



Michigan Blueberry IPM Newsletter

MICHIGAN STATE UNIVERSITY
EXTENSION

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Grand Junction



West Olive

Van Buren County

Jersey in Covert are at full bloom; in Grand Junction, Blueray is at early petal fall, and Bluecrop is at early green fruit.

Ottawa County

Blueray in Holland is at full bloom, and Rubel and Bluecrop in West Olive are at petal fall.

BLUEBERRY NEWS YOU CAN USE...

Disease management: Continue to monitor shoot strikes and open blossoms. If both are present, growers should consider applying a systemic fungicide to protect the flower stigma from infection.

Insect management: Biofix for cranberry fruitworm reached in Grand Junction. Check the MSU Enviroweather website for cranberry fruitworm egg-laying predictions in your area. Aphids are on the rise.

Next Twilight IPM Meeting:

Thursday, June 11
6:00–8:00PM
Carini Farms
15039 Port Sheldon Rd.,
West Olive, MI.

Weed Control Meeting & Demonstration:

Thursday, June 18 6:00–7:30PM
Getzoff Farm
7093 116th St.
Fennville, MI.

See details next page

GROWING DEGREE DAYS

From March 1

| | 2009 | | Last Year | |
|---------------------------|---------|---------|-----------|---------|
| | Base 42 | Base 50 | Base 42 | Base 50 |
| Grand Junction, MI | | | | |
| 5/18 | 644 | 330 | 607 | 324 |
| 5/25 | 820 | 450 | 686 | 366 |
| Projected for 6/1 | 962 | 537 | 818 | 450 |
| West Olive, MI | | | | |
| 5/18 | 508 | 236 | 501 | 245 |
| 5/25 | 676 | 348 | 572 | 280 |
| Projected for 6/1 | 815 | 432 | 689 | 350 |

See MSU Enviroweather website for more information

On-site herbicide demonstration: Best management practices for weed control in blueberry

June 18

6:00–7:30 PM

Getzoff Farm, 7093 116th St., Fennville, MI

Got weeds? Please join Bernie Zandstra, Eric Hanson, and Paul Jenkins for an on-site demonstration and discussion of weed control research plots. Treatments include various new and old herbicides and herbicide combinations. Dinner will be provided. Many thanks to Jim Getzoff for cooperating with us on these trials!

6:00–6:20PM Welcome and dinner

6:20–7:30PM Discussion of herbicide performance and walk-through of treatment plots

Hope to see you there!

INSECT MANAGEMENT

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

Insect activity has increased at all four farms that we sampled. In particular aphids have increased, and the flight of cherry fruitworm and cranberry fruitworm has increased substantially.

Aphids were found at the Covert, Grand Junction and West Olive farms. We are finding 5 to 10% of new shoots have aphids on them. The observed aphid colonies range in size from one to 20 individuals. As aphid numbers are likely to increase across the region, growers and scouts should be sure to check for blueberry aphids on new growth. To scout for aphids examine two young shoots near the crown on each of 10 bushes and record the number of shoots where aphids are found and also record the number of shoots with parasitized aphids. 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. Although natural enemies (parasitic wasps, lady beetles, lacewings, hover fly larvae) can keep this pest in check, aphids can transmit blueberry shoestring virus, so growers with fields of susceptible varieties where symptoms have been seen in the past should consider an insecticide for aphid control. Consult MSU's Fruit Management Guide for the latest recommendations. One new option to consider is Assail which can provide control of aphids and fruitworms but must be applied after honeybees are removed from the field.



Figure 1. Aphid colony found on the underside of leaves.

Fruitworm activity has increased significantly in the past week. Cherry fruitworm and cranberry fruitworm moths were caught at all of the farms sampled. The number of cherry fruitworm moths per trap ranged from 1 to 12, and cranberry fruitworm captures ranged from 1 to 23 moths per trap. More warm nights are expected in the next few days so we should see cherry fruitworm and cranberry fruitworm flight increase over the next week. All four farms were scouted for the presence of cherry fruitworm and cranberry fruitworm eggs, but no eggs were seen for either species.

