Cornell University
College of Agriculture and Life Sciences

New York Berry News

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Errata: The recent NYBN Fruit Rot Management Special Edition had the composition of Badge X2 listed in error. The components are copper oxychloride and copper hydroxide instead of copper octanoate.

Events Calendar

June 17-19, 2013 – *Berry Health Benefits Symposium*, in Concord, NC. Join leading researchers and industry leaders to learn about the newest research in this field. Held biennially; this fourth Symposium will be the first time the event has been held on the East Coast. For more information, contact catmc@peak.org. Info about the 2011 Symposium may be found at www.berryhealth.org.

August 1, 2013 - *2013 Cornell Fruit Field Day*, NYSAES, Geneva, NY. Save the date! Details to follow.

August 13-14, 2013 – *North American Strawberry Growers Association Annual Summer Tour.* Vermont. Save the dates! Details to follow.

December 4-7, 2013 – *Joint North Carolina Strawberry Growers Association and North American Strawberry Growers Association Conference,* Sheraton Imperial Hotel, Durham, North Carolina. More information: info@ncstrawberry.com or www.ncstrawberry.com.

December 10-12, 2013. *Great Lakes Fruit, Vegetable and Farm Market EXPO and Michigan Greenhouse Growers Expo*. More information: http://www.glexpo.com/.

December 17-19, 2013. *New England Vegetable and Fruit Conference*. More Information: http://www.newenglandvfc.org/**.**

June 18-25, 2015 – 11th International Rubus & Ribes Symposium, in Asheville, NC, June 21-25, with preconference tour to farms and research sites June 18-20. More info to come. If you are interested in being a sponsor of this event, contact gina_fernandez@ncsu.edu.

NYSDEC - FIFRA 2(ee) Recommendations for the Control of Spotted Wing Drosophila – *Mike Helms, Cornell University*

The New York State Department of Environmental Conservation recently approved the following 2(ee) recommendations for the control of the unlabeled pest spotted wing drosophila:

- Malathion 8 Aquamul (EPA Reg. No. 34704-474) – for use on blueberries;
- Assail 30SG Insecticide (EPA Reg. No. 8033-36-70506) – for use on strawberries and other low growing berries, blueberries and other bush and cane berries and grapes and other vine small fruit crops;
- Mustang Max Insecticide (EPA Reg. No. 279-3249) – for use on blackberries, loganberries, red and black raspberries, blueberries, currants, elderberries, gooseberries, huckleberries, and grapes;
- Drexel Malathion 5 EC Insecticide/Miticide (EPA Reg. No. 19713-217) – for use on blueberries, blackberries, boysenberries, dewberries, gooseberries, loganberries, raspberries, strawberries, and grapes;
- Malathion 5 EC (EPA Reg. No. 66330-220) – for use on blueberries, blackberries, boysenberries, currant dewberries, loganberries, raspberries, strawberries, and grapes;
- Malathion 57% (EPA Reg. No. 67760-40-53883) – for use on blueberries, blackberries, boysenberries, dewberries, gooseberries, loganberries, raspberries, strawberries, and grapes.

Users must have a copy of the appropriate 2(ee) recommendation in their possession at the time of use. Copies of the above 2(ee) recommendations are posted to the "NYS 2(ee) Recommendations and Categories" section of our web site. (Direct link to find the recommendations: http://pmep.cce.cornell.edu/regulation/2ee/unlabeled_pest/index.html.)

When using a 2(ee) recommendation, remember to follow any applicable directions, restrictions, and precautions on the primary product label.

Chemical Control of Spotted Wing Drosophila in Berry Crops - *Greg Loeb, Cathy Heidenreich, Laura McDermott, Peter Jentsch, Debbie Breth, and Juliet Carroll*

At the start of 2012 field season quite a few berry growers in the Northeast were unaware of the new invasive pest spotted wing drosophila. The situation is likely quite different for 2013 due to the widespread negative impact SWD had on vulnerable berry crops; particularly fall raspberries, late varieties of blueberries, and day-neutral strawberries. Unlike other vinegar flies that attack overripe and rotting fruit, SWD females are able to lay eggs in ripe, marketable fruit of softer skinned crops such as raspberries and blueberries. We estimate SWD caused upwards of 2 million dollars in damages to berry crops in New York State alone in 2012.

We have every reason to believe that SWD will be back among us in 2013 and indeed, there is a lot of research going on to better understand its biology and management. In the short term, though, insecticides will be the main method of control. Below we provide a list of registered insecticide options currently available for use against SWD in NY for blueberries, raspberries/caneberries, and strawberries. There are a number of important factors to keep in mind in selecting insecticides including pre-harvest interval, total amount of active ingredient allowed per season, minimum days between spray applications, total number of applications allowed per season, re-entry interval, insecticide class (and therefore mode of action), whether the insecticide is active through contact or whether it needs to be ingested, compatibility with other chemistry in the spray tank, rain fastness, length of residual, and impact on beneficial insects such as bees. And of course costs. It's beyond the scope of this article to cover all these variables. However, the tables do provide a convenient summary of the most pertinent information. Please also refer to the full insecticide label. Also note that for a significant number of materials we have obtained 2(ee) label recommendations to include spotted wing drosophila on the list of pests. You must have a copy of this 2(ee) recommendation in hand when using the insecticide (2(ee) recommendations can be obtained at Cornell PMEP web site: http://pims.psur.cornell.edu/).

We did want to discuss a couple of aspects of chemical control that might prove helpful in optimizing their use for SWD. Some of the newer insecticide chemistry works best when ingested. For example, although the spinosyns (IRAC group 5) have some contact activity, they work best when ingested. That is also the case for neonicotinoids (IRAC group 4A). For these types of insecticides, recent research has indicated that the addition of a small amount of cane sugar (2 lb/100 gallons water) acts as a feeding stimulant and increases the amount of material ingested and overall efficacy. This is a relatively small amount of sugar and therefore we do not anticipate secondary problems to develop associated with adding sugar to the foliage (e.g. support of sooty mold or increased mortality to beneficial insects), but it's something we continue to investigate. A related question is what life-stage is being targeted by these insecticides? For the most part, it's the adults and this raises questions about how to increase the probability of contacting them with the insecticide. We have a lot to learn about SWD behavior in this regard. Adults do appear negatively affected by dry, low relative humidity conditions and probably seek out shelter in the crop canopy or adjoining habitat during hot, dry weather. And they may be more active in the evenings and early in the morning when relative humidity tends to increase. Therefore, it's reasonable to assume an insecticide applied at dusk or dawn might be more effective than if applied during the middle of the day. Regardless, though, the females need to come to the fruit to lay eggs and both males and females will feed on damaged or overripe fruit. Therefore, getting good insecticide coverage in the fruiting zone is important.

Insecticides will remain the principal method of control for SWD for the near term. The combination of a long harvest period of multiple berry crops and the short generation time of SWD will likely increase the chances for SWD to develop resistance to some insecticide products. One way to reduce selective pressure for resistance development is to rotate among insecticides with different modes of action (MOA). IRAC codes reflect these different MOAs and we strongly encourage rotating to new MOAs with each successive SWD generation. For example, at the start of the harvest period for fall raspberries a grower might start with 2 applications of Delegate (IRAC code 5) over a 10-day period (5 d spray interval). The label requires the next spray to be from a different IRAC group, for example an OP like malathion (IRAC group 1B). After another 10 to 14 days you could rotate back to Delegate or maybe better, go to a third MOA like a pyrethroid (IRAC group 3A) or a neonicotinoid (IRAC group 4A).

As has been the case for years, but perhaps is particularly true for SWD, growers must incorporate many different factors in making chemical control decisions. The accompanying tables provide guidance in this decision process.

For additional information on SWD biology and management, please see the new SWD web site on Cornell Fruit (www.fruit.cornell.edu/spottedwing/).

