



New York Berry News

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Air Dancers as a Potential Bird Deterrent in Blueberries

Heidi M. Henrichs, Paul D. Curtis, Jay R. Boulanger, Cornell University Department of Natural Resources

As part of a USDA-SCRI study, our research team has spent the last two years examining bird damage to fruit crops in New York State, as well as Michigan, Oregon, and the Pacific Northwest. We examined many different aspects of bird damage including:

- 1) bird species causing damage and their behavior;
- 2) spatial distribution of damage within a plot (edge vs. interior);
- 3) effect of the surrounding landscape;
- 4) grower opinions; and
- 5) economic costs.

The main goal of this project is to identify cost-effective, efficient, and environmentally-friendly ways to deter birds from eating cherries, blueberries, apples, and wine grapes.

In 2013, we pilot tested several different techniques in New York State, including bird distress callers, hawk kites, and “air dancers” (inflatable, flexible fabric,



Air dancer in blueberries; photo courtesy of Heidi Henrichs

colorful “people”, powered by a fan to move around; see photo above).

In this article, we focus on our results from the Blue Crop blueberry trials and assessments. However, more information on the full suite of fruits can be found in an upcoming issue of the *New York Fruit Quarterly*.

Air Dancers *(continued)*

Bird behavior data were collected through the use of 15-minute point counts, and 1.5-hour observation periods, where all birds present were recorded as well as their specific foraging behavior in the target fruit plot.

The top four birds seen during these periods in blueberry plots were: American robins (*Turdus migratorius*), Baltimore orioles (*Icterus galbula*), European starlings (*Sturnus vulgaris*), and cedar waxwings (*Bombycilla cedrorum*).

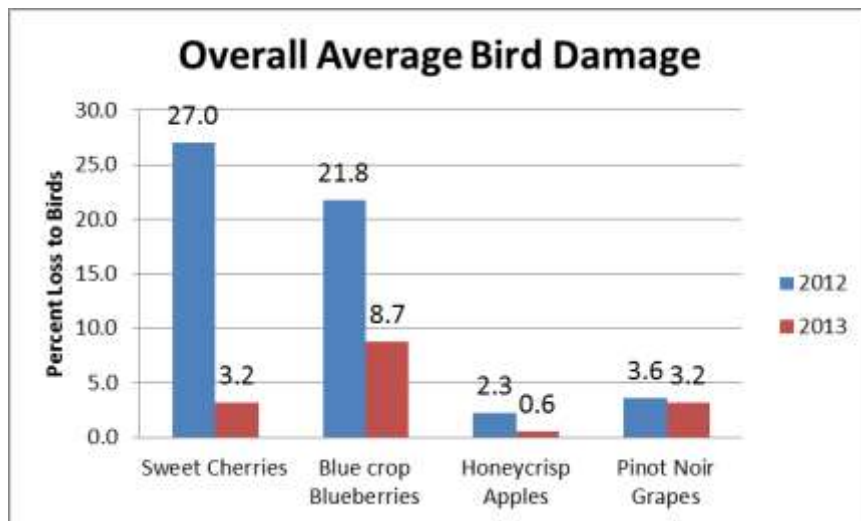
Given the nature of blueberry plantings in New York, we had very few plots with more than four rows of Blue Crop planted in a block, so we were unable to find differences in bird damage between the edges and interior of plots. Data concerning the surrounding landscape and its effect on bird damage are still under analysis.

Assessments and surveys of bird damage to blueberries in central New York took place in 2012 and 2013, with 14 sites and 12 sites, respectively.

Preliminary analysis indicated that the average amount of blueberries damaged by birds in all sites was significantly higher in 2012 (21.8%) than 2013 (8.7%). We believe this is due to the poor fruit crop in 2012, caused by the warm March temperatures, and following late-April freeze. With the low fruit numbers in 2012, bird damage was a more important part of overall crop losses.

We set up a small pilot test of air dancers in four sites during 2013.

The average percent loss to birds in the air dancer sites was 7.4%, which was lower than for paired control blocks, as well as non-trial sites



Average bird damage to four fruits in New York State.

(8.3%, 9.6%, respectively), although this was not a statistically significant difference.

Simultaneous trials in Michigan blueberries reflected this trend, but low sample sizes make it difficult to show a statistical difference. Air dancers showed a similar trend in our grape trials, and were the only deterrent to show any measurable effectiveness for our target fruit varieties.

Consequently, we have decided to do a full experimental design and field trial with air dancers in blueberries and the other fruit crops during summer 2014.

A big thank you to all the growers who gave us access to your plantings and fields- this work would be impossible with you!



Dairy Pro is New CCE Associate Director



April 24, 2014. He's been a top researcher into the metabolism, immune function, and nutritional physiology of cows, the go-to guy for farmers and others throughout the state dairy industry, and mentor to countless animal science students and Cornell Dairy Fellows.

Now, professor Thomas R. Overton is taking on a new role: associate director of Cornell Cooperative Extension.

Overton will step into the shoes of Christopher Watkins, who became director of CCE in January, upon the departure of Helene Dillard.

"We are delighted to have Tom join the CCE team as associate director for agriculture and food systems," Watkins said. "I have had the pleasure of interacting with Tom over many years, and have greatly appreciated his commitment to extension and the agricultural industry in New York.

I feel fortunate to have a faculty member of his caliber helping to enhance the impact of Cornell University throughout the state"

As director of Cornell's PRO-DAIRY program - a role he will continue to serve - Overton has worked extensively with statewide and regional extension teams to enhance the dairy industry in New York.

He teaches numerous courses at both the undergraduate and graduate levels, and helps lead the Cornell Dairy Fellows program.

He was awarded the Cargill Animal Nutrition Young Scientist Award by the American Dairy Science Association in 2006 and the ADSA Foundation Scholar Award in 2007.

