

APRIL 26, 2103



Cornell University
College of Agriculture and Life Sciences

New York Berry News

Cornell University Berry Team

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NYS Berry Growers Association Obtains over \$200,000 for Battle Against Spotted Wing Drosophila!

Dale-Ila Riggs, President, NYS Berry Growers Association, The Berry Patch, Stephentown NY

April 24, 2013. It all started with an invitation to a meeting to represent the Berry Growers Association in a discussion about getting NY fruit into NY yogurt. Growers throughout the state had been losing their raspberry and blueberry crops to Spotted Wing Drosophila (SWD) for weeks. I was overwhelmed with work at my own farm and most of my labor force had headed back to school and teaching jobs. But a thought kept gnawing at me - "This meeting will be the perfect opportunity to raise the alarm that our industry is at severe risk from this insect." So I went to the meeting.



Before I went to the meeting, I talked with Greg Loeb, grape and small fruit entomologist at Cornell, about potential projects to help us understand how to manage this pest if funding were not an issue. Doing back of the envelope calculating, I asked "Does \$200,000 a year for three years in a row sound reasonable for achieving what we need to achieve?" "That would be great!" was his reply.

Pat Hooker, our Former Ag Commissioner, and now with the Empire State Development Corporation, opened the meeting and asked about the potential for NY fruit growers to produce and provide fruit for the state's growing Greek yogurt industry. After going through some background information on the size of the industry, that we certainly have land, water, and technical resources, I swooped in. "But we have a major threat to the industry. It's a tiny fruit fly that has made its way to New York State from Asia. The industry needs immediate assistance for funding to learn how to manage this pest. If we don't get immediate assistance for this work, there may not be a blueberry or fall raspberry industry in this state in five years. The Berry Growers need \$200,000 a year for three years in a row to come up with answers on how to manage this pest."



After a long discussion with Pat after the meeting on how to proceed, we went to work. Pat spread the word that Greg's specialty crops grant application to Ag and Markets would be money well spent. He gave me contacts to talk with in the Governor's office. I met with the Governor's ag staff in December. Members of the Board went to Albany in January and met with staff from the Division of Plant industry at Ag and Markets,

New York State Berry Growers Association

Chairperson-Dale Riggs-(518) 733-6772 Treasurer-Anthony Emmi-(315) 638-7679

Executive Secretary-Paul Baker- (716)807-6827 fax (716)219-4089

goodberries@roadrunner.com

www.nysbga.org

MEMBERSHIP RENEWAL/APPLICATION 2013

Name _____ (Renewal _____ New _____)

Farm or Business Name _____

Address _____

City _____ State _____ Zip _____

Phone _____ Fax _____

E-Mail Address _____ County _____

Web Address _____

Crops: (check all that apply)

Blueberries _____ Raspberries _____ Blackberries _____ Strawberries _____ Currants _____

Gooseberries _____ Other _____ Vegetables _____ Fruit _____

Marketing Venue (Please indicate percent)

U-Pick _____ Retail _____ Wholesale _____

Membership Fee – 1 Year 2013 _____ **\$125.00**
(\$50 of this will go directly to research)

Research Fund Donation _____

TOTAL ENCLOSED _____



Please make check payable to New York State Berry Growers Association
Or NYSBGA and send to:

Paul Baker, Executive Secretary NYS Berry Growers
3568 Saunders Settlement Road, Sanborn, NY 14132
Cancelled check will serve as your receipt, unless otherwise requested

Upcoming Berry Events

May 3, 2013. Erie County Berry Grower Meeting, East Aurora, NY. More information follows.

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.

Save the dates:

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 pre-conference 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 gj.fernandez@ncsu.edu.

Spotted Wing *Drosophila* Funding (continued)

the Governor's staff, and a myriad of state Senators and Assembly members. Paul Baker did a great job setting up appointments with Senator Ritchie's office (chair of the Senate Ag Committee), other Senators on the Senate Ag Committee, Board member's Senators and Assembly members, and Assemblyman Magee (chair of the Assembly Ag Committee). We went with a list of ten research objectives (put together by Greg and other Cornell researchers) that we wanted to have funded over the next three years to come up with recommendations for managing SWD. Our message was consistent. "We need \$200,000 a year for the next three years so that there can be a raspberry and blueberry industry in New York State in the future."

After our initial meetings with our representatives, I worked with Greg to further define the 10 research objectives. Greg did a great job putting together budgets and rationale for each of the objectives, and I put it into an easy to digest format for the Senate and Assembly Ag Committees. And then we waited.

Parallel to our work with the state legislature, I approached Dave Grusenmeyer of the NY Farm Viability Institute to see if there might be any between-cycle funding available for SWD research. As luck would have it, some projects through the Institute were not completed, so yes, money might be available if a proposal was submitted. Dave sat in on the SWD session at the NY Fruit and Vegetable Expo, and after the session, I introduced Greg and Art Agnello to Dave. They put in a pre-proposal that was accepted, then a full proposal. And we waited.

And while we waited, Kevin King, Director of Plant Industry at Ag and Markets asked me to make a presentation to the NYS Invasive Species Council. The Council receives money through the state legislature to address invasive species. On a beautiful, sunny February day, I went to their meeting and presented the facts about SWD, what it is doing to the berry industry in NYS, and potential repercussions in addition to direct yield losses due to this invasive pest. I've given a lot of presentations in my life, but that presentation was among the most satisfying I've ever done. You know you have an impact when people listening wind up in tears. And I made our pitch; \$200,000 a year for the next three years. And we waited.

My husband will tell you that patience is not one of my virtues. The waiting about killed me. But as the saying goes, all good things take time. We succeeded! The NYS Berry Growers Association received a line item in the state budget for \$200,000 for SWD research and outreach. Greg and Art received \$80,000 from the Farm Viability Institute for exploring a fixed sprayer system for tunnels for SWD management. Greg received a \$100,000 specialty crops grant last December for SWD work. And there is potential for funding through the Invasive Species Council if we need a bit more to round out our program for research and outreach work.

We plan a full assault on SWD so that we can devise both short term and long term management solutions for controlling this pest, thereby maintaining a viable blueberry, raspberry, and day-neutral strawberry industry in this state. (continued on page 38)

My heart-felt thanks go to Greg Loeb and other Cornell researchers for continued yeoman's duty and getting us the information we needed to make the case to our funders; to Paul Baker and the Board for acting as a sounding board and advocating at the state level; to Dave Grusenmeyer and the Board at the Farm Viability Institute for recognizing this threat and responding to it outside of their established funding cycles; to Kevin King and the staff at Ag and Markets for their insights and willingness to make things happen; and

Spotted Wing *Drosophila* Funding (continued)

to Senator Patty Ritchie, members of the Senate Ag Committee, and Todd Kusnierz, Director of the Senate Ag Committee for keeping the Berry Growers in budget discussions and ensuring that we received the funding we need to battle SWD.

It took true teamwork and lots of diligence to make this funding accomplishment happen. We look forward to continuing this teamwork to make great things happen for the industry. So join the team, protect your livelihood, and become a member today by filling out the membership form on the next page. More information about the individual projects that will occur because of this funding will appear in future issues. Best wishes for a good season!

Berry News Briefs

Highbush Blueberry Production Program a Hit with Growers - Janet Aldrich, Cornell Cooperative Extension of Delaware County

The April 11th blueberry production school held in Hamden, at Cornell Cooperative Extension of Delaware County, attracted 53 participants. These were a good mix of experienced growers, new producers and serious home gardeners, covering two states and eleven counties (Delaware; Steuben; Saratoga; Chenango; Tioga; Orange, Tompkins; Sullivan; Oneida; Genesee, and Otsego).



Cornell's berry specialists covered a lot of territory in the six hour program.

Dr. Marvin Pritts led the discussion on establishment, production and management. He covered blueberry anatomy, variety types, soil and nutrient management, planting, weed and water management, and pruning basics. Cathy Heidenreich discussed pre-harvest, harvesting and post-harvest considerations. She also talked on the marketing end of things, covering consumer trends, pricing and berry economics.

After a lunch that included blueberry cookies, Kerik Cox covered the identification and management of blueberry diseases, advising on ways to exclude or avoid key pathogens. He discussed anthracnose, botrytis, mummyberry, canker diseases, witches' broom, root diseases, and viruses. Greg Loeb ended the program with a discussion on insects and mites of high-

bush blueberry. He covered two in particular, the blueberry maggot and the new invasive pest Spotted Wing *Drosophila*.

Growers and novice alike enjoyed the day and felt it was a great opportunity to network with Cornell specialists, as well as with each other. A good number of them provided Extension Educator Janet Aldrich with their emails to receive berry alerts and better network for future programs. It was a great day and the blueberry cookies were enjoyed by all.

New Resource for Specialty Crop Growers - Sean Westerveld, Evan Elford, Melanie Filotas and Jim Todd, OMAF and MRA

Small fruit growers have a new resource to help them choose and grow a wide range of specialty crops. The resource, called "SPECIALTY CROPportunities", is now live on the Ontario Ministry of Agriculture and Food (OMAF) website.

There are literally hundreds of specialty crops that can be grown in Ontario (and the NE region) including culinary and medicinal herbs, specialty/ethnic vegetables, specialty fruits and nuts, specialty grains and oilseeds, and industrial crops. Due to limited research and experience with many of these crops, there has been very little written information available

Berry News Briefs (continued)

to Ontario growers looking for a new crop to grow. The research that has been conducted on these crops in Ontario has often been forgotten over time without a permanent database to provide those results to the public – until now.

Ontario Ministry of Agriculture and Food and Ministry of Rural Affairs staff along with University of Guelph colleagues, assembled a team of researchers from the University of Guelph, Agriculture and Agri-Food Canada, Erie Innovation and Commercialization, and Vineland Research and Innovation Centre to pull together all of the available research on specialty crops and provide a single resource for growers. Initially the resource includes specific information on 100 specialty crops, which will be expanded over the next few years.

Growers looking for information pertaining to a specific crop can use the crop category selection or alphabetical crop list to locate a profile on that crop. Each profile summarizes background information on the crop, its growth habit, and specific agronomic information such as plant spacing, fertility, irrigation, soil type, harvest, and storage requirements. It also includes information on pests of that crop, such as a listing of existing and potential pests, notes on potential pest impacts, and how to find more information on pest management. Finally, the profile lists any research projects conducted on that crop in Ontario and other references used to create the profile.

If a grower is unsure of what they want to grow, they can use the Crop Selection Tool to narrow down the list of specialty crops to those specifically suited to their preferences and growing conditions. The selection tool asks a series of 4 questions and the end result is a listing of crops that match the selection criteria along with an indication of labor, irrigation and specialized equipment requirements. Crops not included in the list could still be grown, but may require some additional site modifications. Just because a crop can be grown, doesn't mean there is a market for it. Growers still need to find a market before growing any specialty crop.

The resource also includes a wealth of general information on specialty crops including crop fertility, pest management, on-farm research, business planning and marketing, food safety, and an introduction to organic crop production. A particular challenge for specialty crop growers is a lack of fertility recommendations. The resource provides suggested approaches for fertilizing crops when there are no recommendations. Another challenge is pest management, since it is often unknown what will attack the crop and how to control those pests. The resource discusses integrated pest management, provides information on the major types of insects and diseases, provides alternative management approaches, and discusses how to determine which products are registered for use on the crop.

The resource can be found on the OMAF Crops page at www.omafra.gov.on.ca/english/crops/, in the "Specialty Crops" section.

This project was funded by Agri-Food and Rural Link, a program of the OMAFRA/University of Guelph Partnership.



Cornell University
Cooperative Extension
Erie County

21 South Grove Street
East Aurora, New York 14052-2345
t. 716.652.5400
f. 716.652.5073
erie@cornell.edu
<http://counties.cce.cornell.edu/erie/>

Erie County Small Fruit Growers Meeting



Friday May 3, 2013 ~ 9:15 am to noon

**CCE of Erie Co. Farm & Home Center
21 South Grove Street; East Aurora, NY
Demonstration Room, first floor
Free: Pre-registration requested**

1 hour of NYS DEC Pesticide Recertification credits

AGENDA

- 9:15 – 9:25 Welcome and Introductions
- 9:25 – 10:25 Pest Management in Small Fruits – Spotted Wind Drosophila, Brown Marmorated Stink Bug and More
- 10:25 – 10:40 Break
- 10:40 – 10:50 Excellence in IPM Award (tentative)
- 10:50 – 11:35 Nutrient Management in Small Fruit
- 11:35 – 11:55 NYFVI Berry Farm Business Management Project
- 11:55 – noon Wrap-up, Questions

Presentations by Sharon Bachman, CCE-Erie and. Cathy Heidenreich, Cornell University



Provided in collaboration with the Erie County Soil & Water Conservation District.

