Michigan Blueberry I.P.M. Update

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Contents

The Blueberry IPM Update is a 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 ready for final harvest. Harvest is complete for Bluecrop and Blueray in Grand Junction.

In Ottawa County, harvest is complete for Blueray in Holland. Harvest is complete for Rubel and Bluecrop is ready for a third harvest in West Olive.

Bluecrop ready for third harvest at West Olive.

Editor's Note:

This is the last of our IPM Updates for this year. Thank you for subscribing to this service, and we hope this has helped you with your blueberry pest management issues during the 2007 season.

We would like to continue this service in 2008 but this will be dependent on finding financial support to continue, as the EPA grant that funded this project will expire next spring. We are exploring some potential sources, but if you have ideas please let us know.

In this issue, you'll find a quick questionnaire that should take just a few minutes of your time. One way you can show your support for the continuation of the newsletter is by filling this out and sending it back. If you have any other feedback on the newsletter, please contact Rufus Isaacs isaacsr@msu.edu or Keith Mason masonk@msu.edu

With best wishes for the end of the 2007 season, and a relaxing winter.

The M.S.U. Blueberry Team

DEGREE DAYS AND WEATHER NOTES

Weather Forecast: Chance of showers and storms through Thursday, with warmer temperatures returning by Wednesday. By 8-27 GDD_{50} will increase by ~170, and GDD_{42} will increase by ~225. Complete weather summaries and forecasts are at available enviroweather.msu.edu

GDD (from March 1)	Base 42	Base 50
Van Buren County		
8-6	3011*	2041*
8-13	3222*	2204*
8-20	3392*	2314*
Ottawa County		
8-6	2859**	1911**
8-13	3087**	2083**
8-20	3247**	2188**

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

DISEASE UPDATE

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

All of the scouted plots have been fully harvested and scouting for diseases in the field has come to a close. In these past two weeks, we have seen a dramatic increase in the incidence of anthracnose among the scouted plots. Additionally, throughout the season, we have been collecting extensive anthracnose fruit rot data with regards to the onset of the infections. Finally, we are correlating data collected during pre-harvest scouting with our own post harvest fruit rot testing data.

Anthracnose infections throughout this season

Since anthracnose does not manifest itself until close to harvest, preventative control strategies are usually necessary. The latent nature of anthracnose infections also makes them difficult to study because it is hard to identify when the majority of infections begin. In order to better understand when these infections occur, green fruit has been collected in our scouted plots, the surface of the fruit sterilized and placed on selective fungal media. After a period of seven days, fungi that grow on the media were identified. Figure 1 represents the incidence of the anthracnose fungi (*Colletotrichum acutatum*) seen on collected fruit. From this graph we can estimate that the majority of infections most likely occurred two weeks prior because of the incubation period required by the pathogen. (approximately July 1st this year).

Scouting pre-harvest fruit rots can predict post-harvest fruit rots

As stated in previous weeks of the IPM newsletter, anthracnose is both a pre-harvest and a post-harvest disease. In an effort to validate scouting for pre-harvest fruit rots to determine the risk of post-harvest losses, we collected fruit from all of the scouted plots. The fruit was then returned to MSU and placed under 100% humidity for a period of ten days. Figure 2 represents pre-harvest anthracnose incidence observed in the field with the post-harvest levels rotted in the lab. This data demonstrates that the higher the incidence of pre-harvest rotting observed in the field, the more significant the risk of post-harvest crop losses.
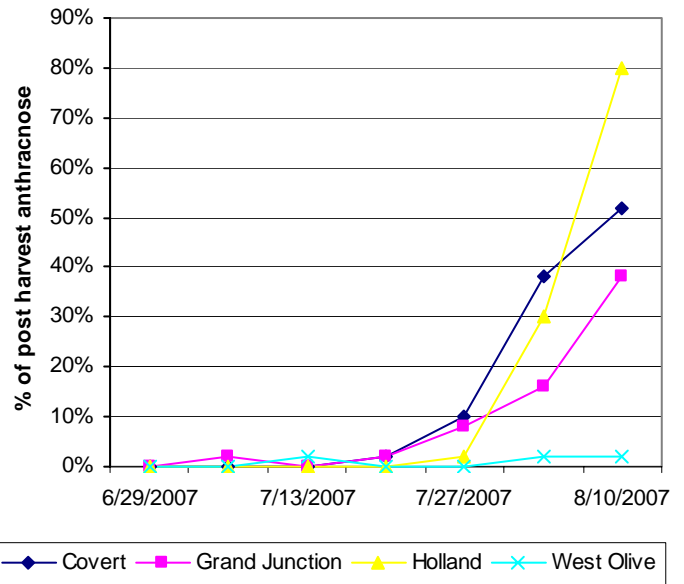