In 2013, he was named a Faculty Fellow of the David R. Atkinson Center for a Sustainable Future.

Overton is a native of northern New York who grew up primarily in Massachusetts.

He earned a B.S. at Cornell University and M.S. and Ph.D. degrees from the University of Illinois.

He returned to Cornell in 1998 as an assistant professor and was promoted to full professor in 2013.

AG NEWS

USDA Designates 5 Counties in New York as Primary Natural Disaster Areas With Assistance to Producers in Pennsylvania

04/07/2014. Washington. — The U.S. Department of Agriculture (USDA) has designated five counties in New York as primary natural disaster areas due to losses caused by a freeze and freezing temperatures that occurred Dec. 1, 2013, and continues. The counties are: *Cattaraugus, Cayuga, Chautauqua, Oswego and Yates.*

"Our hearts go out to those New York farmers and ranchers affected by recent natural disasters," said Agriculture Secretary Tom Vilsack. "President Obama and I are committed to ensuring that agriculture remains a bright spot in our nation's economy by sustaining the successes of America's farmers, ranchers, and rural communities through these difficult times. We're also telling New York producers that USDA stands with you and your communities when severe weather and natural disasters threaten to disrupt your livelihood."

Farmers and ranchers in the following contiguous counties in New York also qualify for natural disaster assistance. Those counties are: *Allegany, Cortland, Erie, Jefferson, Lewis, Oneida, Onondaga, Ontario, Schuyler, Seneca, Steuben, Tompkins, Wayne, and Wyoming.*

Farmers and ranchers in the following contiguous counties in Pennsylvania also qualify for natural disaster assistance.

Those counties are: Erie, McKean, and Warren.

All counties listed above were designated natural disaster areas on March 26, 2014, making all qualified farm operators in the designated areas eligible for low interest emergency (EM) loans from USDA's Farm Service Agency (FSA), provided eligibility requirements are met. Farmers in eligible counties have eight months from the date of the declaration to apply for loans to help cover part of their actual losses. FSA will consider each loan application on its own merits, taking into account the extent of losses, security available and repayment ability. FSA has a variety of programs, in addition to the EM loan program, to help eligible farmers recover from adversity.

Additional programs available to assist farmers and ranchers include the Emergency Conservation Program, Federal Crop Insurance, and the Noninsured Crop Disaster Assistance Program. Interested farmers may contact their local USDA Service Centers for further information on eligibility requirements and application procedures for these and other programs. Additional information is also available online at <http://disaster.fsa.usda.gov>.

USDA Officially Announces Sign-Up Date for Farmer and Rancher Disaster Assistance Programs

Sign-Up Begins April 15 for Livestock, Honeybee, Fruit Grower Programs

April 7, 2014. Washington. — The U.S. Department of Agriculture

(USDA) announced today that farmers and ranchers can sign-up for disaster assistance programs, reestablished and strengthened by the 2014 Farm Bill, beginning Tuesday, April 15, 2014. Quick implementation of the programs has been a top priority for USDA.

"These programs will provide long-awaited disaster relief for many livestock producers who have endured significant financial hardship from weather-related disasters while the programs were expired and awaiting Congressional action," said Agriculture Secretary Tom Vilsack. "President Obama and I prioritized the implementation of these disaster assistance programs now that the Farm Bill has restored and strengthened them."

The Livestock Indemnity Program (LIP) and the Livestock Forage Disaster Program (LFP) will provide payments to eligible producers for livestock deaths and grazing losses that have occurred since the expiration of the livestock disaster assistance programs in 2011, and including calendar years 2012, 2013, and 2014.

Enrollment also begins on April 15 for producers with losses covered by the Emergency Assistance for Livestock, Honeybees, and Farm-Raised Fish Program (ELAP) and the Tree Assistance Program (TAP).

LIP provides compensation to eligible livestock producers that have suffered livestock death losses in excess of normal mortality due to adverse weather. Eligible livestock includes beef cattle, dairy cattle, bison, poultry, sheep, swine, horses, and other

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livestock as determined by the Secretary.

LFP provides compensation to eligible livestock producers that have suffered grazing losses due to drought or fire on publicly managed land. An eligible livestock producer must own, cash lease, or be a contract grower of eligible livestock during the 60 calendar days before the beginning date of the qualifying drought or fire in a county that is rated by the U.S. Drought Monitor as D2, D3, or D4.

ELAP provides emergency assistance to eligible producers of livestock, honeybees and farm-raised fish that have losses due to disease, adverse weather, or other conditions, such as blizzards and wildfires, as determined by the Secretary of Agriculture.

TAP provides financial assistance to qualifying orchardists and nursery tree growers to replant or rehabilitate eligible trees, bushes and vines damaged by natural disasters.

USDA Farm Service Agency (FSA) employees have worked exceptionally hard over the past two months to ensure eligible farmers and ranchers would be able to enroll to receive disaster relief on April 15.

To expedite applications, all producers who experienced losses are encouraged to collect records documenting these losses in preparation for the enrollment in these disaster assistance programs. Information on the types of records necessary can be provided by local FSA county offices. Producers also are encouraged to contact their

county office ahead of time to schedule an appointment.

For more information, producers are encouraged to review the 2014 Farm Bill Fact Sheet, check out the LIP, ELAP and TAP fact sheets online or visit any USDA Service Center. Office locations and contact information can be found using the NY county office locator:

<http://offices.sc.egov.usda.gov/locator/app?state=ny&agency=fsa>

2012 Census Profiles New York Farmers and Agriculture

Value of New York Agricultural Products Sold increases to \$5.42 Billion

May 2, 2014. Albany, New York. Today the U.S. Department of Agriculture's National Agricultural Statistics Service (NASS) released the final 2012 Census of Agriculture results sharing a wide-range of information about what agricultural products were raised in the United States in 2012, and where, how and by whom they were grown. The data, which is reported at the national, state and county level, will help farmers, ranchers, local officials, agribusiness and others make decisions for the future.