***Labeled Insecticides for Control of Spotted Wing Drosophila in New York Berry Crops**

Compiled by Greg Loeb, Cathy Heidenreich, Laura McDermott, Peter Jentsch, Debbie Breth, & Juliet Carroll, Cornell University, May 22, 2013

BLUEBERRIES

PRODUCT	AI[1]	IRAC group	EPA#	RATE/A	REI[3]	DTH[4]	Product (ai)/acre	Total applic's	Spray Interval	Probable efficacy
^@Entrust Naturalyte (2ee)	spinosad	5	62719-282	1.25-2 oz	4 hr	3 d	9 oz (0.45 lb)	3 per crop	6 d	Good to Excellent#
^@Entrust SC (2ee)	spinosad	5	62719-621	4-6 fl oz	4 hr	3 d	29 fl oz (0.45 lb)	3 per crop	6 d	Good to Excellent#
@Delegate WG (2ee)	spinetoram	5	62719-541	3-6 oz	4 hr	3 d	19.5 oz (0.305 lb)	6	6 d	Excellent#
Brigade WSG (2ee)	bifenthrin	3A	279-3108	5.3-16 oz	12 hr	1 d	5 lb (0.5 lb)	-	7 d	Excellent
Danitol 2.4EC	fenpropathrin	3A	59639-35	16 fl oz	24 hr	3 d	32 fl oz (0.6 lb)	2	-	Excellent
Mustang Max Insecticide (2ee)	zeta-cypermethrin	3A	279-3249	4 fl oz	12 hr	1 d	24 fl oz (0.15 lb)	6	7 d	Excellent
Triple Crown	bifenthrin, imidacloprid, zeta-cypermethrin	3A,4A	279-3440	6.4-10.3 fl oz	12 hr	3 d	31.0 fl oz (0.54 lb)	5	7 d	Good to excellent
Imidan 70W	phosmet	1B	10163-169	1.33 lb	24 hr	3 d	7.125 lb (5.0 lb)	5	-	Excellent
Malathion 5EC (2ee)	malathion	1B	19713-217	2.0 pts	12 hr	1 d	6 pts (3.75 lb)	3	5 d	Good
Malathion 5EC (2ee)	malathion	1B	66330-220	2.0 pts	12 hr	1 d	6 pts (3.75 lb)	3	5 d	Good
Malathion 8 Aquamul (2ee)	malathion	1B	34704-474	1.875 pts	12 hr	1 d	3.75 pts (3.75 lb)	1	5 d	Good
Assail 30SG	acetamiprid	4A	8033-36-70506	4.5-5.3 oz	12 hr	1 d	26.7 oz (0.5 lb)	5	7 d	Good#
^Pyganic EC 1.4	pyrethrin	3A	1021-1771	1 pt – 2 qts	12 hr	0 d	-	-	-	Fair to Poor
^Pyganic EC 5.0	pyrethrin	3A	1021-1772	4.5 – 18 fl oz	12 hr	0 d	-	-	-	Fair to Poor
^AzaSol	azadirachtin	UN	81899-4	6 oz in 50 gal	4 hr	0 d	-	-	-	Fair to Poor

*Refer to label for details and additional restrictions.

#Adding sugar (sucrose) at 2 lb/100 gal water as a feeding stimulant will increase efficacy.

^Approved for organic use in NY.

@After two consecutive applications must rotate to different mode of action.

[1] Active Ingredient.

[2] Mode of Action, based on IRAC group code.

[3] Re-entry Interval.

[4] Days to Harvest.

***Labeled Insecticides for Control of Spotted Wing Drosophila in New York Berry Crops**

Compiled by Greg Loeb, Cathy Heidenreich, Laura McDermott, Peter Jentsch, Debbie Breth, & Juliet Carroll, Cornell University, May 22, 2013

RASPBERRIES & BLACKBERRIES

PRODUCT	AI[1]	IRAC group	EPA#	RATE/A	REI[3]	DTH[4]	Product (ai)/acre	Total applic's	Spray Interval	Probable efficacy
^@Entrust Naturalyte (2ee)	spinosad	5	62719-282	1.25-2 oz	4 hr	1 d	9 oz (0.45 lb)	3 per crop	6 d	Good to Excellent#
^@Entrust SC (2ee)	spinosad	5	62719-621	4-6 fl oz	4 hr	1 d	29 fl oz (0.45 lb)	3 per crop	6 d	Good to Excellent#
@Delegate WG (2ee)	spinetoram	5	62719-541	3-6 oz	4 hr	3 d	19.5 oz (0.305 lb)	6	4 d	Excellent#
Brigade WSG (2ee)	bifenthrin	3A	279-3108	8.0-16 oz	12 hr	3 d	2 lb (0.2 lb)	1 post bloom	-	Excellent
Brigade EC (2ee)	bifenthrin	3A	279-3313	3.2-6.4 fl oz	12 hr	3 d	12.8 fl oz (0.2 lb)	1 post bloom	-	Excellent
Danitol 2.4EC	fenpropathrin	3A	59639-35	16 fl oz	24 hr	3 d	32 fl oz (0.6 lb)	2	-	Excellent
Mustang Max Insecticide (2ee)	zeta-cypermethrin	3A	279-3249	4 fl oz	12 hr	1 d	24 fl oz (0.15 lb)	6	7 d	Excellent
Triple Crown	bifenthrin, imidacloprid, zeta-cypermethrin	3A,4A	279-3440	6.4-10.3 fl oz	12 hr	3 d	10.3 fl oz (0.181 lb)	1 post bloom	7 d	Good to excellent
Malathion 5EC (2ee)	malathion	1B	19713-217	3.0 pts	12 hr	1 d	9 pts (6.0 lb)	3	7 d	Good
Malathion 5EC (2ee)	malathion	1B	66330-220	3.0 pts	12 hr	1 d	9 pts (6.0 lb)	3	7 d	Good
Malathion 8 Aquamul (2ee)	malathion	1B	34704-474	2.0 pts	12 hr	1 d	6 pts (6.0 lb)	3	7 d	Good
Assail 30SG	acetamiprid	4A	8033-36-70506	4.5-5.3 oz	12 hr	1 d	26.7 oz (0.5 lb)	5	7 d	Good#
^Pyganic EC 1.4	pyrethrin	3A	1021-1771	1 pt – 2 qts	12 hr	0 d	-	-	-	Fair to Poor
^Pyganic EC 5.0	pyrethrin	3A	1021-1772	4.5 – 18 fl oz	12 hr	0 d	-	-	-	Fair to Poor
^AzaSol	azadirachtin	UN	81899-4	6 oz in 50 gal	4 hr	0	-	-	-	Fair to Poor

*Refer to label for details and additional restrictions.

#Adding sugar (sucrose) at 2 lb/100 gal water as a feeding stimulant will increase efficacy.

^Approved for organic use in NY.

@After two consecutive applications must rotate to different mode of action.

[1] Active Ingredient.

[2] Mode of Action, based on IRAC group code.

[3] Re-entry Interval.

[4] Days to Harvest.

[1] AI – Active Ingredient; [2] MOA – mode of action based on IRAC group code; [3] REI – Re-entry Interval; [4] DTH – Days to Harvest.

