

# Michigan Blueberry I.P.M. Update



May 30, 2007

Volume I, No. 7

## Contents

- Crop Stages
- Weather Notes
- Clarifications
- Pest of the Week – Tussock Moth
- Disease Update
- Insect Update
- Meetings

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](mailto:masonk@msu.edu). Also available online through [blueberries.msu.edu](http://blueberries.msu.edu) and at: [www.isaacslab.ent.msu.edu/blueberryscout/blueberryscout.htm](http://www.isaacslab.ent.msu.edu/blueberryscout/blueberryscout.htm)

## CROP STAGES

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

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



Bluecrop at early green fruit in Grand Junction

## 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:

### **BLUEBERRY IPM SCOUTING WORKSHOP** June 13, 2007

**10-12am at the Bodtke Farm, Grand Junction**

**3-5pm at Carini Farms, West Olive**

## DEGREE DAYS AND WEATHER NOTES

Weather Forecast: Temperatures will be in the mid to upper 80's over the next few days and then cooler for the weekend. Chance of showers and thunderstorms throughout the week. By 6-4 GDD<sub>50</sub> will increase by ~165, and GDD<sub>42</sub> will increase by ~115. Complete weather summaries and forecasts are at available [enviroweather.msu.edu](http://enviroweather.msu.edu)

GDD (from March 1)	Base 42	Base 50
<b>Van Buren County</b>		
5-14	714	400
5-21	826	465
5-29	1030	606
<b>Ottawa County</b>		
5-14	617	328
5-21	725	387
5-29	790*	435*

\* enviroweather data for this station is incomplete for some dates.

## CLARIFICATIONS

### DON'T USE RAW MANURE ON BEARING BLUEBERRIES!

Eric Hanson and Mark Longstroth

Our article on nitrogen fertilization in the May 15 Newsletter warned that fresh or raw manure can be a source of microbial contamination of blueberry fruit, but we should have stated specifically that it should not be used on bearing fields. Manure can contain several human pathogens. As one grower pointed out, a food-borne illness episode could have enormous consequences.

### GROWING DEGREE DAYS FROM ENVIROWEATHER

Due to a misunderstanding in how growing degree days are displayed on the [enviroweather.msu.edu](http://enviroweather.msu.edu) website, we have been reporting GDDs calculated from January 1<sup>st</sup> when we intended to show GDDs accumulated since March 1<sup>st</sup>. This makes only a small difference in Base 42 GDDs, and GDDs Base 50 are unaffected. We have made this adjustment in this issue and we will continue to report GDDs accumulated since March 1<sup>st</sup> in future issues.

## PEST OF THE WEEK

### White marked tussock moth

Rufus Isaacs, MSU Entomology

Tussock moth cause problems for blueberry growers at harvest time, when larvae can contaminate berries and cause skin rashes on hand pickers who come in contact with their hairs. The key to effective control is understanding when this insect is active, and knowing how to time effective controls against the young larvae. Recent research at MSU has determined the timing of key events in the life cycle of this insect, and will be described below. The key thing to know about tussock moth is that there are two generations per year in Michigan. The first larvae hatch from eggs around bloom time, and control of this generation dramatically reduces risk of infestation at harvest. The second generation hatches in early to mid July, and these larvae grow to be mature when fruit are being picked.

Mature tussock moth larvae are large (3-5 cm long) and hairy with distinctive yellow, black, and red coloration (Figure 1). Female moths are flightless and lay large batches of eggs in a hairy mass, which overwinter wrapped inside blueberry leaves. These egg masses can be seen during pruning (Figure 2). This pest is usually

more common near woods because it also feeds on deciduous trees.



Figure 1. Mature tussock moth larva.

Overwintering eggs hatch in early May as bloom is beginning, and small brown larvae disperse into the lower branches of bushes to feed on young leaves, with larvae peaking in mid-June. This helps to explain why fields receiving effective fruitworm control programs rarely experience high tussock moth infestation. Insecticides effective on fruitworms also control tussock moth.



Figure 2. Tussock moth egg mass.

