

Michigan Blueberry I.P.M. Update



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The Blueberry IPM Update is a weekly publication produced by Michigan State University Extension. To receive a copy of this newsletter, send an email to masonk@msu.edu. Also available online through blueberries.msu.edu and at: www.isaacslab.ent.msu.edu/blueberryscout/blueberryscout.htm

CROP STAGES

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

In Ottawa County, Blueray are at late green fruit in Holland. Rubel and Bluecrop are both at green fruit in West Olive.

Berries continue to size up well at all our scouting locations, and a hint of color can be seen on many clusters.



Blueray at green fruit in Holland.

Editor's Note:

We hope you find the information in this newsletter useful in guiding what to look for as you scout your own farm. The scouting data shown in the Disease and Insect Updates below are taken from four Michigan blueberry farms. As conditions are different from farm to farm, we must stress that the information in this newsletter should not be used as a substitute for scouting your own fields. Your spray decisions should be made based on what is seen on your own farm.

Please use this newsletter to determine when and how to look for certain pests, identify potential pest problems, and to get information on the biology of pests and other aspects of integrated pest management. See the Insect and Disease Updates below for descriptions of some scouting methods that can be used on your farm. These scouting methods will also be demonstrated at the Blueberry IPM Scouting Workshops on June 13. Please see the meeting reminder below for times and locations for the workshops.

DEGREE DAYS AND WEATHER NOTES

Weather Forecast: Temperatures will generally be in the low to mid 80's this week with little chance of showers or thunderstorms. By 6-18 GDD₅₀ will increase by ~200, and GDD₄₂ will increase by ~140. Complete weather summaries and forecasts are at available enviroweather.msu.edu

GDD (from March 1)	Base 42	Base 50
Van Buren County		
5-29	1034	610
6-4	1216	744
6-11	1526	846
Ottawa County		
5-29	920*	519*
6-4	1114*	653*
6-11	1243*	742*

* enviroweather data for the West Olive station is missing some dates, so data from Hudsonville was substituted for missing values.

MEETING REMINDER

MSU TO HOST JUNE 13TH IPM MEETINGS AT BLUEBERRY FARMS

There will be two meetings for Michigan blueberry growers held on June 13th 2007, to update attendees on insect, disease, and weed management. The meetings will highlight scouting blueberry fields for key pests, and will provide results from some of MSU's ongoing blueberry IPM research. Attendees will also be updated on pesticide labels and a new weekly IPM newsletter produced for the blueberry industry.

The meeting will be presented by extension specialists and extension educators in the morning in Van Buren County and in the afternoon in Ottawa County. The morning meeting will be from 10-noon at Cornerstone Ag's farm on 57th Street in Grand Junction. This is north of CR 388 (Phoenix Road), a few miles west of Grand Junction. The afternoon meeting will be held from 3-5pm at Carini Farms, 15039 Port Sheldon St., west of US 31 in West Olive. For both meetings, signs will be provided to guide people to parking off the road.

For more information about these meetings, contact Keith Mason at (517) 242-5909 or masonk@msu.edu. RUP credits will be available at both meetings.

PEST OF THE WEEK

BLUEBERRY MAGGOT

Rufus Isaacs and Keith Mason, MSU Entomology

This season is moving fast, and early varieties are beginning to ripen. Growers should begin monitoring for blueberry maggot in the next week or two. We expect to see the first flies emerge around the middle of June this year. And as fly emergence usually occurs after a rain, the next storms that pass through Michigan will likely bring out the first blueberry maggot flies.



Blueberry maggot flies have a distinctive M shape on each wing.

Adult flies are dark and approximately 5 mm in length. The most characteristic feature is the dark pattern on

their wings, which can be used to distinguish it from other fruit flies. Flies also have a white spot on the back of the thorax and three (male) or four (female) white bands across the top of the abdomen.

Fly emergence typically starts as midseason varieties (e.g., Bluecrop) start turning blue. Flies feed and mate for 7 to 10 days before females are ready to lay eggs.

Traps should be hung in the top third of bushes without foliage touching them. Traps placed at the field border and interior can identify immigrating and resident fly populations, respectively. Keep traps effective by changing bait regularly. Place monitoring traps in the top third of the bush to identify the start of fly emergence.



This insect can be monitored using yellow traps baited with ammonium acetate.

It is critical to monitor traps to detect and accurately time controls. Fly species identification is important because other flies with similar wing patterns may be caught.



Infested fruit contains a white, legless maggot.

If flies are detected, management is typically required within 7 to 10 days to prevent egg laying in fruit. Eggs are 1 mm long, oval and white, and are laid singly in fruit. Maggots hatch in about 5 days and grow to about 7 mm long inside one berry. Infested berries soon become soft, and shrivelled. Mature larvae drop to the ground, where they burrow into the soil to pupate.

DISEASE UPDATE

Timothy Miles and Annemiek Schilder
Department of Plant Pathology, Michigan State University

This week all scouted plots were at the early to late green fruit stage. One of the fields showed an increase in blueberry shoestring disease symptoms. This disease, which is caused by blueberry shoestring virus, can be diagnosed by strap-like, elongated leaves and/or the presence of a dark red oak leaf pattern on the leaves (Figure 1). It is spread by the blueberry aphid. Blueberry mosaic disease, which is suspected to be caused by a virus, was seen in Grand Junction (Fig. 2). No vector has ever been identified for mosaic but it appears to spread slowly in a field. Virus and virus-like diseases are important as they can reduce yield and stunt the growth of the plant. Some virus diseases eventually kill the plant. Virus diseases can be controlled by the removal of infected plant material, planting virus-tested plants, and a well timed-insecticide program to control blueberry aphids starting in late May (for blueberry shoestring virus control).