Erie County Small Fruit Grower Registration Form
CCE of Erie County
Register by mail or email. Please return by April 29th.

Name(s)

Farm Name

Address

Telephone Number and/or Email

Total number of people you are registering. _____

Return by mail to:

**CCE of Erie County -Ag Program
21 South Grove Street
East Aurora, NY 14052**

Or email Sharon Bachman:

sin2@cornell.edu

For persons with disabilities requiring accommodations, please contact Sharon Bachman by 4:30 pm on April 29th.

Building Strong and Vibrant New York Communities

Cornell Cooperative Extension in Erie County provides equal program and employment opportunities.



Berry Sprayer Optimization and Calibration Workshops

Proper sprayer calibration and optimization will be a major part of an effective Spotted Wing Drosophila management program. Join us for one of these three workshops to learn more about sprayers – large and small – and how you can improve spray distribution, monitor output and improve efficacy. SWD monitoring will also be discussed.

Locations	Dates	Times
Mead's Orchard , 15 Scism Rd, Tivoli NY 12583 <i>Questions? Contact Jim O'Connell: 845-943-9814</i>	Wednesday, May 22	2:00 PM-4:00 PM
Winney's Farm , 113 Winney Road, Schuylerville, NY 12871 <i>Questions? Contact Laura McDermott: 518-791-5038</i>	Tuesday, May 28	2:00 PM-4:00 PM
Valley View Farm , 228 State Route 9N, Ticonderoga, NY 12883 <i>Questions? Contact Laura McDermott: 518-791-5038</i>	Thursday, May 30	10:00 AM-12:00 PM

These workshops are directed at the commercial grower.

Improving the efficacy, coverage and management of your pesticides will be of imperative this year. Learn how to calibrate air blast, boom and small hand-held or back-pack sprayers. We will demonstrate the utility of water sensitive paper and discuss alternate row spraying and nozzle selection. An emphasis on SWD management will be part of the workshop. There will be time for questions and discussion.

2 DEC Pesticide Re-certification credits will be available.



Please call to let us know you are coming!

This helps us plan – and also allows us to cancel the class in the event of foul weather.

Call the person listed under the location and date you are interested in attending. **When leaving a message include your name and phone number.**



NYS Ag & Markets News



COMMISSIONER AUBERTINE TO FARMERS: IT'S NOT TOO LATE TO FILL OUT THE U.S. CENSUS OF AGRICULTURE

Census Helps Farmers Make Informed Decisions about their Own Operations and Supplies Policymakers with Information to Help Shape the Future of Agriculture

April 24, 2013. State Agriculture Commissioner Darrel J. Aubertine today encouraged farmers across the state to fill out the U.S. Census of Agriculture. Currently, the New York State response rate stands at 68 percent. USDA's National Agricultural Statistics Service (NASS) has mailed a final copy to those producers who have not yet responded. They will be making follow up phone calls and site visits in the coming weeks and months to ensure as accurate a count as possible.

"As a policymaker, I rely on data from the U.S. Census of Agriculture to help me make the best possible decisions on behalf of New York agriculture," said Commissioner Aubertine. "It's extremely important that the most accurate and up-to-date information is available to other policymakers as well. That's why I encourage all New York farmers

to make sure their voices are heard with this Census. When New York agriculture shows its 'strength in numbers,' we can accomplish a great deal."

The U.S. Census of Agriculture is very similar to the U.S. Census, except it is done every five years instead of every ten. According to NASS, it is the only source of consistent and comprehensive agricultural data for every state and county in the nation. The Agriculture Census examines farms, land value, agricultural production, farm practices, expenditures, demographic data, marketing information and other factors that affect the way farmers conduct their business. These data, in turn, are used at the federal, state and local levels to influence agricultural policy.

"By completing and returning their Census questionnaire, producers provide an opportunity to help shape farm programs, boost rural services, and grow their farm future," said Blair Smith, State Statistician of USDA's National Agricultural Statistics Service, New York Field Office.

During this final push to be counted, New York Farm Bureau encourages farmers to take part in the Agriculture Census. It is important to have an accurate picture of the diversity of farming in this state. In addition, it will

assist New York to secure the appropriate funding and programs that will help grow New York agriculture," said Dean Norton, President of New York Farm Bureau.

New York Farm Bureau has produced a video outlining the importance of the Census of Agriculture, which can be viewed at: <http://www.youtube.com/watch?v=Ir5uKpUS6mY&nofeather=True>.

New York farmers can return their Census of Agriculture forms online at www.agcensus.usda.gov. For tips on how to complete the Census, call 1-888-424-7828.

To look at the most recent Census of Agriculture, please visit www.agcensus.usda.gov.



"As a policymaker, I rely on data from the U.S. Census of Agriculture to help me make the best possible decisions on behalf of New York agriculture," said Commissioner Aubertine. "It's extremely important that the most accurate and up-to-date information is available to other policymakers as well. That's why I encourage all New York farmers to make sure their voices are heard with this Census. When New York agriculture shows its 'strength in numbers,' we can accomplish a great deal."



USDA News



"These changes are intended to help agricultural producers and rural small businesses throughout America," Agriculture Secretary Tom Vilsack said. "They will streamline and simplify the application process and give businesses more time to do what they do best: innovate, create jobs and serve their rural communities."



USDA Proposes Simplified Application Process for Renewable Energy Funding

WASHINGTON, April 15, 2013 - The U.S. Department of Agriculture has proposed a series of changes to make it easier for agricultural producers and rural small businesses to apply for renewable energy and energy efficiency funding. USDA remains focused on carrying out its mission, despite a time of significant budget uncertainty. Today's announcement is one part of the Department's efforts to strengthen the rural economy.

"These changes are intended to help agricultural producers and rural small businesses throughout America," Agriculture Secretary Tom Vilsack said. "They will streamline and simplify the application process and give businesses more time to do what they do best: innovate, create jobs and serve their rural communities."

The proposed changes would affect applications for loans and grants through USDA Rural Development's Rural Energy for America Program (REAP). They would:

- Reduce paperwork, especially for projects under \$80,000;

- Implement a more objective and uniform system to

- score applications;

- Authorize funding for refurbished and retrofitted renewable energy systems;

- Reduce certain reporting requirements;

- Establish a quarterly application period for applicants seeking only guaranteed loans. This change is intended to make the program more appealing to lenders and to ensure that funds are available year-round.

REAP is one of USDA's most popular renewable energy and energy efficiency programs. From the passage of the 2008 Farm Bill through the end of Fiscal Year 2012, REAP funded more than 6,800 renewable energy and energy efficiency projects, feasibility studies, energy audits and renewable energy development assistance projects.

In 2012, for example, USDA Rural Development provided ARC Technology of Whitewater, Kan., a \$9,945 REAP grant to assist with installing a 12.2 kilowatt solar array. As a direct result of the USDA grant, the company expects to save approximately \$1,300 per year on its electric bill and see a return on its investment in only two years.

USDA is accepting comments on the proposed

rule through June 11, 2013. For details on how to submit comments, or for additional information, see Page 22044 of the April 12 Federal Register, <http://www.gpo.gov/fdsys/pkg/FR-2013-04-12/pdf/2013-07273.pdf>.

President Obama's plan for rural America has brought about historic investment and resulted in stronger rural communities. Under the President's leadership, these investments in housing, community facilities, businesses and infrastructure have empowered rural America to continue leading the way - strengthening America's economy, small towns and rural communities. USDA's investments in rural communities support the rural way of life that stands as the backbone of our American values. President Obama and Agriculture Secretary Tom Vilsack are committed to a smarter use of Federal resources to foster sustainable economic prosperity and ensure the government is a strong partner for businesses, entrepreneurs and working families in rural communities.

USDA has made a concerted effort to deliver results for the American people, even as USDA implements sequestration - the across-the-board



USDA News (continued)



budget reductions mandated under terms of the Budget Control Act. USDA has already undertaken historic efforts since 2009 to save more than \$700 million in taxpayer funds through targeted, common-sense budget reductions. These reductions have put USDA in a better position to carry out its mission, while implementing sequester budget reductions in a fair manner that causes as little disruption as possible.

Agriculture Secretary Vilsack Announces Disaster Assistance to Producers and Communities in 12 States Affected by Superstorm Sandy

Funds Help Rehabilitate Farmland and Private Forests Adversely Affected by the Disaster

WASHINGTON,
April 22, 2013—Agriculture Secretary Tom Vilsack today announced an important package of disaster assistance valued at \$209 million to help farmers, land owners and communities recover from the effects of Superstorm Sandy. Funding is provided by the U.S. Department of Agriculture's (USDA) Emergency Conservation Program (ECP), Emergency Forest Restoration Program (EFRP) and Emergency Water-

shed Protection Program (EWP). Together, the assistance will help rebuild and repair land damaged on account of flooding and other events in 12 states. Qualifications for funds are based on the Robert T. Stafford Disaster Relief and Emergency Assistance Act, while funding is provided under the Disaster Relief Appropriations Act, 2013, signed by President Obama on January 29. The United States Department of Agriculture (USDA) remains focused on carrying out its mission, despite a time of significant budget uncertainty. Today's announcement is one part of the Department's efforts to strengthen the rural economy.

"Landowners, individuals and communities along our Eastern Seaboard have endured incredible hardships because of the intensity and havoc wrecked on their livelihoods by this historic storm," said Vilsack. "President Obama and USDA are committed to helping America's producers, private forest owners and other communities recover, repair and rebuild. This funding will help to rebuild communities, while states can use the funds to carry out emergency recovery measures. At the same time, this assistance keeps

farmers on the farm, ranchers on the ranch, and landowners on their land, helping to keep American agriculture profitable."

Through the Emergency Watershed Protection Program (EWP), USDA will offer up to \$171 million to help communities recover. EWP helps conserve natural resources by relieving imminent hazards to life and property caused by floods, fires, windstorms and other natural disasters. Recovery assistance for Superstorm Sandy could include: debris-clogged stream channels; undermined and unstable stream banks; jeopardized water control structures and public infrastructures; wind-borne debris removal; and damaged upland sites stripped of protective vegetation. Both public and private landowners are eligible for assistance, but they must be represented by a project sponsor.

NRCS can pay up to 75 percent of the construction cost of emergency measures or up to 90 percent in limited-resource areas. The remaining cost-share must come from local sources and can be in the form of cash or in-kind services.

The Emergency Conservation Program (ECP) pro-



"Landowners, individuals and communities along our Eastern Seaboard have endured incredible hardships because of the intensity and havoc wrecked on their livelihoods by this historic storm," said Vilsack. "President Obama and USDA are committed to helping America's producers, private forest owners and other communities recover, repair and rebuild. ""



USDA News (continued)



"For land to be eligible, the natural disaster must create new conservation problems that, if unattended, would impair or endanger the land; materially affect the land's productive capacity; represent unusual damage which, except for wind erosion, is not the type likely to recur frequently in the same area and; be so costly to repair that federal assistance is or will be required to return the land to productive agricultural use."

gram will contribute \$15 million to producers to help remove debris from farmland, restore livestock fences and conservation structures, and grade and shape farmland damaged by the natural disaster. FSA county committees determine eligibility based on on-site inspections of damaged land and considering the type and extent of damage. For land to be eligible, the natural disaster must create new conservation problems that, if unattended, would impair or endanger the land; materially affect the land's productive capacity; represent unusual damage which, except for wind erosion, is not the type likely to recur frequently in the same area and; be so costly to repair that federal assistance is or will be required to return the land to productive agricultural use.

The Emergency Forest Restoration Program (EFRP) will provide \$23 million in payments to eligible owners of nonindustrial private forest (NIPF) land in order to carry out emergency measures to restore land damaged by the natural disaster. The land must have existing tree cover (or had tree cover immediately before the natural disaster occurred and is suitable for growing trees) and; be owned by any

nonindustrial private individual, group, association, corporation, or other private legal entity, that has definitive decision-making authority over the land. In addition, the natural disaster must have resulted in damage that if untreated would impair or endanger the natural resources on the land and materially affect future use of the land.

ECP and EFRP participants may receive cost-share assistance of up to 75 percent of the cost to implement approved emergency practices. Qualified limited-resource producers may receive cost-share assistance of up to 90 percent of the cost to implement approved ECP practices.

This particular funding for ECP and EFRP is limited to counties named in Presidential Disaster Declarations due to Superstorm Sandy. Producers and forest owners in eligible counties of the following states are eligible for assistance:

1. Connecticut
2. Delaware
3. Maryland
4. Massachusetts
5. New Hampshire
6. New Jersey
7. New York
8. Ohio
9. Pennsylvania
10. Rhode Island
11. Virginia
12. West Virginia

FSA has been collecting ECP and EFRP applications in anticipation of the funding becoming available and will begin providing assistance immediately to eligible landowners. Applications will continue to be accepted through May 31, 2013. For further information on eligibility requirements and applications, producers may visit a local FSA county office or the FSA website at <http://disaster.fsa.usda.gov>. For information on Presidential Disaster Declaration, please visit <http://www.disasterassistance.gov/>.