***Labeled Insecticides for Control of Spotted Wing Drosophila in New York Berry Crops**

Compiled by Greg Loeb, Cathy Heidenreich, Laura McDermott, Peter Jentsch, Debbie Breth, & Juliet Carroll, Cornell University, May 22, 2013

STRAWBERRIES

PRODUCT	AI[1]	IRAC group	EPA#	RATE/A	REI[3]	DTH[4]	Product (ai)/acre	Total applic's	Spray Interval	Probable efficacy
^@Entrust Naturalyte (2ee)	spinosad	5	62719-282	1.25-2 oz	4 hr	1 d	9 oz (0.45 lb)	5	5 d	Good to Excellent#
^@Entrust SC (2ee)	spinosad	5	62719-621	4-6 fl oz	4 hr	1 d	29 fl oz (0.45 lb)	5	5 d	Good to Excellent#
@Radiant (2ee)	spinetoram	5	62719-545	6-10 fl oz	4 hr	1 d	39 fl oz (0.305 lb)	5	3 d	Excellent#
Brigade WSG (2ee)	bifenthrin	3A	279-3108	5.3-16 oz	12 hr	0 d	5 lb (0.5 lb)	-	7 d	Excellent
Danitol 2.4EC	fenpropathrin	3A	59639-35	16-21.3 fl oz	24 hr	2 d	42.7 fl oz (0.8 lb)	2	-	Excellent
Malathion 5EC (2ee)	malathion	1B	19713-217	3.2 pts	12 hr	3 d	12.8 pts (8.0 lb)	4	7 d	Good
Malathion 5EC (2ee)	malathion	1B	66330-220	2.0 pts	12 hr	3 d	12.8 pts (8.0 lb)	4	7 d	Good
Malathion 8 Aquamul (2ee)	malathion	1B	34704-474	2.0 pts	12 hr	3 d	8 pts (8.0 lb)	4	7 d	Good
Assail 30SG	acetamiprid	4A	8033-36-70506	4.5-5.3 oz	12 hr	1 d	13.8 oz (0.26 lb)	2	7 d	Good#
^Pyganic EC 1.4	pyrethrin	3A	1021-1771	1 pt – 2 qts	12 hr	0 d	-	-	-	Fair to Poor
^Pyganic EC 5.0	pyrethrin	3A	1021-1772	4.5 – 18 fl oz	12 hr	0 d	-	-	-	Fair to Poor
^AzaSol	azadirachtin	UN	81899-4	6 oz in 50 gal	4 hr	0 d	-	-	-	Fair to Poor

*Refer to label for details and additional restrictions.

#Adding sugar (sucrose) at 2 lb/100 gal water as a feeding stimulant will increase efficacy.

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Proactive and Pro-IPM Earns Excellence in IPM Award for New York Extension Educator – *Mary Woodsen, Science Write, NYS IPM program*

May 23, 2013. EAST AURORA, NY: After budget cuts cost Erie County in western New York a full-time cooperative-extension horticulturalist, Sharon Bachman's to-do list got longer. Lots longer. Erie County's agriculture sector is worth about $117 million, even though the county hosts the state's second-largest metropolitan area. But Bachman — who already provided farmers countywide with a range of agricultural services — took it all in stride, backing up Erie's cadre of volunteer master gardeners with the diagnostic help they need to help householders cope with pests the least-toxic way.

For this and much more, Sharon Bachman has received an Excellence in IPM award from the New York State Integrated Pest Management (IPM) Program.

Bachman has been making her rounds since 2005: Helping growers place fruitworm traps in upick blueberry farms. Plant cover crops in rotation with strawberries to suppress root rot. Use routine soil and leaf analyses that lead to healthy, nearly pest-free crops. These IPM practices can reduce, steeply, a grower's pesticide use.

"Sharon is a can-do kind of person who lives and breathes IPM," says Cathy Heidenreich, a berry specialist at the New York State Agricultural Experiment Station in Geneva, New York. "She's always personable, always proactive, always thinking ahead."

Bachman received her award on May 3, 2013 at an Erie County Small Fruit Grower meeting in East Aurora, New York.

IPM seeks least-toxic solutions to pest problems on farms — and everywhere people live, work or play. Learn more at nysipm.cornell.edu.

NY STATE NEWS

New York State Joins National Effort Raising Awareness for Hurricane Preparedness

May 26, 2013. Albany, NY. Governor Andrew M. Cuomo today announced Hurricane Preparedness Week in New York State by issuing a proclamation designating May 26th through June 1st as the period for all New Yorkers to review their preparedness plans for the upcoming 2013 hurricane season.

"It is essential that all New Yorkers assess their preparedness for any potential disaster, ensuring that they are ready to endure and respond to the types of destructive storms we have experienced in recent years," Governor Cuomo said. "As we continue to recover from Superstorm Sandy, Hurricane Irene and Tropical Storm Lee, now is the time to make sure our citizens have plans and resources in place for their families, homes and businesses."

"Severe weather associated with hurricanes can also have a disastrous effect on inland areas of the state," Jerome M. Hauer, Commissioner of the New York State Division of Homeland Security and Emergency Services said. "There are some simple measures that citizens can take to be prepared, such as having emergencies supplies on hand including flashlights, batteries, water and canned goods. Don't wait until the storm warnings are posted."

Traditionally, the Atlantic hurricane/coastal storm season runs from June 1st through November 30th. While predominantly coastal storms, the past these devastating storms have affected areas of the State hundreds of miles from the ocean. The National Oceanic and Atmospheric Administration (NOAA), has recently predicted an above average hurricane season.

Before the start of the hurricane season New Yorkers are advised to:

- Develop or review a household disaster plan. Know how to contact all family members at all times. Identify an out-of-town friend or family member to be the "emergency family contact." Then make certain all family members have that number. Designate a family emergency meeting point, some familiar location where the family can meet in the event the home is inaccessible.
- Prepare an emergency phone list of people and organizations that may need to be called. Include children's schools, doctors, child/senior care providers, and insurance agents.
- Know the hurricane / storm risks in their areas, and learn the storm surge history and area's elevation.
- Learn their community's warning signals and evacuation plans.
- Learn safe routes inland.
- Learn the location of official shelters.
- Make arrangements on where to relocate pets during a storm because most shelters will not allow pets.
- Ensure that enough non-perishable food and water supplies are on hand (approximately 10 days). Make sure battery-operated radios and flashlights are available and have an ample supply of batteries. Have a first aid kit available and make sure there is an ample supply of medicines on hand for those who require it.

- Store important documents - insurance policies, medical records, bank account numbers, Social Security card, etc. - in a waterproof container. Also have cash, checkbook, credit and ATM cards readily available.
- Obtain and store materials, such as plywood, necessary to properly secure your home.
- Know how to turn off the power, heat and water at home.
- Repair loose and clear clogged rain gutters and down spouts.
- Secure or bring inside lawn furniture and other loose, lightweight objects such as garbage cans and garden tools that could become projectiles in high winds. Also keep trees and shrubbery trimmed of dead wood.
- Review insurance policies to determine extent of coverage before a storm strikes.
- Determine where to move boats in an emergency.
- Be aware of local weather conditions by listening to National Weather Service broadcasts on NOAA Weather Radio and reports from local television and radio stations.

For more information on hurricane preparedness, visit the DHSES website at http://www.dhses.ny.gov/oem/event/hurricane-safety.cfm. To sign up for NYS related weather alerts go to: http://www.nyalert.gov/.

Commissioner Aubertine Encourages New Yorkers to "Love New York Agriculture" by Purchasing Specialty License Plate

"I Love NY Agriculture" License Plate Celebrates NY Agriculture and Helps Support NY Agriculture in the Classroom

May 6, 2013. Last year, State Agriculture Commissioner Darrel J. Aubertine bought a new bale wrapper at the beginning of springtime for his farm in Cape Vincent, NY. The spring before, he bought a bale processor.

This spring, Commissioner Aubertine has decided to get away from bale-related purchases all together. Last week, the Commissioner purchased a new item for the pickup truck he so proudly drives around his farm.

"I love my pickup truck and I love New York agriculture - now I get the best of both worlds," said Commissioner Aubertine. "Last week I went on the DMV website and purchased my very own 'I Love NY Agriculture' license plate. Not only is it a sharp looking license plate that reflects my own love of agriculture here in New York State, but it helps support a great cause."

The "I Love New York Agriculture" license plate, also known as the "Agriculture in the Classroom" plate, is available for both passenger and commercial vehicles and can be ordered in person at any Department of Motor Vehicles (DMV) office, by telephone at 518-402-4838 or online at dmv.ny.gov/cplates.htm. The initial fee is $53.75 and the annual fee of $25 is in addition to the standard registration renewal fee. This $25 annual fee supports the New York State Agriculture in the Classroom program.

New York Agriculture in the Classroom (NYAITC) is a partnership of the NYS Department of Agriculture and Markets, Cornell University, the NYS Education Department, Cornell Cooperative Extension, and New York Farm Bureau. The program works with pre-K through middle school teachers, Cornell Cooperative Extension and other community educators, farmers and producers, volunteers, parents, and community partners to increase agricultural literacy in New York State.