Figure 1. A) Shoestring virus symptoms seen on new bushes (Holland, MI). B) Mosaic symptoms on the entire lower part of a bush (Grand Junction, MI).

How to scout for Blueberry Shoestring and Mosaic:

For viral diseases, pick 50 bushes and look for symptoms shown in the Blueberry IPM Scouting Guide. Record the suspected disease(s) and the number of infected bushes every week.

Van Buren County

Farm	Date	Mummy berry shoot strikes per bush	Blighted blossoms per bush *	Phomopsis twig blight per bush	Blueberry shoestring virus **
Covert	5-28	3.7	1.8	1.9	0
	6-4	2.7	1.8	2.5	0
	6-11	2.1	0.6	5.5	0
Grand Junction	5-28	28.1	1.0	1.2	0
	6-4	13.7	0.3	2.2	0
	6-11	6.0	0	4.6	0

Ottawa County

Holland	5-28	11.0	1.4	2.2	2/50
	6-4	5.8	1.4	3.0	2/50
	6-11	2.8	1.0	5.8	4/50
West Olive	5-28	11.8	1.6	4.6	0
	6-4	5.2	1.5	5.2	0
	6-11	4.4	2.8	7.8	0

* Blighted blossoms may be symptomatic of mummy berry, Phomopsis, Botrytis or anthracnose.

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

Closing stages - shoot strikes and blossom blights

Scouting over the past few weeks has shown a drop in the number of blighted blossoms and shoot strike infections. 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 (Figure 2). In addition, shoot strike infections caused by the mummy

berry fungus have dramatically declined. In addition, since almost all blossoms are past petal fall, the risk for mummy berry fruit infection is minimal and no control is needed for mummy berry anymore. While 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.



Figure 2. Blighted flower cluster (Grand Junction, MI).



Figure 3. Late-stage shoot strike symptoms (West Olive, MI).

INSECT UPDATE

FRUITWORMS

Insect activity has remained steady over the last week. Cranberry fruitworm moth flight is at its peak in Van Buren County and still increasing in Ottawa County. No cherry fruitworm moths were caught. Cranberry fruitworm egg-laying was observed in Grand Junction, but no cherry fruitworm eggs were found at any of the farms. Single berries with damage were observed at the Covert, Grand Junction and West Olive farms. This damage (example on the right) can be from cherry fruitworm, or it could be early feeding damage from cranberry fruitworm. In the next week, we expect cranberry fruitworm captures to continue, and we expect to see an increase in fruit with signs of fruitworm feeding damage. If either of these insects have been trapped, or if you are seeing damage from these pests on your farm, you will likely need to apply insecticides for fruitworm control. [See the past newsletter page](#) for the 4 June 2007 article on post-bloom fruitworm management for some insecticide options.



Fruitworm entry hole. Note the characteristic darkening around the hole.

BLUEBERRY APHID

Aphids were detected on all farms except in Covert. The percentage of infested shoots has remained steady as has the size of the observed aphid colonies (5-10 aphids). No parasitized aphids were found. You should be scouting your bushes for the presence of this pest (see below for methods). If aphids are found on or near varieties that are susceptible to shoestring virus, the use of insecticides for control may be needed.

TUSSOCK MOTH

No tussock moth larvae were observed. It is likely that sprays targeting fruitworm are controlling this pest.

LEAFROLLERS

We are still seeing a few leafroller larvae. Continue to scout your bushes for these larvae and their damage. [Click here for more information on Obliquebanded leafroller.](#)

BLUEBERRY MAGGOT

Traps for this pest were set last week and no flies were captured. See The Pest of the Week section for more info about this pest.

MONITORING FOR FRUITWORMS

After moths are caught and after petal fall (~5-15 or 5-30) bushes should be inspected for eggs and damage each week for a five minute sampling period. Working in a "hotspot," look at as many fruit clusters as possible on 10 to 20 bushes along the field border. Looking at the fruit clusters can help you find eggs in calyx cup, larval entry holes and damage. When inspecting the fruit grasp the cluster and view with the sun over your shoulder. Carefully turn the clusters over and inspect the bottom of the fruit as well as the top for entry holes and/or frass. Record the number of cranberry fruitworm and cherry fruitworm eggs and the number of berries with damage. [Click here for more info and photos of cranberry and cherry fruitworm.](#)

SCOUTING FOR APHIDS

Begin scouting for blueberry aphids in early to mid May. Look at 2 shoots of new growth at the base of 10 bushes and check for the presence of aphids on the underside of the leaves. As the season progresses, you should look for parasitized aphids (mummies). Record the number of shoots with aphids on the 10 bushes – 2 shoots per bush (multiply by 5 to get % infested shoots). Do the same for aphid mummies. For more on blueberry aphids, [follow this link to the aphid section on the blueberry facts website.](#)

Van Buren County						
Farm	Date	CBFW moths per trap	CFW moths per trap	Blueberry aphid % infested shoots	Blueberry maggot per trap	Japanese beetle per 20 bushes
Covert	5-29	7	2	0		
	6-4	13	0	0	trap set	
	6-11	19	0	0	0	
Grand Junction	5-29	35	0	15%		
	6-4	87	0	10%	trap set	
	6-11	56	0	25%	0	
Ottawa County						
Holland	5-29	4	2	25%		
	6-4	37	1	45%	trap set	
	6-11	60	0	30%	0	
West Olive	5-29	1	16	5%		
	6-4	0	7	25%	trap set	
	6-11	8	0	15%	0	

MSU BLUEBERRY TEAM

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For more information, see our website at
blueberries.msu.edu

The Blueberry IPM Update is a weekly publication of Michigan State University Extension. To receive an electronic copy of this newsletter send an email to masonk@msu.edu (be sure your email program's junk mail filter will allow this address).

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