If the spring generation is not well controlled, the second generation moths emerge in late June-early July. These can be monitored with traps placed at the field edges and interior, baited with a pheromone lure (one lure can last all season). If high numbers of moths are detected, treat with an effective insecticide at 350 to 450 growing degree days (base 55 F) after the first male moths were trapped, which should be in early to mid July. Controlling weeds and ensuring good spray coverage improves control of this pest, by allowing the spray to get to the shaded part of the bush where the larvae spend time during the day.

As harvest approaches, scout fields carefully for tussock moth larvae to ensure that these insects are not present before picking. Look inside bushes and under leaves where larvae like to hide. If larvae are detected close to harvest, select an effective insecticide with an appropriate pre-harvest interval. Because the larvae hide in the bush canopy and the bushes are well developed, aerial applications are likely to be less effective than ground applications.

## DISEASE UPDATE

Timothy Miles and Annemiek Schilder

Department of Plant Pathology, Michigan State University

### Mummy Berry

This week all blueberry plots were at petal fall to early green fruit. The number of shoot strikes per bush has slightly decreased compared with previous weeks, which is probably due to some early shoot strikes drying up and falling off. However, some blossoms are still open and since these shoot strikes produce spores that are the main source of inoculum for fruit infection, shoot strikes should still be actively scouted. In the scouted plots, almost all of the shoot strikes were at a late stage of infection (Figure 1). To scout for shoot strikes, pick five bushes and record the number of shoot strike infections per bush. Shoot strikes can be identified by rapidly wilting leaves, a brown spreading pattern along the veins, and a gray powdery spore layer on the petiole and top of the leaf (Figure 2).



**Figure 1.** Shoot riddled with shoot strikes (photo taken in Holland, MI, 5-25-07)



**Figure 2.** Shoot strike symptoms (photo taken in Grand Junction, MI, 5-25-07)

#### Van Buren County

Farm	Date	Mummified berries per bush*	% germinated mummified berries	Mummy berry mushrooms per bush*	Mummy berry shoot strikes per bush	Blighted blossoms per bush **	Phomopsis twig blight per bush
<b>Covert</b>	5-14	0.25	0	0	2.8	-	0.1
	5-21	-	-	-	3.4	1.2	0.4
	5-28	-	-	-	3.7	1.8	1.9
<b>Grand Junction</b>	5-14	36	0.3	0.1	29.1	-	0
	5-21	-	-	-	37.3	0.4	0.2
	5-28	-	-	-	28.1	1.0	1.2

#### Ottawa County

<b>Holland</b>	5-14	12	3.4	0.8	7.2	-	0
	5-21	-	-	-	15.2	1.2	0.4
	5-28	-	-	-	11.0	1.4	2.2
<b>West Olive</b>	5-14	4.35	0	0	3.4	-	0
	5-21	-	-	-	17.7	1.0	0.4
	5-28	-	-	-	11.8	1.6	4.6

\* The numbers in this table are the average number of mummies in 18 sq ft area of soil at the base of each of 5 bushes spread out in a row. Mummy berry data was not collected after 5-21-07 because all apothecia had dried up.