NYAITC supports a number of agricultural education programs throughout the year, including: Agricultural Literacy Week, Kids Growing Food, an Art and Writing Contest, and Educator Workshops. To find out how you can get involved in Agriculture in the Classroom, call (607) 255-9253 or email NYAITC@cornell.edu.

DMV Commissioner Barbara Fiala said, "I am delighted that Commissioner Aubertine has chosen to put an 'I Love NY Agriculture' license plate on his vehicle. Not only will this plate demonstrate the Commissioner's justified pride in the state's agriculture, but it will also benefit the New York Agriculture in the Classroom's educational activities. It doesn't get any better than that!!!"

Katie Bigness, Coordinator of New York Agriculture in the Classroom said, "New York Agriculture in the Classroom is proud to be able to use the funds generated by the Agriculture in the Classroom license plate to promote, celebrate, and educate students across New York about agriculture. As our students are becoming further removed from the farm and agricultural production, our program is growing in necessity. The funds generated from the license plate allow us to train more teachers how to integrate agriculture into their curriculum, and allows hundreds of students the chance to participate in food production themselves through in-school activities and school gardens."

Ann Peck, Promotion and Education Chair of New York Farm Bureau said, "The specialty New York license plate is just one more way people in this state can support their local farms. The Agriculture in the Classroom program serves to educate our young people about where their food comes and increases their appreciation of a way of life that benefits their communities in many ways."

To find out more about the NYAITC program, please visit http://www.agclassroom.org/ny/index.htm. To order an "I Love NY Agriculture" plate or to see the variety of custom plates offered by the DMV, go to http://dmv.ny.gov/cplates.htm.

USDA NEWS

USDA and EPA Release New Report on Honey Bee Health

May 2, 2013. WASHINGTON -- The U.S. Department of Agriculture (USDA) and the U.S. Environmental Protection Agency (EPA) today released a comprehensive scientific report on honey bee health. The report states that there are multiple factors playing a role in honey bee colony declines, including parasites and disease, genetics, poor nutrition and pesticide exposure.

"There is an important link between the health of American agriculture and the health of our honeybees for our country's long term agricultural productivity," said Agriculture Deputy Secretary Kathleen Merrigan. "The forces impacting honeybee health are complex and USDA, our research partners, and key stakeholders will be engaged in addressing this challenge."

"The decline in honey bee health is a complex problem caused by a combination of stressors, and at EPA we are committed to continuing our work with USDA, researchers, beekeepers, growers and the public to address this challenge," said Acting EPA Administrator Bob Perciasepe. "The report we've released today is the product of unprecedented collaboration, and our work in concert must continue. As the report makes clear, we've made significant progress, but there is still much work to be done to protect the honey bee population."

In October 2012, a National Stakeholders Conference on Honey Bee Health, led by federal researchers and managers, along with Pennsylvania State University, was convened to synthesize the current state of knowledge regarding the primary factors that scientists believe have the greatest impact on managed bee health.

Key findings include:

Parasites and Disease Present Risks to Honey Bees:

- The parasitic *Varroa* mite is recognized as the major factor underlying colony loss in the U.S. and other countries. There is widespread resistance to the chemicals beekeepers use to control mites within the hive. New virus species have been found in the U.S. and several of these have been associated with Colony Collapse Disorder (CCD).

Increased Genetic Diversity is Needed:

- U.S. honeybee colonies need increased genetic diversity. Genetic variation improves bees thermoregulation (the ability to keep body temperature steady even if the surrounding environment is different), disease resistance and worker productivity.
- Honey bee breeding should emphasize traits such as hygienic behavior that confer improved resistance to *Varroa* mites and diseases (such as American foulbrood).

Poor Nutrition Among Honey Bee Colonies:

- Nutrition has a major impact on individual bee and colony longevity. A nutrition-poor diet can make bees more susceptible to harm from disease and parasites. Bees need better forage and a variety of plants to support colony health.
- Federal and state partners should consider actions affecting land management to maximize available nutritional forage to promote and enhance good bee health and to protect bees by keeping them away from pesticide-treated fields.

There is a Need for Improved Collaboration and Information Sharing:

- Best Management Practices associated with bees and pesticide use, exist, but are not widely or systematically followed by members of the crop-producing industry. There is a need for informed and coordinated communication between growers and beekeepers and effective collaboration between stakeholders on practices to protect bees from pesticides.
- Beekeepers emphasized the need for accurate and timely bee kill incident reporting, monitoring, and enforcement.

Additional Research is Needed to Determine Risks Presented by Pesticides:

- The most pressing pesticide research questions relate to determining actual pesticide exposures and effects of pesticides to bees in the field and the potential for impacts on bee health and productivity of whole honey bee colonies.

Those involved in developing the report include USDA's Office of Pest Management Policy (OPMP), National Institute of Food and Agriculture (NIFA), Agricultural Research Services (ARS), Animal and Plant Health Inspection Service (APHIS), Natural Resource Conservation Service (NRCS) as well as the EPA and Pennsylvania State University. The report will provide important input to the Colony Collapse Disorder Steering Committee, led by the USDA, EPA and the National Agricultural Statistics Service (NASS).

An estimated one-third of all food and beverages are made possible by pollination, mainly by honey bees. In the United States, pollination contributes to crop production worth $20-30 billion in agricultural production annually. A decline in managed bee colonies puts great pressure on the sectors of agriculture reliant on commercial pollination services. This is evident from reports of shortages of bees available for the pollination of many crops.

The Colony Collapse Steering Committee was formed in response to a sudden and widespread disappearance of adult honey bees from beehives, which first occurred in 2006. The Committee will consider the report's recommendations and update the CCD Action Plan which will outline major priorities to be addressed in the next 5-10 years and serve as a reference document for policy makers, legislators and the public and will help coordinate the federal strategy in response to honey bee losses.

To view the report, which represents the consensus of the scientific community studying honey bees, please visit: http://www.usda.gov/documents/ReportHoneyBeeHealth.pdf.

Agriculture Secretary Vilsack Unveils Vision for U.S. Organic Agriculture Announces Organic Crop Insurance, Other Measure

May 14, 2013. Washington — Agriculture Secretary Tom Vilsack today discussed his vision for U.S. organic agriculture and USDA efforts to ensure its continued success during remarks to the Organic Trade Association. Vilsack announced a number of changes and new initiatives to support the continued growth of organic agriculture, including that the USDA's Risk Management Agency's (RMA) federal crop insurance program will increase coverage options for organic producers this year and provide even more options in 2014, including a contract price addendum as well as new premium price elections for organic crops. Additionally, RMA will remove the current five-percent organic rate surcharge on all future crop insurance policies beginning in 2014.

Vilsack also said USDA will be providing new guidance and direction on organic production to all USDA agencies in support of organic agriculture and markets. USDA is now asking each agency to routinely address the needs of the organic sector in their programs and services where appropriate. The National Organic Program has supported the continued growth of America's organic sector, which has been increasing market share each year and now is a more than $30 billion industry. Vilsack noted that accurate data is the biggest obstacle for developing better crop insurance options for organic farmers and expressed his desire that Congress help USDA make further progress by renewing the 2008 Organic Data Initiative as part of a new Food, Farms and Jobs bill.

"Organic agriculture is one of the fastest growing segments of American agriculture and helps farmers receive a higher price for their product as they strive to meet growing consumer demand," said Agriculture Secretary Tom Vilsack. "These new options will extend the safety net provided by crop insurance and provide fair and flexible solutions to organic producers. Coupled with the new guidance for agencies to support this growing sector, USDA recognizes that organics are gaining market share and is helping boost this emerging segment."