USDA has made a concerted effort to deliver results for the American people, even as USDA implements sequestration – the across-the-board budget reductions mandated under terms of the Budget Control Act. USDA has already undertaken historic efforts since 2009 to save more than \$700 million in taxpayer funds through targeted, common-sense budget reductions. These reductions have put USDA in a better position to carry out its mission, while implementing sequester budget reductions in a fair manner that causes as little disruption as possible.

The Obama Administration, with Agriculture Sec-





USDA News (continued)



retary Vilsack's leadership, has worked tirelessly to strengthen rural America, maintain a strong farm safety net, and create opportunities for America's farmers and ranchers.

U.S. agriculture is currently experiencing one of its most productive periods in American history thanks to the productivity, resiliency, and resourcefulness of our producers.

A strong farm safety net is important to sustain the success of American agriculture. USDA's crop insurance program currently insures 264 million acres, 1.14 million policies, and \$110 billion worth of liability on about 500,000 farms. In response to tighter financial markets, USDA has expanded the availability of farm credit, helping struggling farmers refinance loans.

Since 2009, USDA has provided more than 128,000 loans to family farmers totaling more than \$18 billion. Over 50 percent of the loans went to beginning and socially disadvantaged farmers and ranchers.

If you have any questions about our webinar series or USDA's Agricultural Marketing Service, please contact Christopher Purdy at (202) 720-3209 or christopher.purdy@ams.usda.gov.

USDA Webinar Series for the Fruit and Vegetable Industry

The [Agricultural Marketing Service's Fruit and Vegetable Program](#) invites you to take part in a series of free, interactive webinars on our many programs and services. At each webinar, you'll hear a presentation from a USDA expert on a specific topic, be introduced to our staff, and take part in an interactive question and answer session. These informative webinars are designed for fruit and vegetable growers, packers, shippers, processors, wholesalers and retailers of all sizes. All of the webinars are free and available to anyone with Internet access. Registration is, however, required and space is limited. Log on today to register – it's your first step to gaining a competitive edge and learning how we can work together to meet your unique business needs. If you miss a webinar, just visit our [Webinar Archive](#) to watch it online.

Take a look at all we have to offer. Follow the links next to the webinar titles below for full information on each session and to register.

How to Sell Fruits and Vegetables to the USDA	June 27, 2013, 2:00 – 3:00 p.m. Eastern Time	To register. http://bit.ly/145Arm2
Market News: New Custom Average Tool Explained	July 25, 2013, 2:00 – 3:00 p.m. Eastern Time	To register. http://bit.ly/13xKKLm
The PACA* Complaint Process – An Interactive Discussion	August 22, 2013, 2:00 – 3:00 p.m. Eastern Time	To register. http://bit.ly/13lopNP

*Learn more about the Perishable Agriculture Commodities Act (PACA) by [watching our video](#).

More to come...

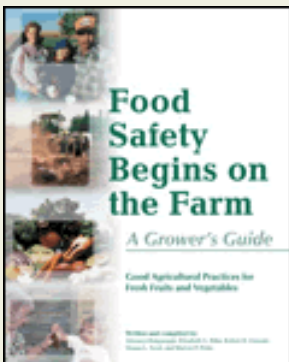


Focus on Food Safety



GAPsNET

*Good Agricultural
Practices Network
for Education and
Training*



FSMA Updates & Comment Period Extensions

The FDA issued Federal Register notices today to extend the comment periods on the proposed rules for Current Good Manufacturing Practice and Hazard Analysis and Risk-Based Preventive Controls for Human Food (the Preventive Controls proposed rule) and Standards for the Growing, Harvesting, Packing, and Holding of Produce for Human Consumption (the Produce Safety proposed rule) until **September 16, 2013**.

The comment period for the Draft Qualitative Risk Assessment of Risk of Activity/Food Combinations for Activities (Outside the Farm Definition) Conducted in a Facility Co-Located on a Farm is also extended.

To view these notices, please visit the links below:
Federal Register Notice: [Current Good Manufacturing Practice and Hazard Analysis and Risk-Based Preventive Controls for Human Food: Extension of Comment Period](#)

Federal Register Notice: [Standards for Growing, Harvesting, Packing, and Holding of Produce for Human Consumption: Extension of Comment Period](#)

Federal Register Notice: [Draft Qualitative Risk Assessment of Risk of Activity/Food Combinations for Activities \(Outside the Farm Definition\) Conducted in Facility Co-Located on Farm; Availability: Extension of Comment Period](#)

As a reminder, there are two ways to comment:

- 1.) Comment electronically at <http://www.regulations.gov/#!docketDetail;D=FDA-2011-N-0921>
- 2.) Written comments may be faxed to the FDA at 301-827-6870 or you may mail them to:

Division of Dockets Management (HFA-305)
Food and Drug Administration
5630 Fishers Lane, Room 1061
Rockville, MD 20852

PSA-FDA Q & A Series on FSMA Proposed Produce Safety Rule Continues

The Produce Safety Alliance, in collaboration with the FDA, continues to host a series of Q & A teleconferences to discuss specific sections of the Food Safety Modernization Act (FSMA) Proposed Produce Safety Rule. This is a great opportunity for you to ask questions directly to the FDA staff. Dr. Jim Gorny, Senior Advisor for Pro-

duce Safety, and Dr. Erick Snellman, Policy Analyst, will be available to answer questions.

Each teleconference will have a different focus; please refer to the schedule below. We ask that you keep your questions for each Q & A session relevant to the topic. Though Dr. Gorny and Dr. Snellman may not be able to answer every question, they will be able to direct and review specific sections of the proposed rule to enhance your understanding of what is being proposed.

If specific details are not available or addressed in the proposed rule or through this Q & A series, we encourage you to write and submit a comment or question to the docket regarding issues that FDA should clarify or address in the final rule or in companion guidance documents. Comments must be submitted BEFORE May 16, 2013.

We recommend reviewing the full proposed produce rule and codified sections before the teleconference. In addition, the links below will take you to other documents that may help clarify the proposed rule.

Proposed Produce Safety Rule at a Glance:
<http://www.fda.gov/>

Focus on Food Safety (continued)

Q & A Session with the FDA

Date	Time (EST)	Topic
May 3, 2013	11 AM	Domestic and Wild Animals
May 6, 2013	11 AM	Growing, Harvesting, Packing, & Holding Activities
May 8, 2013	11 AM	Equipment, Tools, Buildings, & Sanitation
May 10, 2013	11 AM	Health, Hygiene, and Training of Workers
May 13, 2013	11 AM	Recordkeeping, Compliance, & Enforcement

[Food/FoodSafety/FSMA/ucm334554.htm#coverage](http://www.fda.gov/ucm334554.htm#coverage)

Proposed Produce Rule Subpart Fact Sheets:

<http://www.fda.gov/Food/FoodSafety/FSMA/ucm334552.htm#L>

Call-in Information and Instructions

To participate in the teleconference, dial the toll-free number below 5 minutes prior to the presentation. No registration is required. All participants will be placed on mute upon entering the conference; however, the Q & A will be moderated by an operator who will provide instructions for how to ask questions using your telephone and individually unmute the

lines of those who have questions.

We ask that you call into the teleconference 5 minutes prior to the event start to ensure that all participants are available to receive instructions for the Q & A process at the beginning.

***Dial toll-free: 866-906-9888**

***Enter passcode: 8140591**

*These numbers will remain the same for ALL scheduled Q & A sessions.

In case you missed one of the previous sessions, the recordings are now available for listening on the PSA homepage at <http://producesafetyalliance.cornell.edu>.

[ance.cornell.edu](http://www.ance.cornell.edu).

We hope you can join us for one or more of the remaining webinars in the series!

If you have any questions about this series, please contact Gretchen Wall at 607-255-6806 or glw53@cornell.edu.

Betsy Bihn
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glw53@cornell.edu

FSMA Framework for Food Safety



Human Food



Produce Safety



Imports

• Foreign Supplier Verification
• Accredited Third Party Certification



Animal Food



Produce Safety Alliance



Money Talk\$



Editor's note: *Money Talk* is a new column that will provide news briefs and feature articles on business management and marketing topics of interest to commercial berry growers.

NYS Raises the Minimum Wage - Alison De Marree, Lake Ontario Fruit Team

The NYS minimum wage will increase over a 3 year period (see chart below). Each increase will go into effect on December 31st. Growers will need to begin planning for these increases. As we approach December 31, 2013 you will need to download new minimum wage posters from: <http://labor.ny.gov/workerprotection/laborstandards/workprot/minwage.shtm>.

The chart below shows the NYS Minimum Wage increases and **projects** what the Adverse Effect Wage Rate **might be** if it increased at the same rate!

	Current	minimum wage as of:		
		12/31/13	12/31/14	12/31/15
NYS Minimum Wage >	\$7.25	\$8.00	\$8.75	\$9.00
percent increase >		10.3%	9.4%	2.9%
AEWR >	If AEWR is increased at same %:			
	\$10.91	\$12.04	\$13.17	\$13.54

Workbook Helps Farmers Manage Recreation Risk

The University of Arkansas, Mississippi State University, and others have collaborated in the development of an online workbook titled *Using Alternative Enterprises and Recreational Development to Bolster Farm Incomes*. The workbook is divided into six separate learning modules addressing developing an alternative enterprise, legal risk, business planning, and more. The workbook is available online as a 156-page PDF from: http://www-stage.ofp.scc.wa.gov/wp-content/uploads/2013/01/rrumley_agritourism-workbook.pdf.

Making the Most of Collaborative Marketing for Your Farm - Jim Ochterski, Ontario County CCE

November 12, 2012. It seemed like such a simple idea: several small farm owners in the community realized they would rather work together than against each other when it comes to sales. One of the farmers suggested a group effort to merge their marketing efforts into one common identity. Within a few months, they had a group name, a logo, and they generally agreed who was going to grow what. As harvest season approached, there was trouble. The buyer complained that the products from each farm were inconsistent and they did not know who they were supposed to be talking to. Deliveries were delayed when one of the farms got tied up serving another market. Worse, another farm had been lagging in their food safety certification and the whole group was nervous this problem could cost a lot of money. Collaboration seemed like a good idea at the time, but became a major source of stress and financial pressure.

Collaboration is on the minds of many farmers in the Northeast US. As local food evolves beyond farm markets to serve larger clients like schools, restaurants, and distributors, it becomes very



Money Talk\$ (continued)

challenging for a single individual farm to keep up. Collective projects like food hubs, aggregation centers, or farm product pools show a lot of promise, but there is more to these than meets the eye.

The 2012 New York Small Farm Summit mobilized the voices of many farmers, and determined that enhancing food distribution strategies to serve local and regional markets is the top priority for small farms. In response, Cornell Cooperative Extension hosted a one day collaborative marketing seminar and subsequently produced a new bulletin, Collaborative Marketing for Small Farms: Selling and Working Together for Profitability, which is available as a free download at the Cornell Small Farms website.

There are a lot of good reasons to market collaboratively with other farms. The group effort can reduce individual farm marketing expenses, increase the capacity to serve a new buyer and reduce their risk, maintain product availability by dividing production across several farms, or to maximize a marketing advantage that several farms share.

One of the first things many producers presume about market collaboration is that they automatically need to organize a cooperative; this is not true. There are several collaboration approaches available to farms. Collaborative marketing agreements range from very simple contracts to the formation of

new corporations. Something as modest as a consignment agreement allows one farm to sell through another's market channels. More complicated options take longer to form and involve many legal, business, liability, and taxation considerations. Many small farms will benefit from starting with basic agreements (such as a joint venture or consignment), maintaining independence as an individual farm, before committing to a more lasting business structure.

The group effort, described at the beginning of this article, experienced trouble because they were relying on a general sentiment to work as one, rather than a written agreement. Informal agreements, especially oral agreements, carry a lot more risk than meets the eye. What each person recalls from an oral agreement may be different because there is no record of what exactly was agreed to.

An oral agreement is also risky for your farm because the oral agreement could become legally binding when you would rather it didn't. If two or more farms collaborate without a written agreement, the law can imply that a general partnership is formed.

This can unintentionally create legal problems and even liability for each other's debts.

Each farm involved in a marketing collaborative is still obliged to look out for its own interests. A written

agreement is the best way to make sure good intentions turn into good business.

Attorneys are usually necessary to develop collaborative marketing agreements. Even though one of the key elements of collaborative marketing among small farms is simplicity, if an agreement is too simple, the participating farms can face big disagreements and supply problems that can make everyone look bad.