"The 2012 Census of Agriculture provides a wide range of demographic, economic, land, and crop and livestock production information as well as first-time or expanded data," said Blair Smith, New York State Statistician. "Many of these data about New York and our counties are only collected and reported as part of the every-five-year census."

The 2012 Census of Agriculture data show the following key trends for New York.

- ⇒ Land in farms increased slightly from 2007 to 7.18 million acres.
- ⇒ Number of farms decreased 2 percent from 2007 to 35,537 in 2012.
- ⇒ The value of livestock products sold increased 11 percent to \$3.17 billion.
- ⇒ The value of crop products sold increased 44 percent to \$2.25 billion.
- ⇒ The average age of farm operators continued the long term trend and increased to 57.1 years.
- ⇒ Net cash farm income increased 3 percent to \$1.22 billion.

To provide easier access to the data, NASS created a number of online tools for people to find and use Census data, including:

- ⇒ Quick Stats 2.0 – an online database to retrieve customized tables. For those new to this tool, a new tutorial video provides easy-to-follow instructions.
- ⇒ API – a tool for developers.
- ⇒ Agricultural Atlas Maps - profiles of the nation's agriculture at the county-level in a series of multicolor pattern and dot maps
- ⇒ Desktop Data Query Tool- a downloadable desktop tool to analyze data without Internet access once you have downloaded and installed this tool.

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NRCS Starts Signup for Ag Land, Wetland Conservation Easements

Applications for new Farm Bill program due June 6, 2014

May 8, 2014. Syracuse, NY. USDA's Natural Resources Conservation Service is now accepting applications for its new Agricultural Conservation Easements Program. Up to \$366 million is available for the purchase of conservation easements on eligible agricultural lands and wetlands in New York.

"This is an exciting new opportunity for even more people to get involved in conserving natural resources," said Dennis DeWeese, Acting State Conservationist. "We encourage Indian tribes, state and local governments, non-governmental organizations and private landowners to contact their local NRCS office to find out how to apply."

The ACEP, created through the 2014 Farm Bill, funds easements for agricultural lands and wetland reserves.

Approved agricultural easements would prevent productive working lands from being converted to non-agricultural uses and maximize protection of land devoted to food production. Cropland, rangeland, grassland, pastureland and nonindustrial private forestland are eligible.

Wetland reserve easements would restore and enhance wetlands and improve habitat. Eligible lands include farmed or converted wetlands that can be successfully and cost-effectively restored.

Applications are currently being

accepted for wetlands reserve easements and will be rated according to the easement's potential for protecting and enhancing habitat for migratory birds, fish and other wildlife.

Applications must be submitted to New York NRCS by June 6, 2014 or. Applications are available at local [USDA Service Center](#) and at www.nrcs.usda.gov/GetStarted. Agreements will be evaluated starting in late August.

The ACEP combines NRCS' former Farm and Ranch Lands Protection, Grassland Reserve and Wetlands Reserve programs.

Learn more about ACEP and other Farm Bill programs at www.nrcs.usda.gov/farmbill.

To get started with NRCS, visit your local [USDA Service Center](#) or www.nrcs.usda.gov/GetStarted. Learn more about the Farm Bill at www.nrcs.usda.gov/FarmBill.

USDA Announces \$78 Million Available for Local Food Enterprises

Historic Investment Will Support Entire Local Food Supply Chain

May 8, 2014. WASHINGTON – Agriculture Secretary Tom Vilsack today announced that USDA is making a historic \$78 million investment in local and regional food systems, including food hubs, farmers markets, aggregation and processing facilities, distribution services, and other local food business enterprises.

"The 2014 Farm Bill has given USDA new tools, resources and authority to support the rural economy," Vilsack said.

"Consumer demand for locally-produced food is strong and growing, and farmers and ranchers are positioning their businesses to meet that demand. As this sector continues to mature, we see aggregation, processing, and distribution enterprises across the local food supply chain growing rapidly. These historic USDA investments in support of local food give farmers and ranchers more market opportunities, provide consumers with more choices, and create jobs in both rural and urban communities."

Vilsack said that \$48 million in loan guarantees for local food projects is now available through USDA's Rural Development's Business and Industry Guaranteed Loan Program, and \$30 million is available through competitive grants via the Agricultural Marketing Service's (AMS) Farmers Market and Local Foods Promotion Program.

The 2014 Farm Bill requires USDA to set aside at least five percent of Business and Industry (B&I) program loan guarantees for projects that focus on local food business enterprises. Details on how to apply for local food funding through the B&I program are available on the Rural Development website. Applications are accepted on a rolling basis. The B&I program has the authority to fund local food infrastructure in urban areas as long as the project supports farm and ranch income and expands healthy food access in underserved communities.

Rural Development's B&I program provides financial backing for rural business development in partnership with private-sector lenders. It is one of

AG NEWS *(continued)*

several USDA programs that help finance local foods projects. In 2013, Rural Development supported more than 170 local food infrastructure projects – from food hubs, to scale-appropriate processing facilities, to cold storage and distribution networks. Entities eligible for B&I loan guarantees include cooperatives, non-profit organizations, corporations, partnerships or other legal entities, Indian tribes, public bodies or individuals.

