

Michigan Blueberry I.P.M. Update



June 10, 2008

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Next Blueberry IPM Twilight Meeting

When: Wednesday June 11, 2008 6-8PM

Where: Cornerstone Ag, 01240 57th St., Grand Junction, MI 49056 (Van Buren County)

What: Timely updates for control of insect, disease, and weed control. This is a free meeting, with a light dinner served at 6PM. Spray credits available for attending. Hope to see you there!

CROP STAGES

Keith Mason

Department of Entomology, Michigan State University

In Van Buren County, 'Jersey' in Covert is at the end of petal fall. In Grand Junction, 'Blueray' has early green fruit and for 'Bluecrop', the green fruit are increasing in size. In Ottawa County, 'Blueray' in Holland, and 'Rubel' and 'Bluecrop' in West Olive are at early green fruit.



Bluecrop at green fruit in Grand Junction (left) and Bluecrop at early green fruit in West Olive (right).

WEATHER NOTES

Mark Longstroth

Michigan State University Extension

Complete weather data for your area can be found at enviroweather.msu.edu.

Summer arrived last week. Temperatures rose into the 80s with lows in the 60s. Heavy storms passed through the region Friday, Saturday and Sunday. These storms brought heavy rains and high winds, blowing down trees causing local flooding and erosion. Hail also fell in many areas. Rainfall totals from these storms varied from a one to three inches. Allegan County received much more rain (almost 7 inches) than areas to the south. Most of these rains were disease infection periods. The rains also restored soil moisture levels. We expect cool temperatures for a couple days, and then warmer temperatures on Thursday and Friday with highs in the mid 80's and lows near 60. Our GDD totals are about 10 days behind 2007, 3 or 4 days behind average.

DEGREE DAYS

GDD (from March 1)	Base 42	Base 50
	Van Buren County	
6-2-08	843	467
6-9-08	1070	637
Projected for 6-16-08	1258	785
	Ottawa County	
6-2-08	712	364
6-9-08	913	510
Projected for 6-16-08	1102	642

INSECT UPDATE

Keith Mason and Rufus Isaacs

Department of Entomology, Michigan State University

The number of cherry fruitworm and cranberry fruitworm moths in traps at our scouting sites has increased substantially. Cherry fruitworm eggs were found at all four farms, and egg hatch and single berry damage was observed in Grand Junction and Covert. Cranberry fruitworm egg-laying was seen at the Holland farm. Growers



Freshly laid cranberry fruitworm egg in the calyx

at all four farms have applied their first insecticide targeting fruitworm, and the growers at the Grand Junction and Covert farms will be applying post-bloom fruitworm sprays later this week. We expect the number of moths in traps and the number eggs of both species to continue to increase over the next week. Growers and scouts should keep monitoring cherry and cranberry fruitworm traps, and berry clusters should be inspected for eggs and larvae. See below for scouting methods.

All farms were scouted for the presence of blueberry aphid, and aphids were found at the Grand Junction and Holland farms. Some solitary aphids and mid-sized colonies (5 to 20 individuals) were seen. No parasitized aphids were seen

at any of the farms. Growers and scouts should be looking for this pest particularly on farms with varieties that are susceptible to shoestring virus. See below for scouting methods for aphids.

Other insect activity was low over the past week. Some leafroller feeding and a fresh plum curculio egg-laying scar was observed at the Holland farm. We expect feeding by leafrollers, spanworm and cutworm to remain low now that growers are starting to apply insecticides for fruitworms, as these sprays will generally control other moth pests. The flower feeding beetle *Hoplia trifasciata* was not seen at any of the four farms, this pest is probably done for this season. No tussock moth larvae were observed, but growers and scouts should still be on the lookout for this pest. See the May 28th issue of the Michigan Blueberry IPM Update for more on tussock moth.

MONITORING FOR FRUITWORMS

Once 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 will help you find eggs in the 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. Go to the blueberries.msu.edu website for photos of these pests.