There are tough and unfamiliar issues that need to be addressed by a qualified attorney in most farm collaborative arrangements:

- Determining the legal identity and product liability of the collaborative in case of problems
- How and when to allow other farms to enter into the collaboration
- Which participants are authorized to sign contracts on behalf of the whole group
- How to enforce oral agreements if there is a dispute about who said what

Fortunately, a small group of farms can combine their marketing efforts and experience the best aspects of what collaboration can bring with communication, enhanced market opportunities, an improved bottom line, and achieving a shared goal with fellow farmers.

For more details, download and read Cornell Cooperative Extension new bulletin, Collaborative Marketing for Small Farms: Selling and

Working Together for Profitability. The publication is available online at www.smallfarms.cornell.edu/marketing.

Jim Ochterski is an Agriculture Economic Development Specialist at Cornell Cooperative Extension of Ontario County. He can be contacted by e-mail ja014@cornell.edu or 595-394-3977 x402.

Source: "Smart Marketing" is a marketing newsletter for extension publication in local newsletters and for placement in local media.

Past articles are available at <http://market-ingpwt.aem.cornell.edu/publications.html>)





PIMS

Product, Ingredient, and Manufacturer System:

<http://pims.psur.cornell.edu/>



<http://www.omri.org/omri-lists>



Berry Diagnostic Tool

<http://www.fruit.cornell.edu/berrytool/>

Focus on Pest Management

Spotted Wing Drosophila Monitoring Traps – Juliet Carroll, NYS IPM Program

What follows is the “current best” trap monitoring protocol for spotted wing drosophila, based on the latest research and input from the entomologists at Cornell University. Because we anticipate SWD will be found possibly two months earlier in NY this year, it will be best to deploy traps in late April or early May.

The insect was trapped continuously from 2012 until the third week of January 2013 on Long Island, but no trap catches of SWD have been found on Long Island from Jan 23 through April 24. Early season trapping is most important, to establish presence of the insect in sensitive areas/crops.

Trap placement – deploy at least two traps per location being monitored. Preferably four – two in the crop and two in the adjacent wooded edges, near brush piles, streams, shady high humidity areas.

Trap “tweaking” – if you already have clear, not red, cups or containers, you can modify these to improve attractiveness by placing black tape near or over the entrance holes. SWD appear to land preferably on a black surface. A stripe of red tape near the black may also help.

Materials for One Trap

- 16 oz Red Plastic Party Cup (*clear red cups, clear cups, deli containers*)
- Plastic Drink Cup lid (*fragile, may need extras; deli cup lids*)
- 4.5 oz Specimen Container graduated wide mouth with screw lid
- Fine netting (*mesh size < 1 mm to prevent SWD from entering yeast solution*)
- 2-3 ft of plastic coated wire (*twist tie wire with cutter on a spool is very convenient*)

<u>Yeast Bait recipe</u>	<u>Alternate Yeast Dough Bait recipe</u>
- enough for 6 specimen containers	- enough for several specimen containers
1½ cups (12 fl oz) warm water (365 ml) 4 Tablespoons Sugar (59 cc) 1 Tablespoon dry active bread yeast (15 cc)	1½ cups (12 fl oz) warm water (365 ml) 4 Tablespoons Sugar (59 cc) 1 Tablespoon dry active bread yeast (15 cc) ≥ 2 cups whole wheat flour (≥ 473 ml)
<u>Vinegar Bait recipe</u>	<u>Alternate Vinegar Bait recipe</u>
Apple cider vinegar drop Unscented dish detergent	9 parts Apple cider vinegar (90%) 1 part Ethyl alcohol (10%)

Other Materials

Sharpies, pencils Small artist brush Coffee filters Flagging tape
Paper towels Funnel, 6 inch diam (15.24 cm) Cooler, freeze packs
Squirt bottle Dump containers for spent bait solutions Bamboo poles or stakes
Research continues to improve SWD traps and baits. The photos included are not exactly as the methods given here. As improvements are made, update information will be made available on www.fruit.cornell.edu.

Focus on Pest Management (continued)

Methods for making a trap

Make a circular ring hanger for the cup out of a double/triple thickness of the wire. This makes it easy to remove the cup and collect the samples. Leave sufficient length of wire to hang the cup on a branch or pole.



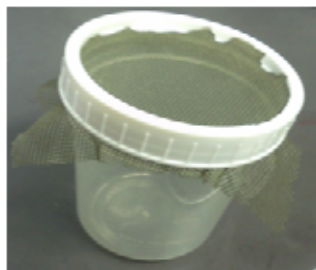
Hanger made from twist tie spool wire



Holes (slightly too large) cut near top lip of cup

Make 10-12 holes around the cup. The width of these holes should not be larger than 1/8 to 3/16 inch diam (3 to 4 mm). This will keep larger insects out. A glue gun tip will melt holes without cracking the cup. Leave a wide area without holes for pouring out the bait solution.

Make the ampule to hold the yeast or dough bait. Take the lid off of the specimen cup and cut out the inside leaving only the outside ring. Cut a 4 X 4 inch piece of the netting. Place the netting over the specimen cup and screw on lid.



Specimen container assembly for the yeast bait

Trap components: specimen cup fits inside cup

Focus on Pest Management (continued)

Assemble trap components. Assembly and addition of baits can easily be done in the field.

Methods for setting up a trap

Unscrew the lid to the specimen cup and fill half-way with the yeast bait (2 fl. oz). If using bread dough, allow space for dough to rise, as needed. Replace screen and lid.

Pour the vinegar bait into the red plastic cup until it is about 2 inches deep.

Place the ampule of the yeast bait into the trap. It will float on the vinegar bait.

Put the cup lid on the top and hang using the wire hanger on a branch, bamboo pole or stake. Place traps in the plant canopy so they are shaded.

Label the trap with a code number for your records. Record the trap GPS coordinates.

Collect the trapped insects and change the baits once per week.



Hang traps with plastic coated wire in canopy.



Methods for collecting the insects

Remove the trap from the wire hanger.

Label a coffee filter with the trap number and date.

Remove the yeast bait ampule and set aside.

Pour the liquid vinegar bait through a coffee filter in the funnel so the filtered solution pours into a dump container. Tap the cup or use a squirt bottle of apple cider vinegar or an artist's brush to collect insects that stick to the sides of the cup.

Place the coffee filter containing the collected insects into a plastic cup without holes, cover with a lid. Place in a cooler if out in the field.

Discard the yeast bait into a trash bin or bag. Wipe out the specimen container and refill with fresh bait.

Refill the trap with a 2-inch-depth of the vinegar bait, put in the yeast bait ampule and re-hang trap.

Refrigerate collected specimens until you can count the SWD.

Based on methods tested by Dr. Steven Alm, Professor, Department of Plant Sciences and Entomology, University of Rhode Island and Dr. Richard Cowles, Agricultural Scientist, Connecticut Agricultural Experiment Station. Photos courtesy of S. Alm and J. Carroll.



Collect insects by pouring vinegar bait through a coffee filter.

Focus on Pest Management (continued)

Guthion 50W Solupak receives supplemental label on blueberry in NYS through 9/30/13

The supplemental label allowing the use of Guthion 50W Solupak (EPA Reg. No. 66222-162) on blueberries until September 30, 2013 in NYS has been posted on the Cornell Product, Ingredient, and Manufacturer System (PIMS) website and is now accessible at: <http://128.253.223.36/ppds/534675.pdf>.

For specific crop use directions on application rates, insects controlled, remarks and additional restrictions, refer to the full product label here: <http://128.253.223.36/ppds/526756.pdf>.

PMEP Distance Learning Center Online Pesticide Applicator Recertification Courses - Ron Gardner, Senior Extension Associate, Cornell PMEP

The PMEP Distance Learning Center has helped many applicators in New York earn credits from home with "Online" courses developed by Cornell faculty and approved by the New York State Department of Environmental Conservation. Perhaps the center can help you or your applicators too. Access to the center's course list and order system is at this url: <http://coursem.cce.cornell.edu>.

Our partnership with the NYS IPM Program has resulted in a diverse library of online courses that can help you achieve your Pesticide Applicator License Recertification while improving your knowledge of IPM and proper pesticide use. Our goal for the future is to continue to grow and offer a wider variety of courses to give applicators more opportunities to obtain their credits from their home; we already have several courses currently in production.

The flyer that follows contains more information about the Distance Learning Center. Please open it to learn more about our educational offerings. Also note that in addition to New York, these courses are approved for pesticide applicator recertification in Maryland and Vermont.

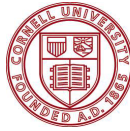
Brown Marmorated Stink Bugs: Resources for Identifying Them and Their Hosts - Diane Brown, Michigan State University Extension

An identification guide for brown marmorated stink bugs is now available online, as well as an extensive list of host plants.

April 1, 2013. Brown marmorated stink bugs are an exotic pest of fruits, vegetables, soybeans, field corn and many ornamental plants. They were first discovered in Michigan in 2010 and, as of April 1, 2013, have been confirmed in nine counties by Howard Russell, entomologist at Michigan State University Diagnostic Services. So far, its presence in Michigan has been primarily as a nuisance pest in homes rather than as an agricultural pest.

According to Michigan State University Extension, an excellent resource for identifying stinkbugs of economic importance, including brown marmorated stink bugs, was published as a field guide by Virginia Tech several years ago. The 40-page guide, titled "[Field Guide to Stink Bugs of Agricultural Importance in the Upper Southern Region and Mid-Atlantic States](#)" is now available for download. The guide has good photos and descriptions of egg nymph and adult stages for economically important species, less common species and beneficial species, along with photos of feeding damage on several economic crops.

I have been asked which plants are reported hosts for brown marmorated stink bugs, and it has been difficult to find this information. What I find most often is a list of a dozen or so common economic crops and a vague reference to about 300 hosts. I finally came across a more complete list (still not 300) in a presentation called "[The Brown Marmorated Stink Bug \(BMSB\) in Oregon](#)," by Helmuth Rogg of the Oregon Department of Agriculture. The list (Fig. 1) shows some 128 reported hosts for brown marmorated stink bugs including a number of weeds as well as economic and ornamental plants. Tree of Heaven, *Ailanthus altissima*, has been reported as a host, although it is missing from this list.



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Education Program**

and the



Have formed the:

**PMEP Distance Learning Center
Offering Research-Based Online
Courses For You!**

A partnership between the Pesticide Management Education Program at Cornell University and the NYS IPM program has created many online courses that can help you achieve your Pesticide Applicator License Recertification. The creation of our Distance Learning website was made possible through grants from the US-EPA Pesticide Stewardship program and the USDA Smith Lever funds.

There are a variety of courses offered and we are continuously expanding our list ever year. We offer both Core and Category courses.

These courses adhere to New York State regulations (6 NYCRR 325.18) and have been approved by the Department of Environmental Conservation. Therefore, when you take an on-line recertification course, you must follow the same rules (described on our Distance Learning website) as you would when you attend live recertification training.

Please visit our website for more information on the online course process and to purchase these courses.

<http://coursem.cce.cornell.edu/>

Amber VanNostrand
Cornell University
Pesticide Management Education Program
5142 Comstock Hall
Ithaca, NY 14853-2601

Core Courses

Core courses are based on the core applicator curriculum found in the Core manual. Credits from these can be used by all certified applicators for their recertification.

Here is a list of the current online CORE courses being offered and their credits:

CORE COURSES

Core Level Module 20 Weatherwise Application (0.5 credits)

Core Level Module 21 Proper Pesticide Disposal (0.5 credits)

Core Level Module 22 Pesticide Storage (0.75 credits)

Core Level Module 4 Toxicity of Pesticides (1 credit)

Core Level Module 6 Ecology & Environmental Considerations (1 credit)

Core Level Module 7 Safety Precautions with Pesticides (1 credit)

Core Level Module 8 Personal Protection for the Applicator and Worker (1.25 credits)

Protecting Water from Pesticide Pollution (1.5 credits)

Category Courses

Category courses contain information for specific certification categories such as Private vegetable farmers or Commercial Ag and Plant applicators. Before purchasing a course please be sure your certification category is included in the list of approved categories.