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

### Blossom Blight –Botrytis, Anthracnose, Phomopsis, and Mummy Berry

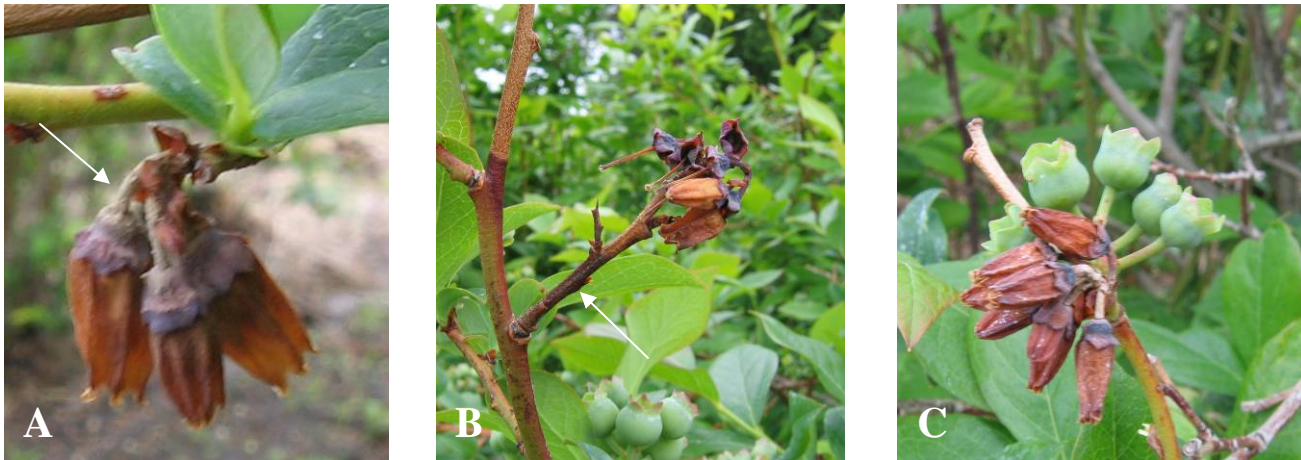
This week, all four scouted fields still maintained relatively low levels of blossom blight. As stated in last week's issue, in Michigan, there are four different pathogens capable of causing blossom blight. Furthermore, unless signs of the four fungi are evident it is extremely difficult to identify the causal agent of the blight. However, some fungi can be identified in the field. 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 3a). In addition, blossoms blighted by Phomopsis can be identified by a brown discoloration of the twig that bears the flower cluster (Figure 3b). In cool-wet weather conditions, Botrytis can be characterized by fluffy gray/brown spores that cover the blossoms, while anthracnose may display tiny orange spore masses.



**Table 1. Fungi isolated from blighted flower clusters collected from blueberry fields in western Michigan, 2007.**

<b>Covert</b>	<i>Botrytis</i>	0%	<b>Holland</b>	<i>Botrytis</i>	0%
	<i>Colletotrichum</i>	40%		<i>Colletotrichum</i>	15%
	<i>Phomopsis</i>	50%		<i>Phomopsis</i>	35%
	<i>Monilinia v.-c.</i>	10%		<i>Monilinia v.-c.</i>	50%
<b>Grand Junction</b>	<i>Botrytis</i>	6%	<b>West Olive</b>	<i>Botrytis</i>	0%
	<i>Colletotrichum</i>	20%		<i>Colletotrichum</i>	50%
	<i>Phomopsis</i>	20%		<i>Phomopsis</i>	30%
	<i>Monilinia v.-c.</i>	54%		<i>Monilinia v.-c.</i>	20%

Last week blighted blossoms were collected from each of the scouted plots and the tissues were incubated on media in the lab. Then the causal fungi were identified with a microscope. There was significant variation between the four fields as to the causal organism of blossom blight.



**Figure 3.** A) Flower strike caused by the mummy berry fungus (*Monilinia vaccinii-corymbosi*) with gray powdery spores on the cluster stem, B) Blighted cluster caused by *Phomopsis vaccinii* with brown spreading stem lesion, C) Blighted cluster with no symptoms that allow for causal fungus identification (Grand Junction 5-25-07).

## Shoestring Virus

This week clear symptoms of shoestring virus were noted at the site in Holland, MI. Shoestring virus is spread from plant to plant by blueberry aphids, and this disease can cause yield reductions of up to 25%. In addition, fruit that is harvested from an infected bush can show a reddish purple color, which lowers the fruit grade. Some common symptoms for shoestring include: elongated reddish streaks (3 to 20 mm long) on green stems, especially on the side exposed to the sun and red or purplish, elongated and strap-like leaves. The main control strategy for shoestring virus is to apply well-timed insecticides to control spread by aphids, starting in late May or early June as the aphid population begins to be build up. Furthermore, when planting new fields, growers should use virus-tested stock as a preventative measure.



**Figure 4.** Blueberry shoestring disease symptoms: A) A purple oak-leaf pattern around the leaf mid-vein. B) Leaves that are reddish, elongated and strap-like. C) Overall stunting effect of shoestring virus after several years (bush on right) (Photos taken in Holland on 5-25-07).