SCOUTING FOR APHIDS

Scouting for blueberry aphids begins 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. If aphids are found on varieties that are susceptible to shoestring virus, insecticides may be needed for control. For more info on blueberry aphids, see the insect section of the blueberries.msu.edu website.

INSECT UPDATE (Continued)

Van Buren County						
Farm	Date	CBFW moths per trap	CFW moths per trap	BBA % infested shoots	BBM adults per trap	JB per 20 bushes
Covert	5-27	1	2	5%		
	6-2	18	6	10%		
	6-9	78	4	0		
Grand Junction	5-27	0	6	0		
	6-2	2	4	0		
	6-9	43	5	25%		
Ottawa County						
Farm	Date	CBFW moths per trap	CFW moths per trap	BBA % infested shoots	BBM adults per trap	JB per 20 bushes
Holland	5-27	1	4	0		
	6-2	21	3	5%		
	6-9	108	7	5%		
West Olive	5-27	0	7	0		
	6-2	1	7	10%		
	6-9	2	2	0		

DISEASE UPDATE

Timothy Miles and Annemiek Schilder

Department of Plant Pathology, Michigan State University

Mummy Berry

This week all scouted blueberry plots were at the early green fruit stage. Also, the number of shoot strike infections per bush has not dramatically increased compared with previous weeks and all shoot strikes that were seen in the field were at an extremely late stage of infection meaning the majority of them most likely occurred several weeks ago (Figure 1). Since blossoms are almost gone, bees will be removed and infection risk will decline. However, if some blossoms are still open, shoot strikes that remain in the field can still produce spores that can cause mummy berry fruit infection. Therefore, shoot strikes and crop stages should be actively scouted to determine if fungicide treatment is still necessary. Indar is still the best fungicide for control of mummy berry fruit infection, and it also has good efficacy against Phomopsis, but it will not control anthracnose or Alternaria fruit rot.

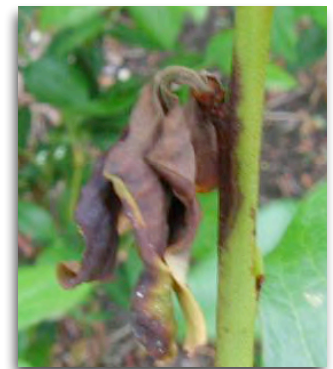


Figure 1. Late-stage shoot strike symptoms (Holland, MI)

Shoestring Virus

This week clear symptoms of shoestring virus were noted at the site in Holland, MI (Figure 2). 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

DISEASE UPDATE (Continued)

sun and red or purplish, elongated and strap-like leaves. The main control strategy for shoestring virus is to monitor for the aphid vector. If necessary, 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 2. Overall stunting effect of shoestring virus on cv. 'Blueray' after several years (bush on left) (Holland, MI).

Scouting for Shoestring

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.

Van Buren County				
Farm	Date	Average number of apothecia on the ground per bush*	Average number of mummy berry shoot strikes*	Average number of blighted twigs per bush**
Covert	5-22	0.0	1.3	2.0
	5-30	-	2.1	2.2
	6-5	-	2.0	2.1
Grand Junction	5-22	0.0	34.1	0.5
	5-30	-	48.1	0.7
	6-5	-	50.3	0.7
Ottawa County				
Holland	5-22	0.0	1.8	0.1
	5-30	-	6.5	0.2
	6-5	-	18.1	0.1
West Olive	5-22	0.0	8.5	0.2
	5-30	-	10.3	0.2
	6-5	-	8.0	0.4

*Average number was calculated for ten bushes.

**Blighted twigs may be caused by various fungi, incl. *Phomopsis vaccinii*, *Colletotrichum acutatum* and *Botrytis cinerea*.