New crop-insurance pricing options will be available to organic producers who grow crops under guaranteed contracts beginning with the 2014 crop year. This contract price option allows organic producers who receive a contract price for their crop to get a crop insurance guarantee that is more reflective of the actual value of their crop. They will have the ability, where available and at their choice, to use their personal contract price as their price election or to choose existing crop insurance price elections. This contract price option will be available for between 60 and 70 crops in the 2014 crop year and this contract price feature will be available to the majority of insured organic crops. RMA is also changing organic transitional yields (t-yields) so they will be more reflective of actual organic farming experience, starting with the 2014 crop year.

All crops are being evaluated for establishing organic prices for the 2014 crop year. Current pricing options only allow farmers to insure organic crops at the conventional prices, with the exception of eight crops (corn, soybeans, cotton, processing tomatoes, avocados, and several fresh stone fruit crops) that already have premium organic price elections. RMA is working to provide organic price elections for six to ten crops in 2014. Oats and mint are two crops that have already been selected for organic price elections in 2014, and apricots, apples, blueberries, millet, and others are still under consideration.

USDA's Agriculture Marketing Service last year announced the Organic Literacy Initiative, a public outreach and employee training program to help connect current and prospective organic operations with appropriate USDA resources. To date, over 14,000 USDA employees have taken the basic training on USDA's role in organic agriculture. The new guidance will further improve USDA agencies' ability to incorporate the needs of the growing organic sector into their programs and services. These combined actions should result in staff better equipped to help organic farmers obtain technical and financial assistance, insure crops and livestock, access research findings, secure loans, develop conservation practices, find current organic price information, and access local, regional, and international markets. Through this effort, agencies will also better understand the scope and rigor of the certification process and how it complements their own programs.

Organic certification allows farmers and ranchers to receive premium prices for their value-added products. Over the past 10 years, the number of certified organic farms and businesses in the United States has expanded to approximately 17,750, representing a 240 percent increase since USDA first began collecting this data. Similarly, the retail value of the organic industry grew almost 9.5 percent in 2011 to $31.4 billion. Organic foods continue to gain market share in the food industry, climbing to 4.2 percent of U.S. retail food sales in 2011.

USDA has already made several changes to better serve organic customers, including offering more flexible microloans and improving Federal crop insurance programs. To help open new markets for U.S. farmers and ranchers, USDA has streamlined trade with multiple foreign governments. These trade partnerships allow U.S. organic products to be sold as organic in Canada, the European Union, Taiwan, and Japan without maintaining certification to multiple standards. Expanding the reach of U.S. organic products creates opportunities for small businesses and increases jobs for Americans who grow, package, ship and market organic products.

USDA is responsible, under the Organic Foods Production Act of 1990 (OFPA), for establishing national standards for organically-produced agricultural products. The National Organic Program has been critical for the development of clear standards and enforcing a level playing-field for organic businesses, which has led to expanded trade opportunities to create new markets for U.S. organic businesses. These standards assure consumers that products with the USDA organic seal meet consistent, uniform standards. For additional information about the USDA National Organic Program, visit www.ams.usda.gov/NOP.

Crop insurance is sold and delivered solely through private crop insurance agents. Contact a local crop insurance agent for more information about the program. A list of crop insurance agents is available at all USDA Service Centers or on the RMA web site at www.rma.usda.gov/tools/agents/.

NYS BERRY GROWERS ASSOCIATION NEWS

Spotted Wing Drosophila Projects Funding - *Dale-Ila M. Riggs, President, NYS Berry Growers Association, Owner, The Berry Patch, Stephentown NY*

Last month, I detailed how the NYS Berry Growers Association obtained funding for the battle against Spotted Wing Drosophila (SWD). This month I will start describing some of the projects that will be done with the funding that we obtained.

At the NYS Produce Expo in January, I approached Dave Grusenmeyer, Managing Director of the NYS Farm Viability Institute (NYSFVI) about the possibility of funding an "out of cycle" project for management of SWD. Serendipity was on the side of the Berry Growers Association as some projects funded by the NYSFVI were never completed, so funding actually was available – a pretty rare occurrence in grant funding organizations. I connected Dave with Drs. Greg Loeb and Art Agnello at the end of the SWD session so they could describe their research idea of managing SWD in High Tunnels with a fixed sprayer system. Dave said the FVI would be very receptive to considering an "out-of-cycle" funding proposal. After submitting a pre-proposal that was approved, Drs. Greg Loeb, Art Agnello, and Andrew Landers, Dept. of Entomology at Geneva, and Dr. Marvin Pritts, Dept. of Horticulture submitted a full proposal to look at the **Management** of SWD in high tunnels while minimizing worker exposure using a fixed sprayer system.

High tunnel systems are increasingly being used to produce berry crops like raspberries and blackberries in NYS. SWD readily colonizes high tunnels and caused major damage to berry crops in high tunnels in 2012. Applying insecticides in high tunnels is very challenging using standard application equipment. Growers often must use backpack sprayers, and many choose to not spray anything, even with organically approved pesticides.

This project will compare the efficacy and costs associated with a fixed sprayer system with current practices at cooperating grower sites and research sites. The scaffolding of high tunnels makes it very amenable to fixed sprayer application techniques.

Fixed sprayer systems will be established at commercial sites and at research sites in three locations in New York. Protocols and costs with establishing each system will be documented and the effectiveness in controlling infestations compared to conventional approaches will be evaluated.

The costs to conduct this research in 3 locations will be high. Fortunately, the NYSFVI approved funding of over $80,000 that will cover materials and supplies associated with the fixed system at 3 sites, labor for construction of systems, assisting with applications, assessing efficacy, organizing extension outreach, and travel.

Research is not cheap; it also is not a "luxury" when a threat like SWD threatens the industry. Thank you to the Board of the NYSFVI for recognizing the immediate need for this research and being flexible to provide funding outside of its standard funding cycles. Berry growers of NYS, join the NYSBGA today. Without the Association, projects like this would not be happening. Fifty dollars of every membership goes into a research fund to support research that we direct. Contact Paul Baker, our Executive Director, to sign up today. pbaker.hort@roadrunner.com or 716-807-6827.

NARBA NEWS

What Will Your Raspberry and Blackberry Prices be in 2013?

The North American Raspberry & Blackberry Association is conducting a survey of growers' prices for their raspberries and blackberries, especially focusing on those growers who sell direct to the public, either pick-your-own or at farm stands and farmers markets. We also ask about wholesale on a small scale, perhaps to other farm stands or local restaurants, as wholesale prices on a larger scale are pretty much beyond individual growers' control.

If you are a grower: please visit http://www.surveymonkey.com/s/berryprices, and fill out our quick and easy price survey. This is a quick and easy way for us to collect this information.

If you don't yet know 2013 prices, report 2012 prices or give your best guess.

If you absolutely hate online surveys, you can email the NARBA office with your information. Remember, for each price, we need to know the type of berry, unit size, and whether already picked or PYO.

Please respond by June 3, 2013.

If you are an extension person, please invite other growers you work with to participate in the survey.

All responses are confidential and no farm will be identified by name. A report of the survey will be published in the June issue of The Bramble, NARBA's newsletter. Non-members who respond will receive the report by email.

Thank you for participating!
Debby Wechsler
NARBA Executive Secretary

FOCUS ON PEST MANAGEMENT

A Crash Course On Virus Disease Control - *Ioannis E. Tzanetakis, Dept. of Plant Pathology, Division of Agriculture, University of Arkansas System and Robert R. Martin, USDA - ARS, Horticultural Crops Research Laboratory, Corvallis, OR*

Not all people are aware that plants can be infected by viruses. Still, plant viruses account for losses in the billions of dollars every year. There have been several cases where a virus epidemic has disseminated crops in vast areas and the most frustrating part from a grower's standpoint is that there is not much to do once a plant is infected.

Let's start from the basics: What is a virus? A virus is an obligate parasite consisting of nucleic acids (RNA or DNA), proteins and in some cases, lipid membranes. The key term here is 'obligate'. Viruses cannot function outside a living cell. If the host dies, the virus goes with it. Thus, in nature viruses have co - evolved with their hosts to keep a fine balance between virus replication and survival, and survival of the host to sustain infection through dormant seasons of the host. This is definitely the case in the majority of plant - virus interactions. Viruses have evolved to co - exist and most have minimal impact on their hosts. With new technologies developed in the last few years we know for a fact that plants are infected with several viruses but in most cases no definite symptoms are observed. These are what we refer to as 'resident' or 'latent' viruses.