## INSECT UPDATE

### FRUITWORMS

Insect activity has increased over the last week. The number of cranberry fruitworm moths has increased and cherry fruitworm moths are still flying in Van Buren and Ottawa counties. All farms were scouted for cherry and cranberry fruitworm eggs and damage, and cherry fruitworm egg laying was detected at the Covert farm, and cranberry fruitworm eggs have been observed at other sites in Allegan County. In the next week, we expect cherry fruitworm and cranberry fruitworm captures to increase, and we expect an increase in cherry fruitworm and cranberry fruitworm egg laying. If either of these moths have been trapped on your farm, you should consider applying insecticide at petal fall. During the period when bees are still present in fields, control of fruitworms can be achieved using Confirm or B.t.

### LEAFROLLERS

An obliquebanded leafroller larva was observed at the West Olive farm. Continue to scout your bushes for these larvae and their damage. [Click here for more information on Obliquebanded leafroller.](#) Specific insecticide treatment for this pest is usually not required as insecticide sprays targeting fruitworms are usually effective at controlling early season leafrollers.

### BLUEBERRY APHID

Aphids were detected on all farms except in Covert. Most aphid colonies were small (1-5 aphids). A parasitized aphid was detected at the West Olive farm. You should be scouting your bushes for the presence of this pest (see below for methods). If aphids are found on varieties that are susceptible to shoestring virus, the use of insecticides for control may be needed.

**TUSSOCK MOTH** A young tussock moth larva was observed at the West Olive farm. See Pest of the Week section above for information about tussock moth.

### MONITORING FOR FRUITWORMS

To monitor for Cranberry fruitworm (CBFW) and Cherry fruitworm (CFW) use pheromone baited traps. For each species, use one Large Plastic Delta Trap (LPD) w/ the appropriate sex pheromone lure pinned to the inside of the roof of the trap. Attach the trap to the outer canopy of the upper third of a blueberry bush on the field border. Traps should be hung adjacent to woods in "hot spots" where damage has been noted in the past. Set traps at least 30ft apart in mid to late April. Check traps weekly, record the number of moths caught. Remove moths from the sticky trap insert and replace sticky insert as needed.

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	5-14	0	10	0		
	5-21	1	2	0		
	5-29	7	2	0		
Grand Junction	5-14	1	0	0		
	5-21	1	0	0		
	5-29	35	0	15%		
Ottawa County						
Holland	5-14	0	0	0		
	5-21	0	0	0		
	5-29	4	2	25%		
West Olive	5-14	0	8	0		
	5-21	0	3	0		
	5-29	1	16	5%		



## UPCOMING MEETING ANNOUNCEMENT

### MSU TO HOST JUNE 13<sup>TH</sup> IPM MEETINGS AT BLUEBERRY FARMS

There will be two meetings for Michigan blueberry growers held on June 13<sup>th</sup> 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 57<sup>th</sup> 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](mailto:masonk@msu.edu). RUP credits have been applied for.

## MSU BLUEBERRY TEAM

Horticulture - Eric Hanson  
Plant Pathology - Annemiek Schilder  
Entomology - Rufus Isaacs  
Trevor Nichols Research Station - John Wise  
Van Buren Co. - Mark Longstroth  
Ottawa Co. – Carlos Garcia  
Berrien Co. - Greg Vlaming  
Southeast Michigan – Bob Tritten

For more information, see our website at [blueberries.msu.edu](http://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](mailto:masonk@msu.edu) (be sure your email program's junk mail filter will allow this address).

This publication is also available online through [blueberries.msu.edu](http://blueberries.msu.edu), and at: <http://www.isaacslab.ent.msu.edu/blueberryscout/blueberryscout.htm>

To be removed from the distribution list please email [masonk@msu.edu](mailto:masonk@msu.edu).



This newsletter is produced by the MSU Blueberry Team with support from MSU Extension and the EPA's Region 5 Strategic Ag. Initiative Program

Michigan State University Extension programs and materials are open to all without regard to race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, marital status, or family status.