The 2014 Farm Bill tripled funding for marketing and promotion support for local food enterprises by creating the [Farmers Market and Local Foods Promotion Program](#), administered by the Agricultural Marketing Service (AMS). This new program makes \$30 million available annually to farmers markets, other direct producer-to-consumer venues, and other businesses in the local food supply chain. Under this program, \$15 million is now available for marketing and promotional support specifically for local food businesses, including food hubs, delivery and aggregation businesses, and processing and storage facilities along the local food supply chain, while \$15 million is for marketing support for farmers markets and other direct to consumer outlets. Since 2009, AMS, which administers this program, has funded nearly 450 projects totaling \$27 million to support direct marketing efforts for local food. [More information about how to apply is available on the AMS website.](#) **Applications are due June 20, 2014.**

These funding opportunities are cornerstones of the USDA's commitment to support local and regional food systems. [USDA's Know Your Farmer, Know Your](#)

[Food Initiative](#) coordinates the Department's policy, resources, and outreach efforts related to local and regional food systems [The Know Your Farmer, Know Your Food Compass](#) maps nearly 3,000 local and regional food projects supported by USDA and eleven other federal agencies. Secretary Vilsack has identified strengthening local food systems as one of the four pillars of USDA's commitment to rural economic development, along with production agriculture (including expanding export markets and improving research), promoting conservation and outdoor recreation opportunities, and growing the bio-based economy.

USDA Awarding \$6 Million to Prepare Farmers for New Farm Bill Programs

Farm Bill Implementation Continues at Brisk Pace with Universities and State Cooperative Extension Programs Now Set to Help Educate Farmers

May 29, 2014. WASHINGTON. Agriculture Secretary Tom Vilsack today announced that the U.S. Department of Agriculture (USDA) is awarding \$6 million to universities and cooperative state extension services to develop online decision tools and other materials and train experts to educate producers about several key farm bill programs. The new Web tools will help farmers and ranchers determine what participation in programs established by the 2014 Farm Bill will mean for their businesses.

The University of Illinois (lead for the National Coalition for Producer Education), along with the Food and Agricultural Policy

Research Institute (FAPRI) at the University of Missouri and the Agricultural and Food Policy Center at Texas A&M (co-leads for the National Association of Agricultural and Food Policy), will receive a total of \$3 million to develop the new online tools and train state-based extension agents who can in turn help educate farmers.

"Helping farmers and ranchers understand new Farm Bill programs and what the programs mean for their families is one of USDA's top priorities," said Vilsack. "With the resources we're providing, university experts will help ensure farmers and ranchers are highly educated as they make critical decisions about new programs that impact their livelihoods. The new tools that will be developed will empower farmers and ranchers to select the plan that best fits their unique needs."

The new resources will help farmers and ranchers make an educated choice between the new Agriculture Risk Coverage (ARC) program and the Price Loss Coverage (PLC) program. Using the new online tools, producers will be able to use data unique to their specific farming operations combined with factors like the geographical diversity of crops, soils, weather and climates across the country to test a variety of financial scenarios before officially signing up for the new program options later this year. Once a producer enrolls in the ARC or PLC program, he or she must remain in the program through the 2018 crop year.

New tools will be provided for other programs as well. Sign-up for the newly established Margin Protection Program for Dairy

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(MPP) begins late this summer and enrollment for "buy-up" provisions under the Noninsured Crop Disaster Assistance Program (NAP) will begin early next year. An online MPP tool will be available when sign up begins and the NAP buy-up provision resource will become available to producers in the fall for the 2015 crop year.

The University of Illinois, as lead for NCPE, and FAPRI at the University of Missouri and AFPC, at Texas A&M, as co-leads for NAAFP will develop the ARC and PLC Web tool program. The University of Illinois will also develop the online resources for MPP and NAP.

USDA will also award \$3 million to state cooperative extension services—a nationwide network of experts based at land-grant universities—for outreach and education on the new Farm Bill programs. Funds will be used to conduct public education outreach meetings where producers can speak with local extension agents and Farm Service Agency (FSA) staff. Outreach meetings will begin late this summer to help farmers and ranchers understand the new programs and their options.

While universities work to create new online tools, producers now have access to a preliminary website that gives them a chance to begin familiarizing themselves with the new programs and the type of information they will need to consider when deciding which program options work better for them. At this site, farmers and ranchers can view ARC and PLC projected payments, ARC guarantees, and PLC payment rate projections. These tables are available on the FSA website.

Today's announcement was made possible through the 2014 Farm Bill, which builds on historic economic gains in rural America over the past five years, while achieving meaningful reform and billions of dollars in savings for taxpayers. Since enactment, USDA has made significant progress to implement each provision of this critical legislation, including providing disaster relief to farmers and ranchers; strengthening risk management tools; expanding access to rural credit; funding critical research; establishing innovative public-private conservation partnerships; developing new markets for rural-made products; and investing in infrastructure, housing and community facilities to help improve quality of life in rural America. For more information, visit www.usda.gov/farmbill.

Partners to Develop Web-based Decision Tools:

For the NCPE, University of Illinois as lead: Michigan State University, Montana State University, Watts & Associates, Delaware State University, University of Arkansas at Pine Bluff, North Carolina A&T University, University of Wisconsin, Cornell University, Pennsylvania State University, Ohio State University, and University of Minnesota.

For the NAAFP, FAPRI and AFPC as co-leads: Texas Tech University, University of Missouri, Iowa State University, University of Nebraska, Kansas State University, Mississippi State University, Oklahoma State University, Tennessee State University, University of Georgia, and Fresno State University.

View a list of funding for the [state](#)

[extension services](#).

Mid-Summer 2014

Producers receive letters notifying them of current bases and yields and 2009 to 2012 planting history.

Late Summer - 2014

MPP, ARC and PLC online tools become available.

MPP enrollment for 2014 and 2015 begins.

MPP owners have opportunity to update yields and reallocate bases for ARC/PLC purposes.

Fall 2014

NAP buy-up online tools become available.

NAP buy-up sign-up starts.

Winter 2014

ARC/PLC one-time selections occur.

Early 2015

ARC/PLC sign-up for 2014 and 2015 starts.

Visit www.fsa.usda.gov or the local FSA office for information about FSA and the 2014 Farm Bill programs.