But there are also cases where viruses cause severe plant disease and even death. This is truly an imbalance in the system. The majority of the scientific community agrees that viruses that kill their hosts are probably accidental introductions, as they die out along with their hosts. There are rare cases where viruses can mutate to cause less severe symptoms allowing for their survival in a particular host.

As we learn more about viruses and virus diseases we have come to realize that, at least in berry crops, the majority of disease are not caused by a single virus but rather by the combination of two or more viruses. In the past, scientists were able to identify the 'easy' viruses, entities that were easy to isolate and manipulate. With the new technologies that have been developed, we now realize that the knowledge of the past only accounts for the tip of the iceberg in terms of what causes virus diseases in berry crops. A clear example is blackberry yellow vein disease (BYVD). Until the turn of the century people assumed that symptoms were caused by Tobacco ringspot virus (TRSV). Although TRSV is found in some plants, the majority of symptomatic plants are free of the virus. Also, TRSV does not cause symptoms in single infections in most modern blackberry cultivars. We now know that BYVD is caused by complexes, with more than a dozen viruses that may contribute to the symptoms. BYVD can be caused by various combinations of these viruses, and in all cases observed to date, there are at least two and up to seven viruses involved.

Management strategies of virus diseases are based on resistance, control of vectors or elimination of viruses from propagation material. Resistance is based on the premise that viruses are identified by their hosts as invaders at the genetic level that results in some step in the virus life cycle being blocked. Given that most virus disease in berry crops are caused by complexes it is a challenging undertaking to develop multiple virus resistances. If symptoms are expresses in the presence of multiple viruses then plants need to be able to recognize all or most of those entities. If a single pathogen causes disease it is easy to screen and identify resistant sources. However, in berry crops, resistance sources have not been identified for most of the viruses. 6 Resistance to multiple viruses is more challenging as different combinations need to be introduced to plants and the reaction to each virus needs to be evaluated. When breeders work with thousands of accession, the challenge is obvious.

Vector control can be a good alternative but knowledge of the epidemiology and transmission of viruses is necessary for the implementation of a successful control program. There are four different modes of transmission when it comes to viruses and their vectors: a. non - persistent; b. semi - persistent; c. circulative and d. circulative propagative. What do those terms mean? In the non - persistent transmission, virus acquisition and transmission takes place in few seconds or minutes and the vector losses the ability to transmit in minutes. In the case of semi - persistent viruses the vector needs to feed on the source plant for several minutes or even hours, but once the virus is acquired it may be able to transmit from hours to days. The latter two modes of transmission are more complicated as vectors need hours or even days of feeding on infected material to acquire the virus. Then, they are unable to transmit for hours or even days as the virus need to pass though vector membranes to make it back into the salivary system. However, once acquired, they are able to transmit for days, weeks or even the life of the vector. In the case of circulative propagative viruses, the virus actually infects the vector and in certain cases, it has been proven that they can move to the next generation though infection of the egg. But why is this important to know? The secret to an effective control regime lies in the knowledge of how viruses are vectored. In the cases of the circulative viruses the answer is straight forward, since there are days between when a vector acquires a virus before it can transmit, allowing for ample time to control the vector. Control will probably eliminate the vector before it is able to move viruses to adjacent plants. How about the case of non - and semi - persistent transmission? This presents a major challenge: Let's assume the case of a non - persistent virus. The vector

transmits the virus after short feeding time. A control agent applied to the foliage may change the vector behavior (e.g. the composition of the plant sap has changed) such that the vector does not settle down, but rather moves from plant to plant, thus increasing the number of plants that it infects. If no control was applied only a single plant would be infected. This situation is very specific and changes depending the environment, the control agent/chemical and of course the virus/vector combination. Without this information the grower may use valuable resources for vector control and that leads to increased virus spread.

Breeding for vector resistance can be effective at controlling all viruses transmitted by the vector. Probably the best example of this in all of plant virology is the success of aphid resistance in virtually eliminating the spread of the raspberry mosaic complex, a group of three aphid - transmitted viruses. Even though successful in North America for more than 50 years, the original source of aphid resistance has been overcome by new biotypes of the aphid and this resistance is no longer effective. In Europe, the resistance was overcome much more quickly and now multiple aphid resistance genes have been overcome. It must be remembered that if we look at a complex like BYVD, there are multiple types of vectors involved (eriophyid mites, whiteflies, nematodes, thrips and pollen, which makes breeding for vector resistance a monumental task. Also, in most cases, vector resistance has not been identified in the berry crops.

The easiest and most effective control is planting clean material. Many growers propagate their own stock for planting new fields. Whereas this appears to be an easy and cost - effective approach it can have devastating results. Plants may appear normal but this is not uncommon when infected with one or two 7 viruses. When placed in the field, viruses are transmitted between plants and complexes develop, plus additional viruses may be vectored into the field and a field decline may become apparent shortly after planting. Even if there are no apparent symptoms, virus infection may account to a 5 - 20% yield loss. Establishing a field with virus - tested plants does not mean that they will never get infected. As a law of nature, all organisms from bacteria to amoebas to plants and primates get infected by viruses. A field with clean plants will stay productive for more time and yield better than a field with infected plants, providing growers with better quality product and better yields.

There have been several cases where growers move self - propagated plants to new areas and introduce new pests to new environments. The introduction of a few Prunus trees infected with Plum pox virus has cost the tax payers hundreds of millions of dollars. Citrus greening is another example of how the inappropriate movement of plant material can cause losses of colossal proportions. So when growers plant their next field they need to recognize the extra investment of virus - tested plants not only in terms of profitability of the newly planted field. But, also in terms of protecting existing fields on the same farm or in the area from the introduction of new viruses that could jeopardize production. It is certain that the return of this investment will be greater that the risk of disseminating viruses.

(Reprinted with permission from: Small Fruit News Vol. 13(2), April 2013)

New Blueberry Gall Midge Fact Sheet Helps Identify Damage That Is Easily Confused With Frost Damage - *Craig Roubos, and Rufus Isaacs, Michigan State University Extension, Department of Entomology, Michigan State University*

May 22, 2013. Blueberry gall midge (*Dasineura oxycoccana*) is a small fly found almost everywhere blueberries are grown. It feeds on young leaf shoots and can cause leaves to become distorted. Feeding can also damage growing tips, resulting in growth of extra side shoots that tend to be stunted rather than shoots with flower buds.

Pest status varies across this insect's geographical range, and in Michigan, it has not been shown to cause economic losses in mature fields. It is important, however, to be aware of this insect so the signs and symptoms of its feeding are not confused with more serious pests or other factors. Leaf shoots infested with gall midge larvae tend to turn brown and can easily be mistaken for frost injury.

A description of blueberry gall midge and methods for sampling and managing this insect are presented in a new fact sheet available through the Michigan State University Extension Bookstore called "Blueberry Gall Midge" (E3191).

Dr. Isaacs' work is funded in part by MSU's AgBioResearch.

Extension Bulletin E-3191 • New • March 2013

Michigan Blueberry Facts

MICHIGAN STATE UNIVERSITY

Blueberry Gall Midge

Craig R. Roubos and Rufus Isaacs
Department of Entomology, Michigan State University

Dasineura oxycoccana **(Johnson)**
(Diptera: Cecidomyiidae)

Introduction

Blueberry gall midge is a small fly found almost everywhere that blueberries are grown. It is native to North America and can be found from the Canadian maritime provinces to Florida, and from Maine to British Columbia. It is also common in other countries where blueberries are cultivated. The broad geographical distribution is likely the result of it being moved around on infested nursery plants. Larvae have been found in many types of blueberries: lowbush, highbush, southern highbush and rabbiteye. Blueberry gall midge has been reported as a pest of blueberry and also of cranberry, where it is known as cranberry tipworm. Recent studies, however, show that the midge feeding on cranberry may be a separate species. This fact sheet provides information on the biology and management of blueberry gall midge in blueberries.