Biofix for cranberry fruitworm was set in Grand Junction last week by scouts checking traps regularly. According to the [model for fruitworm control](#), egg laying is predicted to start ~85 growing degree days after biofix and that point has now been reached. Growers in Grand Junction are putting on bee safe insecticides to control fruitworm. Follow the link above to see cranberry fruitworm egg laying predictions based on the MSU Enviroweather weather stations in your area.

Some feeding by leafroller larvae was seen at the Holland farm. Growers and scouts should continue to look for [leafroller](#) feeding in fruit and leaf buds. Insecticides that are applied for fruitworm management should also control leafrollers.

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 | 5/18 | 1 | 0 | 0% | -- | -- |
| | 5/26 | 12 | 23 | 10% | -- | -- |
| Grand Junction | 5/18 | 0 | 0 | 0% | -- | -- |
| | 5/26 | 7 | 9 | 10% | -- | -- |
| Ottawa County | | | | | | |
| Holland | 5/18 | 0 | 0 | 0% | -- | -- |
| | 5/26 | 2 | 4 | 0% | -- | -- |
| West Olive | 5/18 | 0 | 0 | 0% | -- | -- |
| | 5/26 | 4 | 1 | 5% | -- | -- |

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

Cranberry fruitworm management in blueberry

Rufus Isaacs & John Wise, Department of Entomology, Michigan State University

Cranberry fruitworm is one of the key insect pests of blueberry in Michigan, infesting the crop during and after bloom. Moths usually start flying during bloom, and this year is no exception. The first male moths have been trapped over the past week in Van Buren and Allegan counties, coinciding with peak Jersey flowering.

Once moths are flying and petals start falling off young fruit, growers should protect these blueberry fields to prevent crop infestation by the larvae that bore into berries and web them together. The aim of managing this pest is to minimize the number of larvae that bore into the fruit, but timing sprays for fruitworms can be challenging in some years. MSU entomologists have developed a simple degree day model to help growers know when to start protecting berries from fruitworm infestation. Using degree days to make sure you don't miss the start of fruitworm flight is expected to improve the effectiveness of your insect management program. Implementing degree-day based management for cranberry fruitworm requires the following:

- A) Monitoring traps to detect moth flight and biofix
- B) A method to track insect development

MONITORING TRAPS

We recommend the sturdy large plastic delta trap to monitor fruitworms, because these withstand rain and irrigation intact, plus they can be used for multiple years. Place 1–2 traps per field near historical fruitworm hot spots or near woods next to fields. Place the trap baited with a lure containing the fruitworm sex pheromone in the top third of the bush. Moths are predicted to start flying at 375 degree days (base 50) after March 1. Because of this timing, traps should be in place by the start of Bluecrop bloom, and checked twice each week until moths are trapped. Regular checking allows you to detect the first sustained catch of moths (biofix), the peak of moth activity, and how long moths are active. First sustained catch is when one or more moths are trapped

in consecutive trap visits. The biofix (point at which degree days should start being counted) is the date immediately before this, i.e. the date at which '0' moths were trapped, right before the start of the flight.

DEGREE DAY MODEL

Our research has shown that egg laying by cranberry fruitworm starts between 80 and 100 GDD days after biofix. The MSU Enviroweather program now includes a cranberry fruitworm model page, accessible online at www.enviroweather.msu.edu. Degree days are tallied automatically for the numerous weather stations across Michigan, and this system also predicts degree days totals for the week ahead. This can allow growers and consultants to look at when the target degree day accumulation is expected to be reached, helping to plan sprays ahead of time.

If you have not used degree days in your pest management program before, there are some useful resources online to explain them. One is at: www.ipm.ucdavis.edu/WEATHER/ddconcepts.html Your local MSU Extension Educator will also be able to help with how to monitor degree days on your farm, or how to access information from the nearest weather station.