Here is a list of the current online CATEGORY courses being offered and their credits:

CATEGORY COURSES

Beating Phytophthora Blight (1 credit)

Detection & Management of Brown Marmorated

Stink Bug (1 credit)

Detection & Management of the Emerald Ash

Borer (1 credit)

Insect Biocontrol (1 credit)

Introduction to Developing IPM Strategies

Components and Resources (1 credit)

Introduction to NEWA its use in IPM Strategies

(1 credit)

Mechanical Weed Management (1.25 credits)

Nozzle Selection & Calibration for Orchard

Canopy Sprayers (1 credit)

Nozzle Selection & Calibration for Vineyard

Sprayers (1 credit)

Scouting Basics-The Hows & Whys (1 credit)

Swede midge identification, biology, and

management (1 credit)

Sweet Corn IPM (1 credit)

The Ecology of Weed Management (1 credit)

Weed Suppressive Groundcovers (0.75 credits)

Bed Bugs Module - Introduction to Bed Bugs and

Their Behavior (0.75 credits)

If you have any additional questions please feel free to contact:

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Phone: 1-607-255-1866
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Focus on Pest Management (continued)

Fig. 1. Known host plants for brown marmorated stink bug, *Halyomorpha halys*

Common name	Scientific name	Common name	Scientific name
Abelia, Glossy	<i>Abelia x grandiflora</i>	Honeysuckle	<i>Lonicera</i>
Apple	<i>Malus domestica</i>	Honeysuckle, Tartarian	<i>Lonicera tatarica</i>
Apple	<i>Malus pumila</i>	Jerusalem Artichoke	<i>Helianthus tuberosus</i>
Apricot	<i>Prunus</i>	Jetbead	<i>Rhodotypos scandens</i>
Apricot, Japanese	<i>Prunus mume</i>	Jujube	<i>Ziziphus sativa</i>
Ash, Green	<i>Fraxinus pennsylvanica</i>	Kiwi	<i>Actinidia deliciosa</i>
Ash, Oregon	<i>Fraxinus oregona</i>	Laurustinus	<i>Viburnum tinus</i>
Ash, White	<i>Fraxinus americana</i>	Lilac	<i>Syringa</i>
Asparagus	<i>Asparagus officinalis</i>	Magnolia, Star	<i>Magnolia stellata</i>
Basswood	<i>Tilia americana</i>	Malabar spinach	<i>Basella rubra</i>
Bean, Bush & Kidney	<i>Phaseolus vulgaris</i>	Maple, Bigleaf	<i>Acer macrophyllum</i>
Bean, Lima	<i>Phaseolus lunatus</i>	Maple, Hedge	<i>Acer campestre</i>
Bean, Long	<i>Vigna unguiculata sesquipedalis</i>	Maple, Japanese	<i>Acer palmatum</i>
Bean, Pole	<i>Phaseolus vulgaris</i>	Maple, Norway	<i>Acer platinoides</i>
Beet, Sugar	<i>Beta vulgaris</i>	Maple, Red	<i>Acer rubrum</i>
Birch	<i>Betula sp.</i>	Maple, Sugar	<i>Acer saccharum</i>
Bittersweet	<i>Celastrus</i>	Mountain Ash	<i>Sorbus</i>
Blackberry	<i>Rubus</i>	Mulberry	<i>Morus</i>

Focus on Pest Management (continued)

Common name	Scientific name	Common name	Scientific name
Blueberry	Vaccinium	Mullein, Woolly	Verbascum thapsus
Buckthorn	Rhamnus	Nightshade	Solanum
Burcucumber	Sicyos angulatus	Nightshade, Black	Solanum nigrum
Burdock	Arctium minus	Oregon Grape	Mahonia aquifolium
Butterfly Bush	Buddleia davidii	Paulownia	Paulownia catalpifolia
Cantaloupe	Cucumis melo	Paulownia	Paulownia elongata
Catalpa	Catalpa speciosa	Paulownia	Paulownia fortunii
Cedar	Cedrus	Paulownia	Paulownia kawakamii
Celosia	Celosia argentea	Pea	Pisum sativum
Cherry, Black	Prunus	Peach	Prunus persica
Cherry, Sour	Prunus	Pear, Asian	Pyrus pyrifolia
Cherry, Sweet	Prunus avium	Pear, European	Pyrus communis
Chokecherry	Prunus virginiana	Pecan	Carya illinoensis
Chrysanthemum	Chrysanthemum	Pepper	Capiscum annum
Citrus	Citrus	Periwinkle	Catharanthus roseus
Coleus	Coleus blumei	Persimmon	Diospyros
Comfrey	Symphytum officinale	Persimmon, Japanese	Diospyros kaki
Corn, Sweet	Zea mays	Plum	Prunus
Crabapple	Malus	Plum, Ornamental	Prunus
Cranberrybush, American	Viburnum opulus v. americanum	Princess Tree	Paulownia tomentosa
Cucumber	Cucumis sativus	Privet	Ligustrum
Dahlia	Dahlia	Raspberry	Raspberry
Dogwood, Gray	Cornus racemosa	Rape	Brassicus napus
Dogwood, Red Osier	Cornus sericea	Redbud	Cercis canadensis
Eggplant	Solanum melongena	Rose, Rugosa	Rosa rugosa

Focus on Pest Management (continued)

Common name	Scientific name	Common name	Scientific name
Elderberry	Sambucus	Rose of Sharon	Hibiscus syriacus
Euonymus	Euonymus	Russian Olive	Eleagnus angustifolia
Euonymus, Winged	Euonymus alatus	Serviceberry	Amelanchier canadensis
Filbert, Turkish	Corylus colurna	Siberian Pea Shrub	Caragana arborescens
Fig	Ficus	Soybean	Glycines max
Firethorn	Pyracantha	Spider Flower	Cleome hasslerana
Golden Chain Tree	Laburnum anagyroides	Spiraea	Spiraea
Golden Rain Tree	Koelreuteria paniculata	Strawberry Tree	Arbutus unedo
Grape (Cultivated, Table)	Vitis	Sumac	Rhus
Grape (Cultivated, Wine)	Vitis	Sunflower	Helianthus
Grape (Wild)	Vitis	Sweetgum	Liquidambar
Hackberry	Celtis occidentalis	Sycamore	Platanus occidentalis
Harlequin Glorybower	Clerodendron trichotomum	Tomato	Solanum lycopersicum
Hawthorn	Crataegus	Viburnum, Blackhaw	Viburnum prunifolium
Hibiscus	Hibiscus rosa-sinensis	Viburnum, Tea	Viburnum setigerum
Hinoki cypress	Chamaecyparis	Walnut, Black	Juglans nigra
Holly	Ilex	Watermelon	Citrullus lanatus
Holly, American	Ilex opaca	Willow, Pussy	Salix
Holly, Winterberry	Ilex verticillata	Zelkova	Zelkova
Honeyberry Bush	Lonicera kamchatika	Zinnia	Zinnia

(Source: [Michigan State University Extension](#) Photo credit: David R. Lance, USDA APHIS PPQ, Bugwood.org.)

Focus on Pest Management – (continued)

Spray Adjuvants: What's in a Name? - Franz Niederholzer, University of California Agriculture and Natural Resources.

April 4, 2013. If you can't speak the language, you can't follow the conversation. Talk about adjuvants used in agriculture can be filled with unfamiliar terms like activator, non-ionic surfactant, penetrant, humectants, and buffers. To help growers who want follow a sales pitch or discussion on adjuvants, the following article lists and describes common adjuvant categories by function. This is the first of a series to help growers better understand adjuvants and their effective use.

There are two types of adjuvants – spray adjuvants and formulation adjuvants. Spray adjuvants are packaged separate from pesticides. Formulation adjuvants are mixed with the pesticide active ingredient during packaging and formulation. This article is concerned specifically with spray adjuvants.

There are two general categories of spray adjuvants: 1) activator adjuvants and 2) utility adjuvants. Activator adjuvants directly enhance pesticide performance once the spray hits the plant target. They include wetter-spreaders, stickers, penetrants, and humectants. Utility adjuvants help make the spray application process go better. This group includes defoamers, drift control agents, deposition aides, water conditioners, acidifiers, buffers, and colorants. A single adjuvant product can be both an activator and a utility adjuvant. For example, a product that contains a spreader/penetrant plus a buffer/acidifier is both an activator and utility adjuvant.

There are several categories based on product function within the general groups of activator and utility adjuvants. Many adjuvants fit into multiple categories, as a particular set of ingredients may provide spreading and penetrating properties to a single packaged product.

Wetter-Spreaders: contains surface-active ingredients – surfactants -- that reduce the contact angle of the spray droplet on the target. This allows the spray solution to contact more of the target surface. Spreading is essentially an extension of the wetting process. A spreader adjuvant allows the spray droplet to spread over a larger area of the target compared to a droplet with no spreader.

Most pesticides are mixed with water and sprayed. Wetter-spreaders behave differently in your spray tank based on their electrical charge in water. Surfactants –the active ingredients in wetter-spreader adjuvant -- are further categorized as non-ionic, cationic, anionic, or amphoteric surfactants. Why is this important to a grower? When choosing an adjuvant to use with a water soluble ionic herbicide, you don't want an adjuvant "tying up" your pesticide and reducing pest control. For example, when mixed in the spray tank, a cationic spreader may bind to an anionic herbicide, possibly reducing the pesticide activity. If you use an adjuvant, make sure it matches the pesticide label adjuvant recommendation.

Wetter-spreaders are surface active because they contain surfactant molecules that have a fat/wax loving (lipophilic) end and a water loving (hydrophilic) end. Common ingredients include fatty amines, glucosides, alkylphols, alkylamine ethoxylates, polyethylene oxides, and organosilicones.

Stickers: contains non-evaporating ingredients that resist dislodging of the spray deposit from the target surface. Common sticker ingredients include synthetic latex, low volatile oils, pinene polymer, water-soluble polymers, and resins. The less water soluble the ingredients the lower the "wash off" potential of the pesticide deposit.

Humectants: contains ingredients that reduce spray droplet evaporation before and after it reaches the target. Humectant materials include glycerin, various glycols, petroleum oils, vegetable oils, and urea.

Penetrators: contain ingredients that help the chemical enter the target plant once the spray is deposited. Petroleum oils, vegetable oils, or modified vegetable oils are common penetrator ingredients.

Focus on Pest Management –(continued)

Compatibility Agents: commonly used to keep a homogeneous solution in a spray tank that contains multiple ingredients, usually including liquid fertilizer.

Defoamers: eliminate or suppress foam in the spray tank.

Drift Control Agent: used to reduce the percentage of spray droplets below a certain diameter in an application. Small droplets are considered “driftable fines”. The smaller the droplet, the farther it will move with wind. Droplets with a diameter less than 150 μ m are frequently characterized as “driftable”. Drift control agent commonly include polyacrylamides and polysaccharides.

Deposition agent: do not change spray droplet size, but improve the amount of pesticide deposited on the target – indirectly reducing drift -- or improve the uniformity of spray deposits.

Water Conditioner: eliminates or reduces the interaction of ions in the spray solution with the pesticide. For example, glyphosate efficacy can be reduced when hard water is used in the spray tank. A range of materials including chelating agents, citric acids, and fertilizer salts such as ammonium sulfate and ammonium nitrate are used as water conditioners to improve glyphosate activity when the spray water source contains hard water.

Acidifier: usually a dilute strong acid solution used to reduce spray water pH. An acidifier will commonly not maintain – that is, buffer – the spray solution at a certain desired pH range. Addition of an alkaline pesticide or fertilizer will increase the spray solution pH that was initially lowered by an acidifier.

Buffer: a product that will resist change in the spray solution pH. Buffers will limit the change in solution pH when an acid or base are added to the tank. A buffer/acidifier will reduce spray water pH AND hold the pH in a certain range. How long the pH is held in a certain range when other pesticides or fertilizers are added differs between products. The correct rate of buffer depends on the water source and materials in the tank. Commonly used buffers are buffer/acidifiers using ingredients such as phosphates or organic acids.

Colorants: alters the color of the spray solution so that previous spray passes are visible to the applicator.

So, there’s the general “line up” of adjuvant materials. Once you know the players and their roles in the spray tank, you can begin to select the right material for the job.

(Source: [Topics in Subtropics](#) - A collaborative blog by UC farm advisors and specialists in subtropical horticulture in California)

Blackberry Variety Review – Courtney Weber, Cornell University

New cultivars are released all the time, and the vast majority of them fail to catch on for various reasons including poor adaptability to diverse growing regions, unforeseen disease or insect susceptibility or fruit characteristics that are unacceptable to the buying public. No cultivar will work well in all locations, soil types, and production systems, but many have proven to be useful in many different situations. This list is by no means complete but should address most situations.



Blackberries come in many types with the three predominant types being thorny erect, thornless semi-erect and trailing (thorny and thornless). In newer varieties, the distinction between erect and semi-erect has become less pronounced. All varieties are floricanes fruiting in the mid to late summer except for the new primocane fruiting varieties released in recent years from the University of Arkansas breeding program. The primocane varieties are all thorny types but thornless varieties are under development. High temperatures (above 85°F) during primocane bloom tend to reduce fruit set in these varieties. In NY and regions of similar climate, most blackberry varieties will suffer cold injury on floricanes from low winter temperatures with thorny erect being generally most hardy followed by thornless semi-erect and trailing. Overwintering in closed high tunnels has been successful in avoiding winter damage in trials. A description of the types follows.