Figure 1. Anthracnose incidence at the four scouted plots throughout the 2007 growing season.
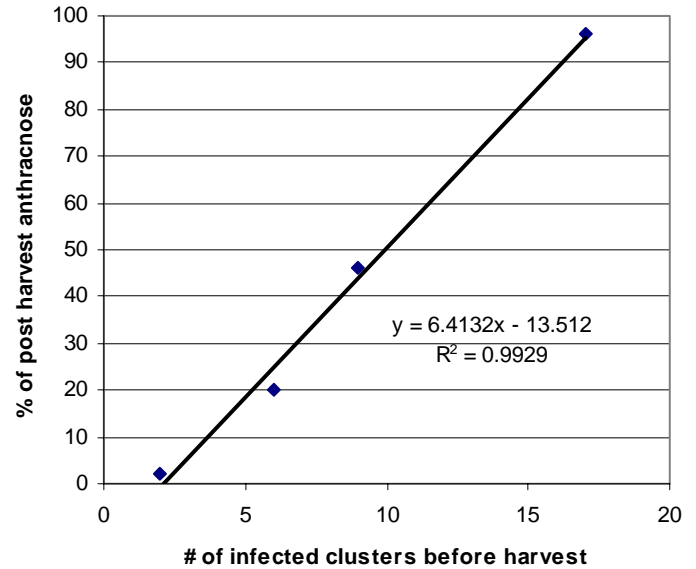

$$y = 6.4132x - 13.512$$
$$R^2 = 0.9929$$

Figure 2. Anthracnose incidence pre-harvest correlates strongly with post-harvest incidence.

Van Buren County

Farm	Date	Mummy berry fruit infections per bush *	Alternaria fruit rot per bush**	Anthracnose fruit rot per bush**	Phomopsis twig blight per bush***
Covert	8-6	-	0.8	1.5	-
	8-13	-	0.4	2.2	-
	8-20	-	0.2	0.9	-
Grand Junction	8-6	-	0.2	0.7	-
	8-13	-	0.2	0.1	-
	8-20	-	0	0.6	-

Ottawa County

Farm	Date	Mummy berry fruit infections per bush *	Alternaria fruit rot per bush**	Anthracnose fruit rot per bush**	Phomopsis twig blight per bush***
Holland	8-6	-	0.5	0.2	-
	8-13	-	0.2	0.7	-
	8-20	-	0	1.7	-
West Olive	8-6	-	0.5	0.4	-
	8-13	-	0.2	0	-
	8-20	-	0	0.2	-

 * - Fruit infected with the mummy berry fungus (berries were scouted on the bush and surrounding it).
 ** - Number of infected clusters showing signs of sporulation (average infected clusters per bush).
*** Phomopsis twig blight was not collected after 7-9-07 because values generally remained consistent throughout the scouted plots.