Identification

Adults are small, only 2 to 3 mm in length. Females are slightly larger than males, and their abdomens are usually orange. Males have slender, yellow abdomens. Like all true flies, adults have one pair of wings, and in this species the wings possess a fringe of small hairs (Figure 1). Blueberry gall midge antennae are long relative to their bodies. Male antennae have longer sensor hairs, which are used in detecting the chemical signal released by females to attract mates. Some of these hairs form loops,

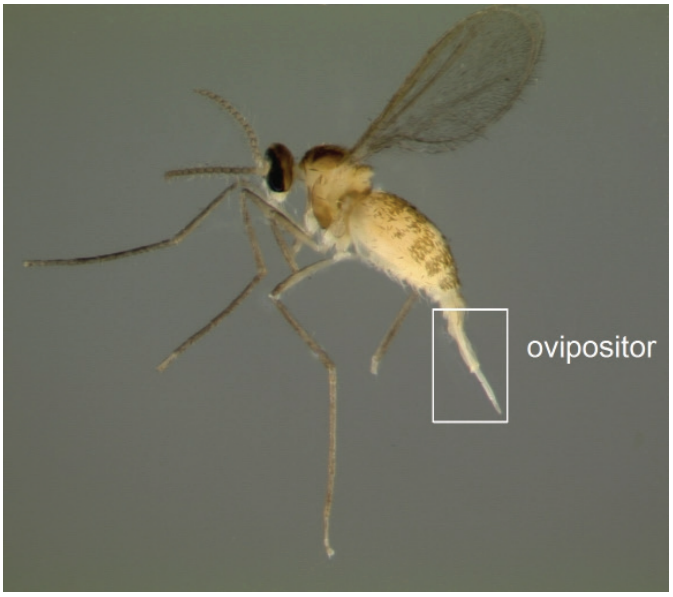

Figure 1. Blueberry gall midge (*Dasineura oxycoccana*) adult female. The ovipositor (used for depositing eggs) is extended.

a characteristic unique to gall midges. The small size of this fly makes it difficult to see these features without a hand lens or microscope.

Larvae range from less than ½ mm when newly hatched to 2 mm when mature (Figure 2). These are legless maggots; the only distinguishing feature is a small T-shaped structure called a “spatula,” located on the underside of mature larvae. Mature larvae use this hardened structure for digging into the soil to pupate. There are three larval instars, and the larval stages can be distinguished by their color: newly hatched larvae are colorless, then white, yellow and finally orange.

Figure 2. Blueberry gall midge larvae (red arrows) on a blueberry shoot that has been peeled open.

The larva is the feeding stage and is responsible for plant damage. Larvae feed in unopened leaf buds. This can result in leaves that are distorted as they develop (Figure 3). If this feeding kills the growing point (meristem) of the shoot (Figure 4), it can cause lateral growth that may slow the establishment of the ideal bush architecture (Figure 5).

Life cycle

The midge survives the winter as a pupa in the soil. Adults emerge in the spring, when blueberry plants are putting out new vegetative growth and new leaf buds. Multiple overlapping generations of blueberry gall midge occur each year. Mating occurs shortly after emergence; then females fly to blueberry plants in search of suitable sites to lay eggs. Eggs are cylindrical to elliptical and only ¼ mm long.

A female may deposit several eggs in one leaf bud, and each bud can contain eggs from multiple females. Adults live for only one or two days. A larva will feed on a blueberry plant for approximately 10 days. When mature, the larva leaves the plant, drops to the soil and burrows beneath the soil surface to pupate. During the summer, the blueberry gall midge life cycle can take two to three weeks to complete; under cooler weather conditions, it can take longer.

Monitoring and Damage

Monitoring. Because of its small size, blueberry gall midge can easily be overlooked. Usually symptoms of black shoot tips (Figure 4) on blueberry plants are the first sign that blueberry gall midge is present and active. These symptoms can be easily confused with frost damage. Sticky traps are not very effective at catching adults, but bucket emergence traps placed between blueberry plants can catch adults emerging from the soil in spring. Emergence traps also catch a number of other small flies that pose no threat to blueberries, so correct identification is critical.

A more reliable method for monitoring blueberry gall midge is to sample blueberry leaf buds and open them to look for larvae. Eggs can also be found using this method, but they are so small that they require high magnification to see and will likely be missed. Begin monitoring when leaf buds start to unfold (early to mid-May) by looking for signs of injury: leaf buds that are starting to curl and turn brown. If buds are completely brown and brittle, the larvae are usually long gone. The sampled shoots (at least

Figure 3. Distorted blueberry leaf resulting from blueberry gall midge feeding during its development.

Figure 4. Blueberry shoot tip showing blueberry gall midge feeding damage.

20 spread throughout the field) should be placed in a sealable clear plastic bag with a bit of damp paper towel. The bag can be examined periodically for larvae that have exited the buds. Larvae can be examined directly through the clear plastic bag with the aid of a hand lens. Peeling open leaf buds to remove larvae is also possible, but this is more labor-intensive and, therefore, limits the sample size.

Damage. The branching of blueberry shoots that is caused by blueberry gall midge feeding (Figure 5) can potentially lead to reduced bush height in young plants in nurseries or in newly established fields. In mature bushes, the impact of this feeding may be more significant during

Figure 5. Blueberry shoot with multiple branches resulting from blueberry gall midge injury to the growing tip.

short growing seasons because the bushes may not have enough time to compensate for the damage with new shoot growth and formation of buds for the following year's crop. To date, however, no significant economic loss from blueberry gall midge has been recorded in mature Michigan blueberry fields.

Control

Biological control. Small parasitic wasps have the potential to provide a high level of natural population suppression of blueberry gall midge, and several species of wasps have been documented to parasitize this insect. These wasps attack the midge larvae within the leaf bud, laying their eggs inside the larvae. The wasp eggs hatch and complete their development within the host. A fully developed adult wasp will emerge from the remains of a midge larva. To enhance biological control, growers should conserve the parasitic wasps naturally present through careful selection and use of pesticides that have minimal negative effects on non-target organisms.

Chemical control. Chemical control of blueberry gall midge can be challenging. Eggs and larvae are protected within the leaf buds, and pupae are protected under the soil from foliar pesticides. The adult flies are exposed, but they are also very short-lived, so timing of foliar applications would need to be exact. Nevertheless, some products are labeled for blueberry gall midge control or suppression on blueberry. Products with systemic activity may provide the best control because the active ingredient has a better chance of reaching the target. Because no significant economic losses from blueberry gall midge have been observed in Michigan blueberries, pesticide applications directed specifically at this pest are seldom required. Pesticides targeting other insect pests may provide incidental control of blueberry gall midge. For a list of specific insecticides, see the latest version of MSU Extension's Michigan Fruit Management Guide (E154), available from the MSU Extension Bookstore (**bookstore.msue.msu.edu**).

For more information on blueberry gall midge and other insect pests of blueberry, consult these resources:

Blueberry facts website: **www.blueberries.msu.edu**.

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Strawberry Harvest & Storage/Shipping Considerations *Craig Kahlke, Lake Ontario Fruit Program*

With a certainly much more normal spring as compared to 2012, strawberry harvest will be underway shortly. Thus now is a good time to discuss handling of the fruit associated with harvest and post-harvest activities. Strawberries are among the most perishable of all fruits, and thus it is critical that marketing channels are open before harvest starts. Strawberries are extremely susceptible to bruising, and rough handling at harvest and during any time thereafter will encourage fungal growth and decay. It is critical that personnel be trained in the careful picking and handling of fruit. In addition, fruit quality declines as the season progresses, so the highest quality fruit will be earliest in the season. With varying degrees of ripeness in single plantings, it is also extremely important that the fruit is harvested as near peak ripeness as possible.