Thorny blackberries (erect)

Blackberries are more vigorous than red raspberries and benefit from summer pruning. Thorny blackberry (erect) canes are tipped when 0.9 to 1.2 m in height to stiffen the canes and encourage lateral branching. The laterals can be shorted in early spring to 30 to 40 cm in length and canes thinned to 5 canes per meter of 30 cm wide row. Longer laterals will produce more but smaller fruit. Alternate year mowing can be used to avoid the difficult job of pruning thorny blackberries. In this procedure, half the planting is mowed each year with the other half allowed to fruit with only minimal pruning and row width management.

Thornless blackberries (semi-erect)

For two years after planting, many semi-erect blackberry varieties tend to grow close to the ground like a vine. The trailing canes may need to be moved into the row to allow for cultivation and mowing. After two years, the canes become more upright and naturally branched. Growers often take special precautions in colder growing regions to protect thornless cultivars because of their increased cold sensitivity. Some growers will tip the canes at 60 cm to better able to protect them from the cold. In the spring, the canes should be tied at least 90 cm about the ground to trellis wires. Fruiting canes can be shortened to the height of the top wire or woven around the wire with 60 to 80 cm of overlap with the next plant. Laterals should be shortened to 45 cm and lower ones removed. Thinning to 6 to 8 canes per hill will maintain acceptable production and aid in weed control.

Trailing blackberries (thornless and thorny)

Trailing blackberries are not cold hardy and generally not productive in most cold climate locations. These varieties produce canes that grow along the ground and must be physically tied to a trellis for production to keep the fruit off the ground. Overwintering in cold climates is done by removing the canes from the trellis and laying them on the ground and covering with an insulating material. Cold damage still occurs in many cases, reducing yields considerably. They are not recommended for NY and regions of similar climate. Varieties include Marion, Evergreen, Black Diamond, Obsidian, Olallie and others and will not be described further in this review.

Thorny

Darrow (Cornell University, NY) produces large, long conic and often irregular, black, glossy fruit in the late season. The fruit is mildly sub-acid with good quality. Secondary fruiting laterals produce fruit into the early fall. The erect canes are vigorous and winter hardy for a blackberry.

Blackberry Variety Review –(continued)

Illini Hardy (University of Illinois) fruit is medium sized with good flavor and quality but acidic until fully ripe. Ripens in the late season. Canes are erect and vigorous with good winter hardiness. It suckers mainly from the crown and is resistant to Phytophthora root rot.

Kiowa (University of Arkansas) produces large fruit on erect canes. Yield potential is moderate over a long harvest period (6 weeks).

Shawnee (University of Arkansas) produces high yields over an extended period late into the season. The fruit quality is good but tends to be soft and is suitable for local markets.

Primocane varieties (thorny)

Prime Ark 45 (University of Arkansas) is a late season primocane fruiting variety. Harvest is too late for NY outside of tunnels (up to 2 weeks after Prime Jim) and may be too late in tunnels as well except in more southern locations. The canes are erect and produce firm, medium sized berries.

Prime Jan (University of Arkansas) is a late season primocane fruiting variety but is the earliest available at this time. It produces medium sized berries in September-October in Geneva, NY with only modest productivity. The fruit is generally too soft for shipping and is suitable for home growers and local markets. The canes are semi-erect and require trellising for good production.

Prime Jim (University of Arkansas) is a late season primocane fruiting varieties that produces a few days after Prime Jan. The fruit is medium sized and moderately firm but still only suitable for local markets and home growers. The canes produce in September-October in Geneva, NY with only modest productivity. The canes are semi-erect and require trellising for good production.

Thornless

Apache (University of Arkansas, USA) produces conical fruit with good quality and flavor and ripens mid-season with high production. Sunburn can be a problem following rain. The fruit is well presented for picking. Erect, strong canes are self-supporting. Canes are vigorous and prolific. It is resistant to orange rust. Winter hardiness is similar to other thornless varieties.

Arapaho (University of Arkansas) produces medium sized, firm berries with smaller seeds than most varieties. It produces in the early season with a concentrated harvest season. The canes are moderately vigorous and erect for a thornless type with reported good hardiness. It is reported to be resistant to orange rust.

Black Satin (USDA, Illinois, USA) ripens late with large, firm and dull black berries that are slightly tart. These plants are very vigorous, semi-erect, productive, and resistant to anthracnose. More winter hardy than 'Thornfree' but not outstanding. Fruit is excellent for jams, jellies, and pies and more suitable for the local market.

Chester (USDA/Southern Illinois University). The late ripening fruit is somewhat difficult to pick but is of high storage quality with little breakdown. It produces high yields of medium sized fruit with average flavor. The glossy black color and firmness holds well in hot weather, and the variety does well in high tunnels. Vigorous canes are semi-erect. Chester is considered the hardiest of the thornless cultivars. It is resistant to cane blight. Flowers are lavender colored.

Dirksen Thornless (USDA/Southern Illinois University) produces large berries with low acidity. The color can be slightly dull when fully mature. They ripen in the early season. Canes are vigorous, semi-erect and moderately winter hardy. It grows mainly in a crown with few suckers. It is tolerant to Septoria leaf spot and anthracnose and moderately tolerant to powdery mildew.

Doyle (private breeder, Texas) is a very vigorous midseason cultivar capable of producing high yields. Fruit quality and size are average outdoors; quality is significantly higher in tunnels.

Loch Ness (SCRI, United Kingdom) produces large glossy black fruit with good quality suitable for local markets. The canes are semi-erect and moderately vigorous with hardiness equal to 'Chester'.

Blackberry Variety Review – (continued)

Natchez (University of Arkansas) is the earliest ripening thornless variety with high production potential. The fruit is large with good flavor. The canes are semi-erect and require trellising for good performance. Cold hardiness is unknown but expected to be only average.

Navaho (University of Arkansas) produces high yields of small fruit with very good flavor. The fruit is firm and stores well. The new canes (non-bearing primocanes) are very vigorous and benefit from tipping at 5-6 ft. several times during the season.

Ouachita (University of Arkansas) produces high yields of medium sized berries with good flavor and firmness. The very erect canes show poor cold hardiness and are at risk for significant winter injury in northern regions. The plants are resistant to orange rust, anthracnose and double blossom/rosette disorder. Harvest starts a week after Arapaho and a week before Navaho.

Triple Crown (USDA, Maryland, USA) has large, sweet aromatic berries with excellent flavor and is very productive. Canes are semi-erect, vigorous and sturdy, but have insufficient cold hardiness for most northern regions except in tunnels where they do well.

Irrigation Methods Compared for Highbush Blueberry Plants

Drip irrigation outshines microsprays, sprinklers in water use efficiency

March 8, 2013. Corvallis, OR - Highbush blueberry is a shallow-rooted crop that is very susceptible to water stress. The plants usually require irrigation, even in wet climates. In the United States, overhead sprinklers and drip irrigation are the most common irrigation methods used by commercial blueberry growers. Some growers have also begun testing low-volume microsprays - also known as microjets or microsprinklers - on blueberries. A new study evaluated the effects of the three systems and recommended drip irrigation as the best method for establishing young blueberry plants.

According to David R. Bryla, a research horticulturist with the U.S. Department of Agriculture's Agricultural Research Service, each of the three irrigation systems used in blueberry production has unique advantages and disadvantages. While overhead sprinkler systems are easier to install and maintain than drip systems, they also require more water and energy and are more expensive to install. Drip irrigation systems enable more frequent and uniform water applications, thereby increasing water use efficiency, but have distinct shortcomings; drip emitters can plug when water infiltration is inadequate or the system is improperly maintained, and drip may increase plants' susceptibility to root rot disease.

Microspray irrigation offers advantages similar to drip irrigation but applies the water to the soil surface using a small spray. A major problem with microsprays, however, is "plant interference" during water applications. When plants mature, much of the water from microspray emitters is intercepted by the canes, thus reducing the uniformity of water application.

Bryla and his colleagues published a study in *HortScience* that evaluated the effects of sprinklers, microsprays, and drip on vegetative growth in blueberry crops. The scientists collected data during the first two years after planting 'Elliott' northern highbush blueberry and focused on identifying irrigation systems that improved growth of the crop during establishment.

Irrigation Methods –(continued)

For the study, blueberry plants were grown on mulched, raised beds and irrigated by sprinklers, microsprays, or drip at a rate of 50%, 100%, and 150% of the estimated crop evapotranspiration (ETc) requirement. Irrigation was applied at different levels to identify the optimum irrigation rate and to investigate the consequences of over- and under-irrigation with each system. "Irrigation requirements are usually much less during establishment than at maturity but are often considered very important at this stage because even small amounts of water stress (including drought or flooding) in young plants may substantially increase the time for the plants to reach their full production potential," Bryla explained.

After two years, drip irrigation at 100% Etc produced the most growth among the irrigation methods with at least 42% less water than needed for maximum growth with microsprays and 56% less water than needed with sprinklers. "The primary benefit of drip was likely the result of higher soil water content in this treatment in the vicinity of the roots," said Bryla. "In terms of plant growth and water use efficiency, drip irrigation was the best method to establish healthy blueberry plants in the present study. However, sprinklers and microsprays may be better alternatives for susceptible cultivars grown at sites prone to problems with root rot."

"This study demonstrated that drip irrigation may not only increase water use efficiency in blueberry compared with other irrigation methods, but it also may improve plant establishment. Generally, plants that establish more quickly have higher production once fruiting begins," the researchers said.

The team is planning further research to examine the effects of the irrigation methods and rates of water application on fruit production during plants' growth to full maturity.

The complete study and abstract are available on the ASHS *HortScience* electronic journal web site: <http://hortsci.ashspublications.org/cgi/content/abstract/46/1/95>

Original Article: Evaluation of Irrigation Methods for Highbush Blueberry—I. Growth and Water Requirements of Young Plants. David R. Bryla, Jim L. Gartung, and Bernadine C. Strik. *HortScience* 46:95–101. Corresponding author. E-mail: david.bryla@ars.usda.gov

Fertilizing Berry Crops – Laura McDermott, Eastern NY Commercial Horticulture Program

The beginning of May is the trigger date for fertilization and given our cool temperatures, I wouldn't put material down any earlier as plants are not actively growing yet and won't be able to grab that nitrogen yet. Table 3., below, is the chart right out of the Cornell Guidelines.

Remember to measure your plantings if you haven't already done so. Some excellent growers that I know have been under the impression that they were farming just under 7 acres of mixed vegetables for the past decade, but they took the time to carefully measure each of their individual fields. The actual production acreage was just over 5.5 acres. They were measuring chemicals and fertilizer for almost 1.5 acres more than they needed. For large growers, that difference surely doesn't seem like much, but if your margin of error is the same for large acreage? We could be talking decent money.

When measuring plantings, consider that for fertilizer, we measure just the planted row acreage. Measure the width and length of the rows to determine actual acreage.

Fertilizing Berry Crops (continued)

Also, remember that table 3 is recommending **actual N** – not pounds of total fertilizer material. To determine the actual N in your fertilizer source, look at Table 1 and Table 2. Table 2 lists organic sources – remember that there could certainly be variation in your compost so getting it tested is recommended.

To calculate the amount of fertilizer to apply, divide the desired amount of actual N by the percent N in the fertilizer and then multiply the result by 100. Apply the total amount of fertilizer in a 3-foot band in the row (1 foot band over the row for strawberries).

Example: Calcium nitrate, actual N recommended is 30#/A on strawberries. Calcium nitrate is 15% N.