SCOUTING THE MAJOR DISEASES OF HIGHBUSH BLUEBERRIES

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

Highbush blueberries in Michigan experience five economically important diseases throughout the growing season; mummy berry, phomopsis (twig blight and canker), shoestring virus, anthracnose fruit rot and alternaria fruit rot. Since the entire growing season is full of different diseases and disease symptoms we thought it would be best in this last IPM newsletter that we recapped the most important diseases and re-examined effect scouting methods for each of them. Furthermore, in addition to this newsletter, MSU has several notable IPM resources, most notably the pocket scouting guide pictured on the top right.
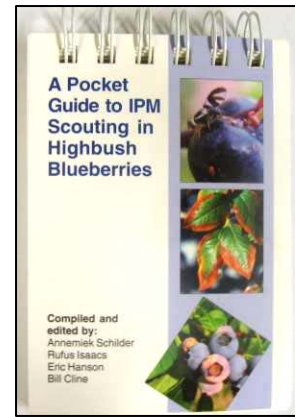
How to scout for…

Mummy berries or Mummy berry apothecia *(Budswell to bloom)*: To scout for mummy berry in fields with susceptible varieties, visually examine an approximately nine sq ft area of soil at the base of each of five bushes spread out in a row, preferably a mummy berry hot spot. Count the number of mummified berries and mushrooms.

Mummy berry shoot strikes *(Bloom to petal fall)*: To scout for shoot strikes, pick five bushes and record the number of shoot strike infections per bush. Shoot strikes can be identified by the brown oak leaf pattern along the veins of wilting leaves and a layer of gray powdery spores on the upper part of the leaf and petiole.

Phomopsis twig blight and canker *(Bloom to fruit coloring)*: To scout for Phomopsis twig blight, pick five random bushes spread out in a row and look for recent browning and death of young twigs and collapsing flower/fruit clusters. Twig lesions may originate from infected buds which subsequently die. Blighted twigs will generally give rise to cankers later in the season.

Shoestring virus *(Bloom to green fruit)*: To scout for blueberry shoestring virus, pick two rows within a field and look for common symptoms of shoestring virus. Common symptoms 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, strap-like leaves. In addition, leaves may become cupped if one side of the leaf fails to develop. Scouting for shoestring virus should only be done once per season because disease incidence will not change drastically within one growing season.

Newly mummified fruit *(fruit coloring to 50% ripe)*: To scout for newly formed mummified fruit, pick five random bushes spread out in a row and look for fruit infections that have a tan-brown to pink discoloration of fruit. Additionally, when scouting for mummy berries, it is extremely important to not only scout on the bush but also on the ground as mummies tend to detach from the cluster prematurely. Scouting for this years' mummies only should be done once per growing season, ideally before harvest.

Anthracnose fruit rot *(pre-harvest)*: To scout for anthracnose fruit rot pick five random bushes spread out in a row, sample ten clusters per bush and record the number of clusters with visible signs of sporulation. Anthracnose fruit rot manifests itself as sunken areas on ripe fruit with gelatinous, orange spore masses.

Alternaria fruit rot *(pre-harvest)*: To scout for alternaria fruit rot pick five random bushes spread out in a row, sample ten clusters per bush and record the number of clusters with visible signs of sporulation. On the bush alternaria appears as sunken areas near the calyx that are covered by a dark green, velvety growth.

INSECT UPDATE

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

In general, insect activity has diminished over the past two weeks and the cooler wet weather will likely continue that trend.

One thing for scouts to keep an eye open for is scale, as this pest has been detected in some fields (outside this project). The exact species identification has not been made yet, but there is little that growers can do until the end of harvest for controlling this insect. The scales are flat and from 1-3 mm diameter. If present, they can be found on the leaves on the midrib, on the green stems, and on the fruit. A hand lens would be needed to see them clearly. Please let us know if you detect this in Michigan fields as we are trying to learn more about this insect.

BLUEBERRY APHID
This week, aphids were detected only at the Grand Junction farm. The percentage of infested shoots has been low at all farms while the level of parasitism continues to increase. Now that this season is nearly complete, you should record where aphids were present on your farm. This will help you plan future control measures on or near varieties that are susceptible to shoestring virus and reduce the chance that virus will be transmitted from bush to bush, or field to field.

TUSSOCK MOTH
No larvae were observed in our scouting, but second generation Tussock Moth may be present at this time.