Worker Hygiene

From a food safety standpoint, (microbial contamination with the potential to cause foodborne illness) strawberries, raspberries, and blackberries are considered high risk. One reason is because often the last person to touch the fruit prior to it being eaten by the consumer is the picker, as postharvest on-farm washing soon after harvest reduces shelf-life considerably in soft berries. Therefore, proper worker hygiene training is critical. Workers should ALWAYS wash their hands before entering the fields, and before/after eating and during breaks, prior to re-entry into fields. This should be an enforceable rule. Workers should be trained in proper hand-washing techniques, and always use soap and potable water, with single-use paper towels. There should be no smoking or eating in the fields, and there should also be designated areas for breaks/lunches (these can be on the edges of harvest fields but not between the rows). For more information and to order proper worker hygiene training materials, please go to http://www.gaps.cornell.edu, and click on GAPs Educational Materials.

Strawberries Destined for Direct Markets

Since most strawberry markets in the Northeast are consumed very close to the farms in which they are produced, many growers lack and may not need the cooling methods and storage facilities used by long-distance shippers such as those employed by the production areas in California and Florida. Direct market channels are ideal for many growers in the Northeast, as fruit loss is further accentuated from shipping from the farm to wholesalers, and from the wholesalers to retail markets. By bypassing wholesale shipping, fruit loss due to bruising and fungal decay can be reduced by an average of 20%. For optimum quality, it is critical that direct market fruit is harvested at or very near peak ripeness. Top quality strawberries should be fully ripe, with a uniform red color, be firm, flavorful, and show no signs of decay or disease.

Temperature is the single most important factor affecting shelf life of strawberries.

If cooling down to the recommended 32 F is an issue for growers, research shows that strawberries held at 50F storage at high humidity will benefit storage life greatly as compared to room temperature storage. In addition, strawberries at 50F tend to retain their color and glossy appearance better than berries stored at 32F. Many direct-market local growers claim approximately 90% of their strawberries are consumed the day they are harvested, thus in these cases, it is very critical that the berries be at peak ripeness. The berries are most often harvested in morning only when field heat is low, are usually then shipped out to markets on refrigerated trucks the same morning, reach the retail shelves by afternoon, and are bought and consumed within a day or two.

Strawberries Destined for Long-Distance Markets

For strawberries that are being transported beyond local markets, there are two factors that impact on maximum shelf life potential. First, the fruit will hold up better if they are harvested at the white tip stage, rather than fully ripe. Second, cooling is critical. As soon as harvest occurs, it is imperative that field heat is removed from the fruit. It is recommended that cooling is started within an hour of harvest. Ideally, 32F forced-air cooling with high humidity (90-95% RH) is recommended. Refrigeration without forced air can also be used; however, shelf-life will be shortened. Proper forced-air cooling removes field heat from fruit in around 90 minutes, while simple refrigeration without forced air can take about 9 hours. Proper ventilation around, below, and above the fruit is essential for removing field heat quickly. Covering containers with plastic prior to cooling, and not removing plastic until berries are at room temperature for several hours after reaching market shelves will prevent condensation buildup on the inside of the bag and delay fungal growth. It is estimated that for each hour delayed in cooling the fruit results in reducing shelf life of fruit by one day.

Following field heat removal, shipping on refrigerated trucks to market destinations is essential. If cold storage will be limited at market destination, as stated in the section on direct marketing, research shows 50F storage at high humidity will benefit storage life greatly as compared to room temperature storage. If all precautions are taken from harvest to cooling to storage, shelf life from harvest to market and on the consumer's table can be up to 10-14 days maximum for strawberries, but likely averages more like 7 days in the Northeast. For growers interested in exploring the potential of longer distance markets, including more information on how to set up an inexpensive forced-air cooling system for berries and many other types of perishable produce, please contact Craig Kahlke at 585-7355448, or email at cjk37@cornell.edu. In addition, see more information in a future Berry News.

Acknowledgments – I wish to thank the late Jim Coulter, Marvin Pritts and Chris Watkins for their help in providing information for this article.

Resources:

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Resources for Commercial Highbush Blueberry Growers - *Andrew Muza, Penn State Extension*

Ever wonder where to find additional information on highbush blueberry production? This article's provides a list and description of select available hardcopy and web-based resources.

May 1, 2013. So, you need information on some/all aspects of the production of highbush blueberries. An excellent place to start is with your local Extension Educator or your state's Small Fruit Specialist. However, since the growing season is underway, someone may not always be **immediately** available to answer your questions. Therefore, I have compiled a list of resources that you can explore to answer many questions that you may have, regardless if you are a prospective, novice, or veteran producer of highbush blueberries.

The first resource that any commercial blueberry grower should have is their state's current commercial small fruit guide. For Pennsylvania, New Jersey, Delaware, Maryland, Virginia and West Virginia growers, their guide is the *Mid Atlantic Berry Guide for Commercial Growers 2013 – 2014.* A hard copy of this guide can be purchased or downloaded for free. Chapters 1 - 5 provides general information for small fruit crops concerning: Preplant Considerations; Soil Management and Nutrition for Berry Crops; Pesticides, Pesticide Safety, and Chemical Fumigation; Weed Management; and Wildlife Damage Control. Chapter 7 is specific to highbush blueberry production. An extensive appendices (A-E) provides information on: Expanded Special Topics; Diagnostic Services; Nursery Sources of Berry Plants; Production Supplies and Services; and Additional Sources of Information. An excellent companion resource is the 200 page Highbush Blueberry Production Guide which can be purchased for $42 plus $6.00 shipping and handling. This guide covers all aspects of production from site preparation – marketing of fruit and includes 168 color photos.

Since Michigan is the number one state for highbush blueberry production it should be no surprise that a visit to the Michigan Blueberry Facts site provides an abundance of information on: Growing Blueberries; Nutrition; Pest Management; and Chemical/Other Injury. MSUE Blueberry News is available along with the option to view past blueberry articles. A number of publications can also be purchased at this site including: A Pocket Guide to IPM Scouting in Highbush Blueberries; Managing the Nutrition of Highbush Blueberries; and a DVD on Pruning Blueberries to name a few. In addition, from the Links page eXtension's All About Blueberries can be accessed which contains videos, webinars, moodle courses and more. One of the webinars at this site is an Organic Blueberry Production Webinar.

The Blueberry Bulletin (Rutgers – NJAES) provides weekly information during the growing season on cultural practices, and potential insects and diseases to consider. These bulletins often contain good pictures of insect pests and disease symptoms along with management options. Past bulletins back to 1998 are available.

The Cornell Fruit – Production- Blueberries site has a listing of publications from Cornell, Penn State, Michigan State, etc., on: Site Selection; Cultivar Selection; Nutrient Management; Water Management; Plant Growth and Development; Pollination; Frost Protection; Pruning; and Postharvest Handling. In addition, Organic Production information can also be accessed from this site.

The Berry Webinar Archive provides a listing of webinars on topics relevant to small fruit production including spotted wing drosophila. This site also provides a jump down menu to NEIPM Blueberry/Cranberry Mini Series which consists of 4 webinars on: Weed Management; Blueberry Viruses; Overcoming Pollination Challenges; and Japanese Beetles.

The Berry Diagnostic Tool assists in identifying potential causes of problems in berry crops. At this site select Blueberry then choose the closest descriptions to your problem to reach a final diagnosis.

Although the Northwest Berry & Grape Information Network – Blueberry Category site is most relevant for production in Oregon and Washington states it contains valuable information for all blueberry growers.

The last resource to be mentioned is an available DVD produced from the daylong Blueberry School that was conducted this spring in southeastern, PA. For purchasing information contact Steve Bogash, Penn State Extension – Franklin County (717) 263-9226. Remember, you can always contact your local Extension Educator or your state's Small Fruit Specialist for information on blueberries, but now, you may not need to. *(Source: PSU Vegetable and Small Fruit Gazette, Volume 17(5) May 1, 2013)*

Questions or comments about the New York Berry News? Ms. Cathy Heidenreich, Cornell University Dept. of Horticulture, 630 W. North Street, Geneva, NY 14456 *Phone*: 315-787-2367 *Email*: mcm4@cornell.edu

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