POST-BLOOM MANAGEMENT OF FRUITWORMS IN BLUEBERRY

Rufus Isaacs and John Wise

Department of Entomology, Michigan State University

With blueberry bloom complete in much of Michigan and beekeepers removing colonies from fields, grower insecticide options for fruitworm control expand. Blueberries are at risk from infestation by cherry and cranberry fruitworm, two moth pests whose larvae have the potential to infest fruit at harvest and which can cause reduced yield if populations are high.

During the past week, monitoring traps have detected increasing catches of cranberry fruitworm across southwest Michigan and cherry fruitworm moths continue to be trapped. Scouting of bushes has revealed fresh cherry fruitworm and cranberry fruitworm eggs on clusters in Van Buren, Allegan, and Ottawa counties, and the first entry holes of larvae into fruit have been found. This emphasizes the need to maintain active management of these pests and continue monitoring in the coming weeks after bloom, because fruitworm activity typically extends throughout June. Once bees are removed from the fields, broad spectrum insecticides become an option that growers can consider for protecting their berries from fruitworm infestation.

Guthion, Imidan, Lannate, Asana, Danitol, and Sevin are effective broad-spectrum insecticide options available to blueberry growers. With all these products, maintaining good coverage of the clusters is still important, to get residue to the parts of the berry where fruitworms are found such as in the calyx cup where eggs are laid. The larvae of the two species chew into the berries in this location, with cranberry fruitworm larvae preferring to enter berries at the stem end. Because these insects move over such a small distance, it is important to use sufficient water and to consider spray additives (spreader-stickers) that will help spread the material across the berry surface.

EPA's phase-out of Guthion will remove this insecticide from blueberry production by the end of 2012. Given the current reliance on this chemical for fruitworm control, it would be wise for growers to test alternative programs on a few fields this season, so that an effective fruitworm control program is in place when Guthion is completely restricted. There are many options for chemical control of fruitworms, including some recently-registered products such as Assail that has performed well in our recent trials and Delegate that we are testing this season for the first time. See our earlier article for a description of these options and their performance characteristics at <http://www.ipm.msu.edu/cat08fruit/f04-29-08.htm>.

Research trials in Michigan have demonstrated that Confirm applied at 16 oz/ac after bloom to fields with low or moderate fruitworm pressure can also achieve control of these pests. This insecticide has the benefit of minimal negative impact on natural enemies such as parasitic wasps, ladybeetles and lacewings, plus long residual activity because of resistance to wash-off and ultraviolet breakdown. We expect similar performance from the recently-registered Intrepid at 12 oz/acre. In trials conducted at commercial blueberry farms over the past few years, a program that used Confirm during bloom followed by Asana post-bloom was effective against fruitworms, and we are also testing a Confirm, then Delegate, then Assail program this season. For organic growers, formulations of B.t. such as Dipel, Javelin, etc. and the spinosyn insecticide Entrust provide good control but they must be reapplied every 4-5 days and they are not resistant to wash-off.

In fields with a history of high infestation by fruitworms and where traps continue to trap, an additional application of insecticide may be required to protect fruit. The residual activity of the previous insecticide and the amount of rain since the last spray will be critical determinants of the need for reapplication. Residual control under dry conditions ranges from a few days for B.t. up to a few weeks for Guthion, Confirm, and Intrepid. Few insecticide residues can withstand an inch of rain, although Confirm and Intrepid are the most rain-resistant of the current options. While decision-making during this wet time of year can be very challenging, it is important to maintain regular checking of fruitworm monitoring traps, to check the bushes in hot-spots for eggs or larval entry-holes into berries, and to think about the amount of rain since your last spray to protect the fruit.