BLUEBERRY MAGGOT
No flies were captured. Continue to use traps to monitor this pest until harvest is complete.

JAPANESE BEETLE
Last week beetles were observed only at the Holland farm, and no beetles were observed at any of the farms this week. The number of beetles observed has generally decreased at sites where harvest is complete or where growers are using insecticides to control this pest. Fresh beetle feeding damage was not observed on leaves or fruit. Continue to scout for this pest through out the harvest period (see below for methods). For insecticide control options see the newsletter from 6-26-07.

SCOUTING FOR JAPANESE BEETLE
Begin scouting for Japanese beetle in mid to late June. Visually scan the canopy of 10 bushes on the field border and 10 bushes in the interior of the field. Count the number of beetles observed. As beetles are very mobile, check for the presence of feeding damage on leaves and fruit to let you know if beetles have been active in the field recently. See pictures above for examples of fruit and leaf feeding.

Top: Leaf feeding by Japanese beetle.
Bottom: Japanese beetle feeding on fruit.

FRUITWORMS
Be sure to record locations where you noticed fruitworm damage this season and monitor those areas for fruitworm activity in future years.

Farm	Date	CBFW moths per trap	CFW moths per trap	Blueberry aphid % infested shoots	Blueberry maggot per trap	Japanese beetle per 20 bushes
Van Buren County						
Covert	8-6	0	0	0	0	15
	8-13	-	-	0	0	0
	8-20	-	-	0	0	0
Grand Junction	8-6	0	0	5%	0	8
	8-13	-	-	10%	0	0
	8-20	-	-	5%	0	0
Ottawa County						
Holland	8-6	1	0	5%	1	1
	8-13	-	-	0	0	26
	8-20	-	-	0	0	0
West Olive	8-6	0	0	30%	0	0
	8-13	-	-	20%	0	0
	8-20	-	-	15%	0	0

BLUEBERRY IPM UPDATE – END OF SEASON QUESTIONNAIRE

The Blueberry Team at Michigan State University received one year of funding to develop and deliver our IPM Update during 2007. You have been a subscriber to this free service, and we would like to get your feedback. Please help us by spending a few minutes to fill out and return this **anonymous** survey, so we can learn how to improve it and what we should change if we get funding to continue this in 2008.

1. Please describe your role in the blueberry industry (check all that apply):

□ grower   □ processor   □ scout/consultant   □ university   □ other (describe)_____.

2. How many acres of blueberry do you farm?_____acres.

3. Where are you based? State or Province_____   County_____.

4. Please rank how useful MSU's Blueberry IPM Update was for you during 2007.

□ very useful   □ somewhat useful   □ not useful   □ didn't read it

5. If you did not read the Blueberry IPM Update, what was the reason?

□ not relevant   □ no time   □ no access to the internet   □ other_____.

6. Did your pest management practices change in 2007 because of the Blueberry IPM Update?
   (check all that apply)

□ no change	□ scouted more	□ scouted less
□ better insect pest control	□ sprayed more	□ sprayed less
□ better disease control	□ improved spray timing	
□ other_____.		

7. Did the information in the Blueberry IPM Update save you money?   □ YES □ NO

If it saved you money, how much did you save (approximately)? US$_____.

8. We are interested in your response to the amount of information in the IPM Update. Is it......

□ too much   □ too little   □ just right

9. What other sources do you use to get current pest management information? (check all that apply)

□ MBG scout	□ chemical company scout	□ private scout
□ MSU CAT Alert	□ Rutgers Blueberry Bulletin	□ neighbors
□ other_____.		

10. What would you like to see more of?_____.

11. What would you like to see less of?_____.

12. Any other feedback you wish to provide?_____.

_____.

_____.

Please email completed surveys to masonk@msu.edu, or mail your printed and filled out survey
to Keith Mason at 202 CIPS, MSU, E. Lansing, MI 48824.

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Berrien Co. - Greg Vlaming
Southeast Michigan – Bob Tritten

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

Thanks for your support and we'll see you in the winter sometime!!