Calculation:

$$\frac{30 \text{ lbs/A actual N}}{15\% \text{ N in Ca nitrate}} \times 100 = 200 \text{ lbs/A calcium nitrate}$$

Table 1. Nitrogen sources and calculation of actual N

Fertilizer	% actual N in fertilizer
Ammonium nitrate	34.0
Ammonium sulfate	20.5
Calcium nitrate	15.0
Diammonium phosphate	17.0
Potassium nitrate	13.0
Urea	46.0

Table 2 – Organic Nitrogen sources, source: Vern Grubinger, UVM; <http://www.uvm.edu/vtvegandberry/factsheets/organicN.html>

Organic Source	% N	C/N ratio	Lb N/ton	Example FOB cost/ton	\$/lb N	Release Rate
Finished field compost	1.2	17	24	\$25	\$1.04	slow
alfalfa meal	2.7	15	54	\$348	\$6.44	medium
poultry manure compost	4	15	80	\$251	\$3.13	slow
soybean meal	6	7	120	\$314	\$2.62	medium
feather meal	10	4	200	\$968	\$4.48	Very slow
'Pro-Gro' 5-3-4 5	5	3	100	\$340	\$3.40	medium
'Pro-Booster' 10-0-0	10	2	200	\$375	\$1.87	medium

Fertilizing Berry Crops (continued)

Table 3 – Nitrogen Guidelines for Berry Crops. Source: 2013 Cornell Pest Management Guidelines for Berry Crops

Crop	Age of planting	Amount/timings (actual N)	N source	Comments
Strawberries				
	0	30 lb/A, early June 30 lb/A, early September	calcium nitrate ammonium nitrate or calcium nitrate	Be sure plants are growing well prior to application.
	1+	70 lb/A, at renovation 30 lb/A, early September	ammonium nitrate, urea, calcium nitrate	Adjust fall amount based on leaf analysis.
Raspberries and Blackberries (summer-bearing)				
	0	25-35 lb/A, 4 weeks after planting	calcium nitrate	Avoid touching plants with fertilizers after planting.
	1	35-55 lb/A, in May or split between May and June	urea or ammonium nitrate	Use higher amount on sandier soils or if irrigation is used.
	2+	40-80 lb/A, in May or split between May and June	urea or ammonium nitrate	Use higher amount on sandier soils or if irrigation is used.
Raspberries (fall-bearing)				
	0	25 lb/A, 4 weeks after planting	calcium nitrate	Avoid touching plants with fertilizers after planting.
	1	50-80 lb/A, split between May and June	urea or ammonium nitrate	Use higher amount on sandier soils or if irrigation is used.
	2+	70-100 lb/A, split between May and June	urea or ammonium nitrate	Use higher amount on sandier soils or if irrigation is used. Adjust with leaf analysis.
Blueberries				
	0	Do not fertilize newly planted blueberries		Soil should be adjusted to pH 4.5 prior to planting.
	1	15 lb/A, split between May and June	ammonium sulfate or urea	Use ammonium sulfate where soil pH is >5.0.
	2	20 lb/A, split between May and June		
	3	25 lb/A, split between May and June		
	4	35 lb/A, split between May and June		

Fertilizing Berry Crops (continued)

Crop	Age of planting	Amount/timings (actual N)	N source	Comments
Blueberries (continued)				
	5	45 lb/A split between May and June		
	6	55 lb/A split between May and June		
	7+	65 lb/A split between May and June		
Currants and Gooseberries				
	0	25 lb/A, 4 weeks after planting	calcium nitrate	
	1	50-80 lb/A, split between May, June, August	calcium nitrate	
	2+	70-100 lb/A, split between May and early August	calcium nitrate	
Elderberries				
	0	Do not fertilize newly planted elderberries.		
	1+	Apply 1/8 pound of ammonium nitrate for each year of the plant's age, up to one pound per plant. or Apply 0.5 lbs. 10-10-10 for each year of the plant's age, or up to 4 lbs. 10-10-10.	ammonium nitrate or 10-10-10	In spring, spread fertilizer with a spreader in bands one foot wide along both sides of the rows.
Cranberries				
All varieties	0	50 lb/A	Alternate N-only products with N-P-K products with a 1:1:1 ratio	Use frequent applications (every 2-3 weeks) of 5-10 lb/A until late summer to promote good runner growth.
Small-fruited varieties (i.e. 'Early Black', 'Howes')	1+	20-30 lb/A*, split between roughneck (20-25%), bloom (30-35%), and fruit set (30-35%) growth stages	ammonium nitrate	Wait to make first split application until soil temperatures are between 50 to 70°F**
Large-fruited varieties (i.e. 'Stevens')	1+	30-60 lb/A*, split between roughneck (20-25%), bloom (30-35%), and fruit set (30-35%) growth stages	ammonium nitrate	Wait to make first split application until soil temperatures are between 50 to 70°F**

Fertilizing Berry Crops (continued)

Crop	Age of planting	Amount/timings (actual N)	N source	Comments
Juneberries				
	0	25 lb/A, 4 weeks after planting	calcium nitrate	Avoid touching plants with fertilizers after planting.
	1	50-80 lb/A, split between May and June	urea or ammonium nitrate	Use higher amount on sandier soils or if irrigation is used.
	2+	70-100 lb/A, split between May and June	urea or ammonium nitrate	Use higher amount on sandier soils or if irrigation is used. Adjust with leaf analysis.

*Rates > 40lb/A actual N should be used with caution to prevent vine overgrowth and reduced fruit set. Rates may need to be adjusted based on soil type and temperature, soil and tissue analysis results, and observations of plant growth and appearance.

**If soil temperatures exceed 70°F and air temperatures exceed 70°F, reduce, delay, or omit N applications.

For more information on cranberry fertilization or other aspects of cranberry production consult: "Cranberry Production A Guide for Massachusetts", available from the UMASS Cranberry Station, College of Natural Resources and the Environment, East Wareham, MA.

Hardy Kiwifruit: Invasive Plant? Or Throwback to the Gilded Age?

Kathy Demchak, Dept. of Plant Science, Penn State University; Bob Guthrie, Volunteer Curator, University of Minnesota Actinidia collection; Iago Hale, Dept. of Biological Sciences, Univ. of New Hampshire

In 2012, the Massachusetts Audubon Society published an Invasive Plant Pest Alert on hardy kiwifruit, *Actinidia arguta*, also called "tara vine", strongly urging people not to grow or propagate this plant (http://www.massaudubon.org/PDF/invasive_species/hardykiwipestalert.pdf).

The apparently rampant growth of vines had been documented at three particular locations: 1) at Kennedy Park and the Pleasant Valley Wildlife Sanctuary in Lenox, MA where there is significant area covered with large vines that are overtopping trees, plus a population of seedlings nearby; 2) near Sturbridge, MA; and 3) at Coffin Woods on Long Island, NY, where the issue is thought to be a remnant of an estate planting. These sites stand in marked contrast to observations of the behavior of commercial and research plantings in PA, OR, MN, NY, ME and many other locations, where planted specimens have stayed in place and seedlings have extremely rarely germinated from fallen berries. The disparity in experiences with this plant has prompted many questions: 1) Is hardy kiwifruit invasive? 2) If it is, is its invasiveness a new problem? 3) Why is hardy kiwifruit problematic in one location, and not another; and why does this disparity in observations and experiences exist? 4) Could hardy kiwifruit become invasive in other locations, given more time? This article is an attempt to summarize the current state of knowledge and to



Hardy Kiwi fruit: Invasive Plant? Or Throwback to the Gilded Age? (continued)

suggest a clear research agenda for addressing these questions.

1) Is Hardy Kiwifruit Invasive?

Unofficially, there is a lack of consensus on the answer to this question, due to the disparity in observations alluded to above. The official, legal answer to this question currently, however, is "No." An Executive Order 13112, issued Feb. 3, 1999 (Federal Register, Vol. 64, No. 25), established the National Invasive Species Council (NISC) that in turn is guided by the Invasive Species Advisory Committee's Invasive Species Definition Clarification and Guidance White Paper (ISAC, 2006). As it relates to federal policy, an invasive species must be gauged by the following criteria:

Environmental Harm – "We use environmental harm to mean biologically significant decreases in native species populations, alterations to plant and animal communities or to ecological processes that native species and other desirable plants and animals and humans depend on for survival. Environmental harm may be a result of direct effects of *invasive* species, leading to biologically significant decreases in native species populations." (ISAC, 2006, p. 5)

Cultivated Plants – "Plant and animal species under domestication or cultivation and under human control are not *invasive species*. Furthermore for policy purposes, to be considered invasive, the negative impacts caused by a non-native species will be deemed to outweigh the beneficial effects it provides." (ISAC, 2006, p. 8)

So far, *A. arguta* has failed to meet the criteria required for classification as invasive by several non-federal groups as well. When evaluated in 2005, the Massachusetts Invasive Plant Advisory Group placed *A. arguta* in "Evaluated Plants Not Meeting Criteria", referring to criteria that would have caused it to be classified as invasive, likely invasive, or potentially invasive. However, that was in 2005, and the plant will be reevaluated, as the following statement was found in the same report: "Can form dense stands; evidence needed to evaluate its reproductive ability and potential to establish new populations away from cultivation." (<http://www.newfs.org/docs/docs/MIPAGo4o1o5.pdf>)

The U.S. Forest Service, following evaluation of hardy kiwifruit, placed it in Category 4 "Plants – Local Concern and Monitoring", rather than placing it in Categories 1, 2, or 3 which are "Plants – highly invasive", "Plants – moderately invasive", and "Plants – widespread non-native species", respectively (<http://www.fs.fed.us/r9/wildlife/range/weed/Sec3B.htm>). Further, the Connecticut Invasive Plants Council also evaluated hardy kiwifruit in October, 2012, and did not place it on their invasive plants list when gauging it by the criteria used to determine whether a plant is invasive. (<http://www.cipwg.uconn.edu/list.html>).

2) If It Is Invasive, Is Its Invasiveness A New Problem?

Hardy kiwifruit is native to eastern Asia, but in the U.S. the species is often referred to as a new crop, since commercial-scale production has been undertaken only in the past 25 years or so. This has led some people to conclude that the invasiveness question is a direct result of recent commercial plantings, but this does not appear to be the case.

Based on geologic fossil evidence, *Actinidia* were once native to North America and likely were present on various parts of the continent for nearly 80 million years (Late Cretaceous into the Tertiary Period). Fossilized *Actinidia* seeds have been identified in north-central Oregon (Dillhoff et al., 2009) and in Arctic Canada (Matthews and Ovenden, 1990), where the vines grew in a forest composed of pines, spruce, redwood, and tamarack, at a paleolatitude of 74 degrees (well north of the Arctic Circle). Changes in climate and repeated glaciations during the Late Miocene, Pliocene, and Pleistocene eliminated *Actinidia* and many other plants from North America.

Regarding more recent history, the hardy kiwifruit species *Actinidia arguta* was reintroduced to the U.S. from Japan in 1877 by Col. William S. Clark (Anonymous, 1886), who instituted the structure for the Massachusetts Agricultural College (MAC; now known as the Univ. of Massachusetts, or UMass) and served as its third President (<http://www.library.umass.edu/spcoll/umarmot/?p=444>). In addition to the Japanese seed material brought back by Colonel Clark, additional material was subsequently introduced. Accessions of at least 3 winter-hardy *Actinidia* species (*A. arguta*, *A. polygama*, and *A. kolomikta*) were brought into the U.S. by plant explorers and established on various estates, in botanical gardens, and in arboreta, including the Arnold Arboretum of Harvard University located in Boston, MA. During the 1880's and into the 1890's, there was some confusion and misidentification between *A. arguta* and *A. polyga-*

Hardy Kiwi fruit: Invasive Plant? Or Throwback to the Gilded Age? (continued)

ma, as noted by MAC graduate Samuel B. Green (Green, 1892). Initially, most *Actinidia* vines were grown for their ornamental qualities, and by the 1890's *A. arguta* was reported to be a common plant in many gardens: "The genus *Actinidia*, woody climbers of the Himalayas and eastern Asia, appears in Japan in three species, of which two are exceedingly common, and are conspicuous features of the mountain vegetation. Of these, the largest and most common, especially at the north, is *Actinidia arguta*; little need be said of this handsome plant, as it is now common and well-established in our gardens, where it grows with great vigor and rapidity, and where it is one of the best plants of its class." (Sargent, 1893; p. 88)

At the time, the use of vining plants to decorate dwellings was very popular. An American Gardening article in 1904 that discusses the use of vining plants includes specific mention of *A. arguta*: "Vines are indispensable to the proper embellishment of every well-regulated and artistically designed place, and not only should they be on the walls of mansions, but also on the less pretentious dwellings, on fences, arbors, walls, and dead tree stumps, covering them and hiding them from the ravages of time, and rendering the lowly cabin a fit subject for the brush of an artist" (Dallas, 1904). However useful they were, it also was apparent that unmanaged *A. arguta* plants could be vigorous to a fault. Consider this passage, from the *Transactions of the Massachusetts Horticultural Society for the Year 1890*, where William P. Brooks, Professor of Agriculture at the Univ. of Mass, Amherst, presented the following information in his discussion "Fruits and Flowers of Northern Japan". "Of that fruit, the Kokuwa (*Actinidia arguta*) ... I presume you have all heard. Much has been written and said about it within the past few years; though, strangely enough from my point of view, it has been urged upon the public attention as an ornamental climber." He then describes its rampant growth, including growth that overtops trees, and then states "Unless looked after far more closely than most will find time for, it will be found to overgrow all desired bounds, to displace eaves spouts and to make itself a nuisance generally by its omnipresence."

A. arguta continues to be mentioned in *Transactions of the Massachusetts Horticultural Society*. A discussion is presented on ornamental climbing plants and how to use them, including *A. arguta* (1887); information is presented on suitable propagation methods for *A. arguta* (1894); an award is given for a Japanese garden that included *A. arguta* (1908); and further information is presented on how best to propagate *A. arguta* (1908). Other publications offering advice on growing hardy kiwifruit included *Vines and How to Grow Them: A Manual of Climbing Plants for Flower, Foliage* by William C. McCollom (1911), as well as *Landscape Gardening as Applied to Home Decoration* by Samuel Taylor Maynard (1915).