RAINFAST CHARACTERISTICS OF BLUEBERRY INSECTICIDES

John Wise

Trevor Nichols Research Complex, Michigan State University

The heavy rainfall events experienced in Michigan over the last several days has prompted many questions about the relative "rainfastness" of the insecticides used in blueberry production. Very little research has been done on this subject in recent years, leaving growers to depend largely on folk lore to guide their decisions of whether or not they need to spray after a rain event. In 2006 the Michigan Agriculture Experiment Station provided funds to purchase and install a state-of-the-art rainfall simulation chamber at the MSU Trevor Nichols Research Complex (TNRC). Precipitation events vary in duration, intensity (water volume per minute), and droplet size. In our first field season (2007) we focused our efforts on calibration the new equipment to simulate various precipitation patterns relevant to Michigan's spring production season. We were able to run some initial trials in apples (Michigan Apple Industry grant) that can provide some preliminary insights, although independent studies in blueberry will be needed before conclusions can be reported with full confidence.

In the 2007 apple study we compared the performance of Azinphosmethyl (Guthio®), Phosmet (Imidan®), Esfenvalerate (Asana®), Indoxacarb (Avaunt™ - not yet registered in blueberries), and the two neonotinoids Acetamiprid (Assail™) and Thiacloprid (Calypso® - not yet registered in blueberries) on the codling moth (an apple fruit pest). We sprayed all treatments on apple trees using labeled field rates, harvested fruit clusters 24 hours after sprays had dried and simulated ½ inch of rain. These fruit clusters were then exposed to codling moth larvae in the laboratory, comparing fruit protection to untreated (no simulated rainfall) samples. Parallel fruit samples were analyzed for their surface and sub-surface residue levels by the MSU Pesticide Analytical Laboratory to document the resulting chemical wash-off under the simulated rainfall event.

All treatments that were exposed to ½ inch of rain after 24 hours of drying provided good control of codling moth, although there was reduced activity when Asana was treated with ½ inch of simulated rainfall. For the conventional insecticides Asana, Imidan and Guthion that have primarily surface residues, the amount of chemical lost from 0.5 inch simulated rainfall ranged from 30 - 50%. This suggests that pyrethroid and organophosphate insecticides are similarly susceptible to wash-off from precipitation, but that the Ops' higher toxicity to codling moth larvae maintained equal performance to the untreated check. In comparison Avaunt residues on apple leaves were reduced by only 25% under the ½ inch rainfall conditions. Assail and Calypso, being neonicotinoids, have systemic movement into plant tissue. The residue data showed that even though losses of surface residues were similar to that of the OPs, the residues in and below the plant cuticle were protected from wash-off. There is much more work to be done in this area of research, including the simulation of more severe rainfall events. We expect to be reporting our findings to you as they develop over the coming years.

BLUEBERRY CHEMICAL USE SURVEY THIS JUNE

The USDA National Agriculture Statistics Service, in cooperation with Michigan State University Extension, will be conducting a survey of chemical use and IPM practices used in blueberries during the 2007 growing season. This survey will gather information that is essential for supporting the need for new registrations, section 18 labels, and for tracking pesticide use trends in this industry. This kind of information is used by EPA when making decisions related to blueberry, and it is also valuable to the MSU Blueberry Team when competing for funding to support research and extension projects. The survey will be conducted during June, and if your farm is selected a NASS representative will contact you to arrange a 30-45 minute interview. Gathering chemical application information can be made faster by having a photocopy or printout of the spray records from a representative field when the NASS representative visits. Please help represent your industry in this important effort.

MEETINGS AND ANNOUNCEMENTS

2008 Blueberry IPM Twilight Meeting Schedule:

All meetings held from 6-8PM

June 11: Cornerstone Ag, Van Buren County

June 24: Carini Farms, Ottawa County

These meetings are hosted by MSU to update growers on insect, disease, and weed control as the season progresses. They are completely free, with a light dinner served at 6PM. For more information, contact Paul Jenkins (517-432-7751, jenki132@msu.edu).

For more information visit our website at blueberries.msu.edu

MSU BLUEBERRY TEAM

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IN NEXT WEEK'S ISSUE...

Blueberry maggot

Irrigation requirements of blueberry



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