BERRY ORGANIZATION NEWS

NEW YORK BERRY GROWERS ASSOCIATION

NYS Berry Growers Association Receives \$320,000 to Battle Spotted Wing Drosophila

*Dale Ila M. Riggs President, NYS Berry
Growers Association*

Success is sweet! The NYS Berry Growers Association (NYSBGA) was successful again in obtaining a legislative allocation from the NYS Senate to continue our battle against Spotted Wing Drosophila (SWD).

Thanks to the \$320,000 allocation we received this year, we will be able to continue the great work that our Cornell berry team of researchers and extension staff started last year.

As a berry industry we need to send our sincere appreciation to Senator Patty Ritchie, her staff, and her colleagues on the Senate Agriculture Committee for understanding the gravity of the situation with SWD.

They have worked on our behalf to obtain state funds so that we can battle this pest in a coordinated way on a statewide basis.

The NYS Farm Viability Institute (FVI) is again stepping up to the plate to help with the administrative details of obtaining and using this funding.

We extend heartfelt thanks to Dave Grusenmeyer, Managing Director of the Institute, and the FVI Board of Directors.

The NYSBGA Board of Directors had a conference call last month with Dr. Greg Loeb at Geneva to review the different projects that we will be funding with this allocation.

Steps are already under way to plan and run three SWD workshops throughout NYS next winter to educate growers on the knowledge we are gaining to help growers manage this pest.



So keep your eyes on your SWD traps this summer and your eyes on your mailbox this fall announcing the workshops, tentatively planned for December, January, and March in Eastern, Central, and Western NYS.

Best wishes for a productive berry season and preferably, a season of low SWD pressure!

NASGA NEWS



First Announcement

8th North American Strawberry Symposium

and

*North American Strawberry Growers Association
(NASGA) 2015 Berry Conference*

Crowne Plaza Hotel, Ventura, CA

February 3-6, 2015

We invite you to the **8th North American Strawberry Symposium** to be held **Feb. 3-6, 2015** in **Ventura, California, USA**. This meeting of strawberry scientists and producers from around the globe promises to be remarkable. California, where nearly 90% of U.S. strawberries are grown, features a unique coastal environment with its western ocean exposure, moderate temperatures, warm sunny days, and cool foggy nights – perfect for growing strawberries year-round.

Subject areas for presentations will include: Global and North American Overviews, Breeding, Genetics,

BERRY ORGANIZATION NEWS *(continued)***NASGA NEWS**

Molecular Biology, Disease & Pest Management, Propagation & Nursery Management, Cultural Practices, Plant Nutrition and Water Management, Plant Physiology, Economics of Production Practices, Post-Harvest, and Food Safety. **Workshop topics** will include water-use efficiency and nutritional management, production physiology, pesticide-resistance management, and expansion of variety adaptation through cooperative breeding and testing. To help us plan the program, **please submit presentation titles as soon as possible, indicating whether your presentation will be oral or a poster, to Kim.Lewers@ars.usda.gov**

Please reserve the dates of **February 3-6, 2015** for the **8th North American Strawberry Symposium (NASS)** – two and a half days of workshops, research presentations, poster sessions, a banquet, and other special events. The Symposium will be followed by a post-conference tour on February 7, which will encompass strawberry production in the region and opportunities to visit other horticultural operations. The Program Committee is committed to **making this a world-class research symposium for growers and scientists**, and we eagerly look forward to seeing you in Ventura.

Look for a mail-in registration form and more program details (abstract deadlines, keynote speakers, etc.) and opportunities for industry, organization and agency sponsorship on the NASGA website: <http://www.nasga.org/> in July 2014. On-line registration will become available in September.

Program committee:

- 🍓 *Gary Bardenhagen*, NASGA Past President, Bardenhagen Berries, Lake Leelanau, MI, g.c.bardenhagen@gmail.com
- 🍓 *Oleg Daugovish*, Farm Advisor for strawberry and vegetable crops, University of California, Ventura, CA, odaugovish@ucanr.edu
- 🍓 *Kathy Demchak*, Berry Extension Associate, Penn State University, University park, PA, efz@psu.edu
- 🍓 *Kevin Edberg*, NASGA Board, The Berry Patch, Forest Lake, MN, kedberg@aol.com
- 🍓 *Pam Fisher*, Berry Crop Specialist, Ontario Ministry of Agriculture and Food, Simcoe, ON Canada, pam.fisher@ontario.ca
- 🍓 *Kim Lewers*, (Co-chair), Research Geneticist (Plants), USDA-ARS, Beltsville, MD, kim.lewers@ars.usda.gov
- 🍓 *Penelope Perkins-Veazie*, Post Harvest Physiologist, North Carolina State University, Raleigh, NC, penelope_perkins@ncsu.edu

- 🍓 *Kevin Schooley*, NASGA Executive Director, Kemptville, ON, Canada, info@nasga.org
- 🍓 *Jami Simmons*, NASGA Treasurer, Lassen Canyon Nursery, Redding, CA, jami@lassencanyonnursery.com
- 🍓 *Blaine Staples*, (Co-chair), NASGA President, The Jungle Farm, Innisfail, AB Canada, bstaples@cciwireless.ca
- 🍓 *Fumiomi (Fumi) Takeda*, Horticulturist and Small Fruit Scientist, USDA-ARS, Kearneysville, WV, Fumi.Takeda@ars.usda.gov
- 🍓 *Hillary Thomas*, Production Research Manager, California Strawberry Commission, Watsonville, CA, hthomas@calstrawberry.org
- 🍓 *Scott Thompson*, NASGA Vice President, Thompsons Strawberry Farm, Bristol, WI, Tsf_scott@yahoo.com



Save the Date": November 17-19, 2014 / Pinehurst, NC

You're invited to join us for the 2014 Southeast Strawberry Expo!

Registration will open late July.

Look for our invitation to register at that time.

Meeting agenda & program materials – COMING SOON!



