from the first to the last harvest. Fruit rots are favored by high humidity and temperature. Fruit rot symptom development may be slowed down by refrigerated storage, but will resume on the supermarket shelves, lowering fruit quality.



Fig 2. Newly infected mummy berries falling on the ground at the Grand Junction site.



Fig 3. Dramatic symptoms of A) Anthracnose ‘ripe rot’ B) Alternaria fruit rot C) Botrytis fruit rot.

Controlling Fruit Rots

If the first blueberries are starting to show rot, fungicide sprays can limit new infections of nearby healthy berries. It is important to take note of the pre-harvest interval (PHI) for the various fungicides. Most fungicides used at this time of the year have a 0-day PHI; however, Ziram has a 14-day PHI. Fungicide applications on blueberries before the first harvest may provide significant control during subsequent harvests. The strobilurins (Abound [azoxystrobin], Cabrio [pyraclostrobin], Pristine [pyraclostrobin + boscalid]) are all systemic fungicides that are highly effective against anthracnose, with Pristine having the most broad-spectrum activity since it contains two different active ingredients. However, it is also the most expensive of the three. Both Switch (cyprodinil + fludioxinil) and Pristine provide good to excellent control of anthracnose. Studies have also shown that Switch is effective at controlling anthracnose and Alternaria fruit rot. Elevate (fenhexamid) primarily controls Botrytis, whereas Captevate (fenhexamid + captan) controls Botrytis as well as anthracnose.

Disease Scouting Results

Farm	Date	Avg number of newly-mummified fruits*	Avg number of infected anthracnose clusters per bush*	Avg number of infected Alternaria clusters per bush*
Van Buren County				
Covert	7/9	2.3	--	--
	7/16	3.6	0.0	0.0
Grand Junction	7/9	98.3	--	--
	7/16	120.6	0.0	0.0
Ottawa County				
Holland	7/9	6.1	--	--
	7/16	5.8	0.0	0.0
West Olive	7/9	5.7	--	--
	7/16	39.0	0.0	0.0

*Average based on scouting on and below 10 bushes.
 **Average number based on 10 bushes.



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