A short note on cherry fruitworm: There is no degree day model for this pest in blueberries, but we have been trapping this insect in the past few weeks. In fields that have experienced infestation in past years and where moths have been trapped this spring already, protection of the young fruit should be considered as petal fall starts to expose the fruit to egg laying.

PREVENTING FRUTWORM INFESTATION

Fields requiring protection against cranberry fruitworm should be treated using an insecticide applied to achieve excellent coverage of the berries. This will improve the chance that larvae are controlled. In high pressure fields, the first application is usually during bloom, so growers should use the bee-

safe insecticide Intrepid (at 12 oz/ac) or a B.t. based product such as Dipel or Javelin starting at 50–100 GDD after biofix. Follow label directions regarding bee safety. A follow-up spray may be needed, with the timing of this depending on the residual control provided by the first spray, the amount of new fruit-set since the first application, whether bees are still in the field, and the amount of rain.

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, Mustang Max, Danitol, and Sevin are effective broad-spectrum insecticide options available to blueberry growers. With all these products, maintaining good coverage of the fruit 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 fruitworm 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 and Delegate that have performed well in our recent trials at research stations and at commercial farms.

Research trials in Michigan have demonstrated that Intrepid or Confirm applied after bloom to fields with low or moderate fruitworm pressure can also achieve control of these pests. These insecticides 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. In trials conducted at commercial blueberry farms over the past few years, a program that used Confirm or Intrepid during bloom followed by Asana post-bloom was similar in performance to a Confirm, then Delegate, then Assail program, and these were similar to performance of a Confirm then Guthion program. 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.

DISEASE MANAGEMENT

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

Mummy berry – Shoot and flower strikes

This week all scouted plots were at 75% bloom to full bloom. Shoot strike infections were found at much higher levels than previous weeks, with the highest incidence being observed at the Grand Junction site averaging 67.2 shoot strike infections per bush (Fig. 2), which is a pretty dramatic increase from 5–18–09. Flower strikes were also observed in some of our plots but at extremely low levels (~1 per site) (Fig. 3). Gray sporulation was particularly visible on the infected tissues this week.



Figure 2. Heavy gray sporulation of the mummy berry fungus observed near Grand Junction, MI on 5-21-09.

Research has shown that bees are attracted to shoot strikes and it is possible for other insects as well to physically move the spores from infected shoots to the stigma of an open flower (Fig. 4). Once spores reach the stigma they will germinate and then the fungus grows alongside the pollen tubes through the pistil into the ovaries. Flowers are the most susceptible on the day that they open and then their susceptibility declines over the next four days. Good pollinating weather can mean that a considerable amount of fruit infection occurs despite low shoot strike incidence. Management using a fungicide spray program is important during this period to protect the flower stigma from infection. Systemic fungicides, such as Indar and Orbit, are the most useful.



Figure 3. Flower strike seen near Grand Junction, MI on 5-18-09. (Gray sporulation points to mummy berry ascospores as the casual agent).

Figure 4. Pollinating honey bee seen near a shoot strike observed near Grand Junction, MI on 5-21-09.

Disease Scouting Results

| Farm | Date | Avg number of apothecia on the ground* | Max apothecia cup diameter | Avg number of shoot strikes per bush* |
|------------------|------|--|----------------------------|---------------------------------------|
| Van Buren County | | | | |
| Covert | 5/18 | 0 | -- | 1.9 |
| | 5/21 | 0 | -- | 2.8 |
| Grand Junction | 5/18 | 0 | -- | 32.2 |
| | 5/21 | 0 | -- | 67.2 |
| Ottawa County | | | | |
| Holland | 5/18 | 0 | -- | 2.6 |
| | 5/21 | 0 | -- | 4.3 |
| West Olive | 5/18 | 0 | -- | 17.4 |
| | 5/21 | 0 | -- | 22.3 |

*Average number based on 10 bushes.



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