FOCUS ON FOOD SAFETY

Focus on Food Safety Series – Introduction, Part 1 - Craig Kahlke & Betsy Bihn

Are you a fruit or vegetable grower that is beginning to get asked questions about your food safety practices or having a 3rd-party food safety audit that requires a comprehensive farm food safety plan? Are you concerned with ever increasing food safety requirements that are part of the Food Safety Modernization Act (FSMA) and the extra burden it might put on your business? **Well, you are not alone, and hopefully this multi-part series of articles on food safety will help ease your mind.** This weekly series will focus on clearing up common misconceptions, providing background information on the risk of foodborne illnesses associated with fresh fruits & vegetables, sharing a brief history of produce-related foodborne illness outbreaks, and outlining basic Good Agricultural Practices (GAPs) to guide you through thinking about the potential food safety risks on your farm. Throughout, we will provide resources that can give you more detailed information and ask you to give us ideas for future articles.

Tentative Outline of Focus on Food Safety Series

Here are some of the areas we would like to cover in this series.

- A Brief History of Produce Associated Foodborne Illness Outbreaks
- Buyer Demand for Produce Safety Drives Implementation
- Third Party Audits
- Food Safety Modernization Act (FSMA) Produce Rule and the Produce Safety Alliance
- Produce Safety Hazards on the Farm: Chemical, Physical, and Biological
- Assessing Risks on Your Farm
- Good Agricultural Practices to Reduce Risks (multiple parts)
- Crisis Management
- Developing Your Own Individual Farm Food Safety Plan

We would love to have your suggestions, so please email Craig at cjk37@cornell.edu to suggest article topics or share your concerns about produce safety. The main purpose is to engage you in the topic of farm food safety and provide ways for you to expand your understanding so that you can meet both the market demand and federal requirements for food safety on your farm (without wanting to poke your eye out with a pen!).

Focus on Food Safety Series – Introduction, Part 2 - Craig Kahlke & Betsy Bihn

An Overview of Foodborne Illness in the US

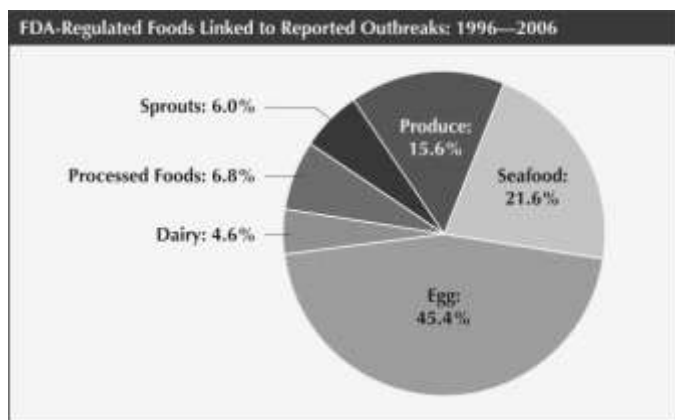
The Center for Disease Control (CDC) estimates that each year roughly 1 in 6 Americans (or 48 million people) gets sick, 128,000 are hospitalized, and 3,000 die of foodborne illnesses. There is much more information here on the CDC website following their 2011 estimates/findings.

<http://www.cdc.gov/foodborneburden/2011-foodborne-estimates.html>. **It is important to realize these are ESTIMATES because not everyone who has a foodborne illness is documented.** Many people get flu-like symptoms, diarrhea, stomach cramps, etc. for a day or 2, do not go to the doctor, and then recover. Many such instances are likely to be caused by foodborne illnesses that go unreported, in many cases severely under-reported. For instance, the CDC estimates that for salmonellosis, the illness caused by certain strains of *Salmonella* bacteria, 36 times more people have may have contracted salmonellosis than report it. Unfortunately, an increasing number of the US population have weakened or compromised immune systems, making them more susceptible to foodborne illnesses. Immunocompromised groups include the elderly, young children under 5, pregnant women and those with organ transplants. Since it is impossible to know the health status of those that eat fresh produce grown on your farm, reducing produce safety risks is one way to protect all consumers.

FOCUS ON FOOD SAFETY *(continued)*

To understand some of the data presented next, it is important to understand the distinction between a foodborne illness and a foodborne outbreak. An illness is a confirmed case of an individual becoming sick from a foodborne pathogen. This requires testing and confirmation via a health department or medical facility, and linking the pathogen to its source (e.g. *Salmonella* from eating chicken from a specific source). An outbreak is defined as 2 or more confirmed illnesses in people resulting from the same pathogen and source. Although this is very tough to do, recent advances in pathogen subtyping and communication systems such as PulseNet make it possible.

Before we talk specifically about fresh produce, it is important to realize that foodborne illnesses can be associated with all types of foods. High profile foodborne illness outbreaks associated with undercooked hamburgers are remembered by many, but as **Figure 1** (below) shows, produce was implicated as the cause of about 15.6% of FDA-regulated outbreaks from 1996-2006.



These outbreaks led to 37.3% of all illnesses in the same time period (Figure 2, above right). These two figures are included to highlight the fact that fresh produce can be the vehicle for human pathogens and once consumed, result in illnesses and outbreaks.

There are many attributes that make fresh produce a good vehicle for human pathogens. Fruits and vegetables are often eaten uncooked, so there is no cooking step to kill pathogens that may be present. Produce is grown in the open environment that includes risks from wildlife, wind, water, and soil. Unfortunately, many different commodities have been associated with illnesses and outbreaks.