Some who grew *A. arguta* in the Northeast during this period did not find the vigor to be objectionable or perhaps had selections that were more manageable. Some were quite fond of the plant. This is apparent in the following account written by David Fairchild, a botanist and plant explorer for the USDA who oversaw the Office of Seed and Plant Introduction: "In 1907, we went to Marblehead [Atlantic coast of MA] on vacation, and in strolling around on the rocky point of land - "The Neck" I think it is called, we saw such a charming garden that we wandered into it. We found an old man there. He was disturbed about something and when I introduced myself and asked permission to look around, he unburdened himself of his annoyance. The house painter had just cut in two a wonderful vine of *Actinidia arguta* which almost encircled the house with its immense twining stems and covered it with dark green foliage. It had been the pride of Mr. Parker's garden for years and I could have wept with him at the catastrophe, for I realized that he was no longer young, and it would be years before it could again be the stunning plant which it had been. We thought it a strange coincidence that we had wandered into the garden of Mr. Charles N. Parker who had long been the President of the Massachusetts Horticultural Society" (excerpt from "The Fascination of Making a Plant Hybrid Being a Detailed Account of the Hybridization of *Actinidia arguta* and *Actinidia chinensis*", published in the *Journal of Heredity* in 1927).

Clearly, *A. arguta* plants were being grown in various states throughout the late 1800's and early 1900's, including many locations in MA, and were prized for their ability to rapidly cover buildings, with its smooth, green leaves contrasting nicely with the bright, red petioles. We know from historical accounts that the seeds/plants Col. Clark brought back were distributed to the Arnold Arboretum, Michigan State University, and likely to Ames, IA. Further, *Actinidia* had been introduced to other places in New England. For example, George Buckham Dorr's Mount Desert Nurseries in Bar

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Harbor, ME, were selling *A. arguta* vines in the early 1920's and possibly a decade or two earlier. This genetic material may have originated from the seeds that Clark brought back from Japan, or from C.S. Sargent of the Arnold Arboretum who made a trip to Japan in 1892 (Sargent, 1893). The origin of the material also may have been mainland Asia through the explorations of E.H. Wilson, the collections of which Dorr may have had access to; C.S. Sargent was his step-cousin. Many *A. arguta* vines were planted in the estates on Mount Desert Island, much of which is now Acadia National Park. In the 1980's, Mark Fulford of Teltane Farm and Nursery collected and propagated cuttings from numerous historically planted vines he encountered on Mount Desert Island. As far as is currently known, the seeds derived from the female vines never went feral, a claim supported by biological survey info from the Acadia National Park survey (Greene et al., 2004) for the identification and distribution of 24 invasive taxa of invasive status within Acadia National Park. *A. arguta* did not make this list, even though it has been present in many estate gardens dating back to the beginning of the 20th century or earlier.

A. arguta was also reported to have been planted in some of the cottage estate gardens of the Berkshires, near Lenox, MA. Interestingly, the author of the American Gardening article quoted above was Lenox resident John Dallas, who described from his own experience the growing of many ornamental vines including *A. arguta* and *A. polygama* in an article titled "The Decorative Quality of Vines" (Dallas, 1904). In another instance: "There is at Lenox, in the Berkshire Hills, a place with the musical name of Fernbrook Farm. It is high on one of the glorious hillsides between Pittsfield and Lenox and reached by a romantic drive through pretty by-roads. The house itself is of white stucco and dark wood and here the eye catches first of all, perhaps, the decorative use of fruit, especially of rich black grapes, as the vines are caught upward above windows of the second story. ... *Actinidia arguta*, the fine creeper from Japan, and our native bittersweet were in evidence here, very much thinned as to branches but full of fruit" (King, 1915).

It is also known that renowned landscape architect Beatrix Ferrand did design work in the Berkshires including for her aunt, Edith Wharton, at her estate "The Mount". Ms. Ferrand was known to incorporate *A. arguta* in her landscape-garden designs in various locations across the Atlantic Seaboard (McGuire, 1982; Ferrand and Pearson, 2009); Edith Wharton authored many books, including classics such as *The Age of Innocence* and *The House of Mirth*, and also co-authored *The Decoration of Houses* in 1897 with (<http://www.edithwharton.org/>).

While so far we have not been able to establish the exact origin and provenance of the *A. arguta* vines identified in the Kennedy Park site or the Pleasant Valley Wildlife Sanctuary in Lenox, we do know that "E.J. Woolsey of Boston and his brother-in-law John Aspinwall bought most of the mountain land west of Main Street (today's Kennedy Park) and established the hilltop Cliffwood estate." (http://www.townoflenox.com/public_documents/lenoxma_webdocs/about). Thus, given the historical evidence of known plantings in this area, it is reasonable to suppose that the *A. arguta* vines could have been first planted on the site anywhere from the 1890's to the 1920's (i.e., approximately 100 years ago). In fact, a postcard of the west wing of the Aspinwall hotel - a grand hotel in a nearly mind-boggling sense - from 1912 depicts a well-established plant that resembles *A. arguta* climbing trees and the building itself (http://commons.wikimedia.org/wiki/File:Hotel_Aspinwall,_Lenox,_MA.jpg). If the dates are correct, this means that the plants could not have been very old, as the hotel was built in 1902. It was destroyed by fire in 1931, and the grounds later became the site of Kennedy Park (http://en.wikipedia.org/wiki/Lenox,_Massachusetts).

3) Why Is Hardy Kiwifruit Problematic In Certain Locations But Not Others, And Why Does This Disparity Exist?

There appear to be at least 4 different possible explanatory factors for these disparate observations: 1) plant biology and morphology, 2) genetics (interrelated with biology), 3) growing conditions including those that favor germination, and 4) origin of plant material (i.e. history).

Plant biology. Most clones of *A. arguta* are either males or females, as the plants are nearly always dioecious. Thus, isolated male or isolated female plants may grow to be large, but cannot multiply sexually. However, the plants can grow along the ground if they can't find a structure to climb (trellis, building, or tree), can tip-root if the tips touch the ground, can root if the stems reach down to the ground (i.e. self-layer), and can cover large spaces over time if

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growth is left unchecked. Generally, in cases where single plants remain, such as sites where cottages formerly existed, no offspring are created.

However, a population of plants that includes both male and female plants can potentially set seed, as can the rare hermaphroditic plant. So, if there are seedlings present, there had to be both male and female vines in close proximity, or a hermaphrodite. However, even having male and female plants near each other doesn't mean that viable seeds will result.

Plant genetics. There is a huge amount of genetic diversity among different clones of *A. arguta*, a species which can have either two, four, six, seven, or even eight sets of chromosomes (i.e., multiple ploidy levels) (Kataoka et al., 2010). This places significant limitations on the viable crosses that are likely to take place (Ferguson and Seal, 2008).

Among the species within the *Actinidia* genus, *A. arguta* has the greatest geographic distribution in terms of area where they are found in East Asia (Cui et al, 2002). This variation in environment correlates strongly with genetic variation in traits such as flowering time, vigor, and hardiness. Males and females need to have coinciding flowering times, and the same ploidy levels (number of sets of chromosomes) in order for pollination to be expected to effectively take place to produce seedlings that are fertile and not aneuploids (i.e., having an incomplete set of chromosomes). This does not mean, however, that a lack of pollination is guaranteed in all years and cases if ploidy levels and flowering times are different. Oddly enough, in the case of the cultivar Issai, which is of interest in home plantings especially because it is partially self-fertile (i.e., it can pollenize itself, resulting in some fruit set), viable seeds still are not produced, as its ploidy level is 7x (i.e., it's similar to a seedless watermelon, in terms of seed production).

Growing conditions, including those affecting seed germination. In general, kiwifruit prefers soils with a high organic matter content; and seed germination, though germination is likely to be enhanced in a high organic media such as a soilless mix, as compared to an agricultural soil (Sale, 2003; p. 19). There also is some indication that passage of seeds through the digestive tract of at least one bird species can accelerate germination and increase the germination rate of *Actinidia* seed greatly (Logan and Xu, 2006). Even when *Actinidia* crosses are purposefully made, such as in breeding attempts, germination percentages, even under highly controlled conditions, can vary widely from 0% to nearly 100%.

Origin of plant material (i.e. history) Although it is implied in the above three factors, it is worth making explicit how important plant origin is to this central question of invasiveness. However "invasive" they appear today, abandoned plantings, allowed to grow unhindered, are easily explained and fail to meet the criteria of invasiveness. It is only in those cases where seeds are known to have been naturally dispersed and germinated that these other factors of biology, genetics, and environmental conditions need to be examined.

What does all this mean for the site(s) where hardy kiwifruit appears to be invasive due to a process of seed dispersal? If indeed they are seedlings, it means that it's likely there was a "perfect storm" situation, where two or more selections of different *A. arguta* specimens matched in ploidy level and time of flowering co-existed. In addition, conditions had to exist that were conducive to seed germination, possibly including ones that would "prime" the seeds (i.e., induce them to germinate). Further investigation into historical accounts may provide more clues regarding to help explain what is happening in these cases.

4) Could Hardy Kiwifruit Become Invasive In Other Locations, Given More Time?

A continuum exists for the potential of introduced (or alien) species to become invasive, ranging from benign to extremely aggressive. Most introduced species are not invasive, according to the "Tens Rule": only 10-percent are likely to become established, and only 10-percent of the established plants are likely to become invasive (Williamson and Fritter, 1996).

If hardy kiwifruit originating from old plantings or specimens are truly invasive, and have a high capacity to disperse in a relatively short time, then these vines should have escaped by now and occupied a much greater area than their present distribution indicates. This is especially notable given that *A. arguta* has been present in Lenox, MA for more

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than 100 years based on historical information. Regarding many of the older kiwifruit plants found in surveys, it appears that the vast majority of hardy kiwifruit "finds" surviving on many sites are not recently established invasive plants but rather the botanical headstones of long-lost gardens and cottages. This does not mean, however, that individuals or organizations should stop monitoring them.

In commercial and research plantings across the country, where pollination has been taking place for decades and thousands of pounds of viable seed-containing fruit have been produced per acre, volunteer seedlings have been extremely rare. Logically, what this suggests is that there may be some basic difference in the genetics of the plant material present on problem sites, or possibly some other factors such as habitat fragmentation or degradation that enabled *A. arguta* to become locally established. For example, this might be due to changes in the soil conditions from burning or from the invasion of earthworms in forest ecosystems, which are linked to a lack of understory growth.

There may well be genetic propensities in material on problem sites that are not present in commercial plantings, reflecting on the fact that the plant material utilized on these sites was likely to have been selected for ornamental characteristics (i.e., the ability to quickly grow to cover cottages and estates) rather than fruit production. Because of these different objectives, it is possible that ornamental material ended up at the Arnold Arboretum in Boston, whereas plants with valuable fruit production characteristics were sent to the USDA in Washington, as plant exploration expeditions continued, as specified in an agreement between the two entities: "By means of a cooperative arrangement between the Bureau of Plant Industry and the Arnold Arboretum, Mr. E. H. Wilson, the well-known explorer of central China, who is in the central provinces of China collecting seeds and plants for the Arboretum, will collect for the Bureau such seeds and plants as are of a purely agricultural character in exchange for material which Mr. Meyer is authorized to obtain for the use of the Arboretum." (Galloway, 1908; p.83). Here, the words "agricultural character" means having characteristics of greater value for fruit production rather than for ornamental purposes. Both Meyer and Wilson conducted extensive plant explorations in parts of China, Korea, Russia, and Japan.

Another possibility is that in commercial production, most of the berries and seed source is removed through harvest, compared to untended vines where the berries could ripen past maturity.

The Path Forward

Ultimately, this issue will be addressed state-by-state and area-by-area, as local individuals and organizations should know what is best for their situations. In all cases, however, local decision-makers will greatly benefit from a more thorough understanding of the "invasiveness" observed at those sites that have been identified as problematic. As suggested by the information collected here, a detailed historical record should be assembled for these sites to better understand the pattern of land-use and factors that would have influenced the magnitude and type of *A. arguta* growth. Such research will be informative and suggestive, but it will not be conclusive for all sites. To supplement this historic perspective, research needs to be conducted to establish the genetic relatedness of individual plants within problematic populations to each other as well as to known cultivars. It is only through a detailed genetic characterization of this kind that we will be able to say, with certainty, if the intrusions we observe are due to vegetative propagation or seed dispersal. Furthermore, detailed information on site-specific parameters such as bird species involved in seed dispersal, and past or current site disturbances should be gathered. Given the rich history and great economic potential of this species in the region, we urge decision-makers to support these clear avenues of research and postpone considering any changes to the invasive status of *A. arguta* until such information is gathered.

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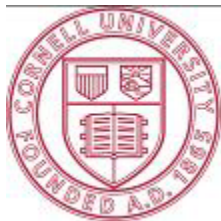
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