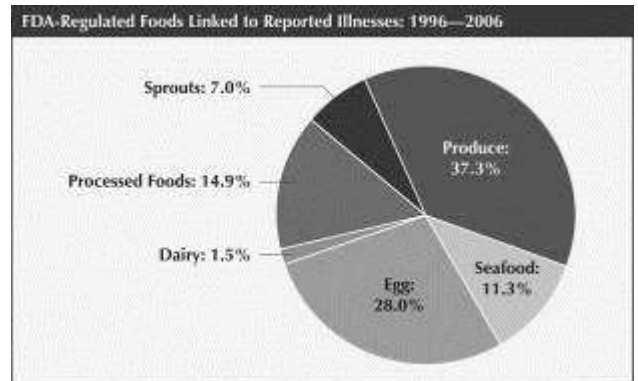
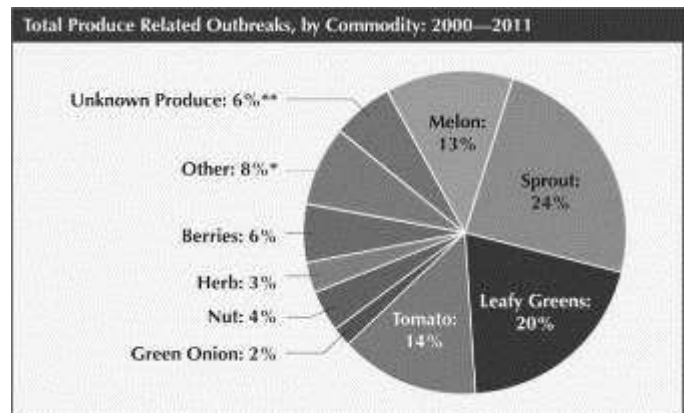


Figure 3 (below) shows a collection of fresh produce items that became contaminated resulting in illnesses.



Although sprouts, leafy greens, tomatoes, and melons lead the way, accounting for over 70% of produce-related outbreaks, commodities such as berries and green onions are also implicated. The important point to understand is that all produce can become contaminated, so understanding produce safety risks on your farm and how to reduce them is very important to protecting the fresh produce you grow.

In the next installment (part 3) of this series, we will examine the pathogens that most frequently cause foodborne illnesses associated with fresh produce. Understanding a little bit about the microorganisms and what they need to survive and multiply is important to understanding how to assess and minimize risks on the farm.

ON THE ORGANIC SIDE...

NOP Accepting Comments on Post-Harvest Handling Guidance

The USDA National Organic Program (NOP) has published a draft guidance that provides information on substances that may be used in post-harvest handling (washing, cooling, and sorting) of raw organic products. Public comment on the draft guidance is being accepted until June 24, 2014, via Regulations.gov.

Publications on Supporting Pollinators on Organic Farms

Concerned about pollinators on your organic farm? The Xerces Society recently released a new manual on Pollinator Management for Organic Seed Producers.

This new publication aids organic seed producers in understanding the role and diversity of seed crop pollinators, as well as strategies for reducing pollen movement between organic and conventional farms. Profiles of common pollinators, strategies for managing pollination, and guidelines for specific crops are all included.

You can download the publication [here](#).

Visit the Xerces Society website for more publications on creating and conserving pollinators on organic farms which are available for download including:

- Pollinator Habitat Assessment Form and Guide for Organic Farms
- Organic Farming for Bees Toolkit

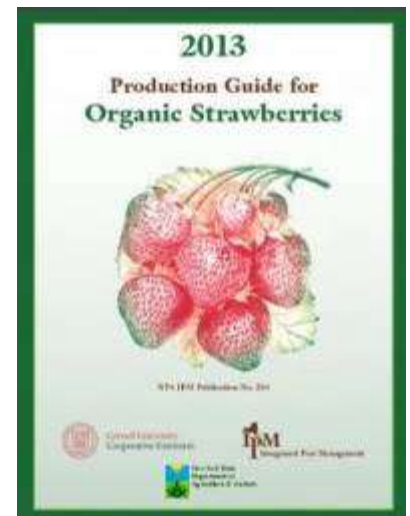
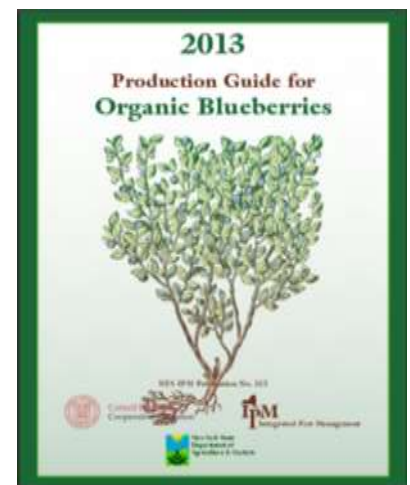
- Organic Farming Practices: Reducing Harm to Pollinators
- Organic-Approved Pesticides: Minimizing Risk to Pollinators
- Farming for Bees
- Biodiversity Conservation: An Organic Farmer's Guide, by the Wild Farm Alliance

USDA Updating the National Farmers Market Directory

Do you sell your products at one of the 8,000+ farmers markets across the country? If so, AMS needs your help updating the National Farmers Market Directory. The Directory relies on self-reported input from farmers' market stakeholders.

The Directory is one of the most comprehensive and up-to-date sources of information about farmers markets nationwide. If you are part of a farmers market, encourage your market manager to add or update their listings in time for the peak market season. The complete Directory will be released the first week of August.

Market listings can be added and updated at www.usdadirectoryupdate.com.



FOCUS ON PEST MANAGEMENT

Two New Cornell Guideline Publications Released

The Pesticide Management Education Program (PMEP) at Cornell University is pleased to announce the addition of two new titles to the Cornell Crop and Pest Management Guidelines series.

Each “Cornell Guideline” is designed as a practical guide for agricultural and horticultural crop producers, turf and landscape managers, crop consultants and industry advisers, Extension educators, pesticide dealers, and others working in crop or pest management.

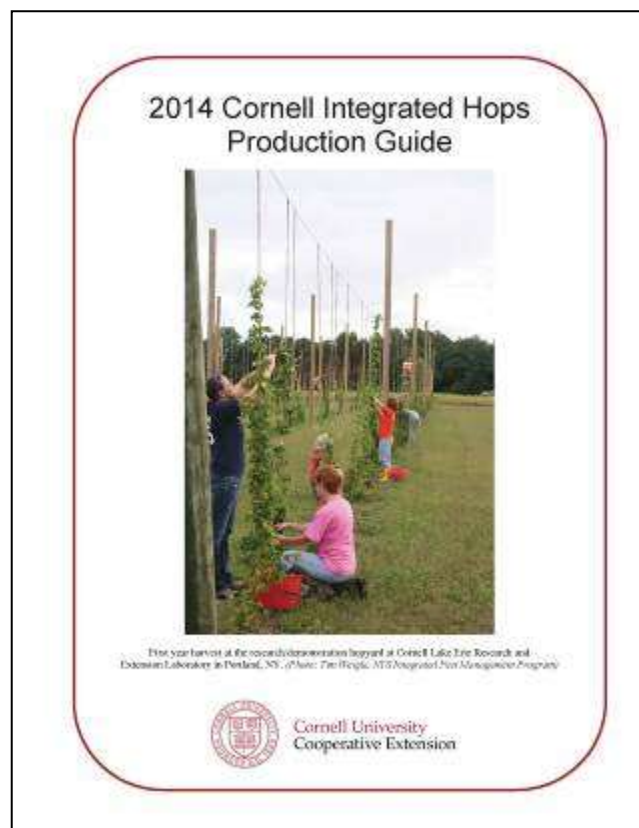
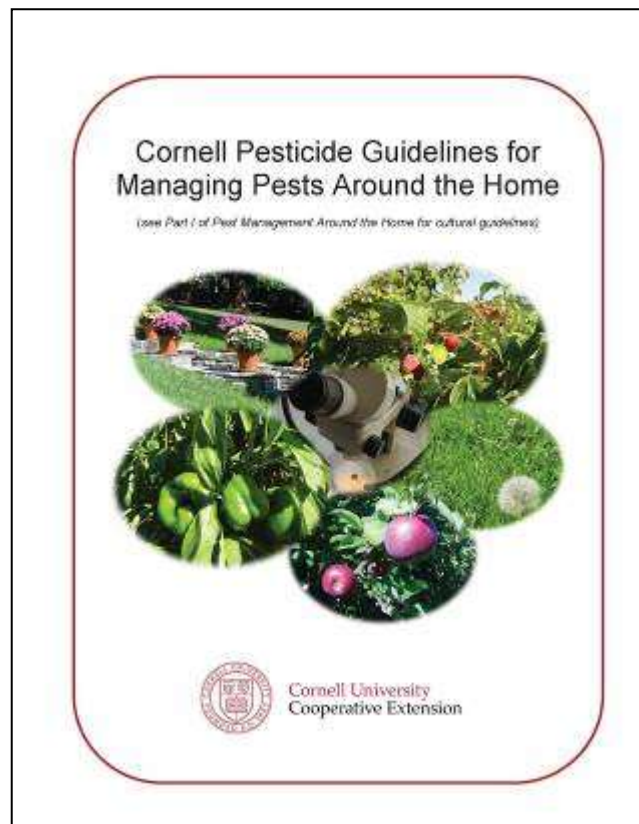
The two new “Cornell Guideline” titles are:

⇒2014 Cornell Integrated Hops Production Guide.

This newly created publication is designed to offer beginning and veteran hops producers practical information on growing and managing hops. Topics covered include site selection, nutrient management, use of cover crops, selecting varieties, and managing common hopyard pests. Also included is information on selecting, operating, and maintaining pesticide spray equipment. Cost for this Guide is \$28.00 plus shipping.

⇒**Cornell Pesticide Guidelines for Managing Pests Around the Home.** *Cornell Pesticide Guidelines for Managing Pests Around the Home* is designed to give options for controlling common pests found in and around residential areas. Helpful strategies, including non-pesticide control measures when appropriate, are provided to help manage: pests inside the home, annoying outdoor pests, wildlife, indoor and outdoor plant pests, fruit and vegetable pests, and turfgrass pests. Also included is updated information on pesticide application methods, the types of pesticides available, and how to use pesticides appropriately. Cost for this Guide is \$28.00 plus shipping. Note that this publication updates and replaces the 2009-2010 edition of Pest Management Around the Home – Part II – Pesticide Guidelines.

These publications can be purchased through your local [Cornell Cooperative Extension office](#) or through the Cornell Store at Cornell University. To order through the Cornell Store, order online at <http://store.cornell.edu/c-875-guidelines.aspx> or call (800) 624-4080.



FOCUS ON PEST MANAGEMENT *(continued)*

MANA Introduces Captan Gold™ with Unique Packaging, Formulations

March 11, 2014. RALEIGH, N.C. – [MANA](#) introduces [Captan Gold™](#) 80 WDG with its unique formulation and packaging. Setting itself apart from all other captan formulations on the market, Captan Gold is a low-dust, low-foam formulation that easily and quickly mixes into spray tanks. These handling properties help mixers and applicators save time without having to wait long for foam to subside or for the product to mix into solution.

The Captan Gold 80 WDG packaging also aids in handling with its convenient bag properties and sizes. The unique 20-pound bag is the perfect size for a 500-gallon spray tank, and it comes with an EZ-Open top that mixers can quickly open without using any tools. Once unfolded, the top of the bag has a handle to allow for steady pouring. Captan Gold 80 WDG also comes in 30-pound bag and 6.25-pound standup pouch, both featuring tear notch openings, eliminating the need for tools to open.

“Backed by more than 50 years of captan manufacturing, the Captan Gold 80 WDG formulation sets a new standard for one of the most essential fungicides for tree fruit and other specialty crop growers,” said Sara Zinck, MANA marketing leader. “The new EZ-Open and standup packaging round out the distinct Captan Gold offering and will help shift the perception of captan for mixers and applicators.”

For more information, call 866-406-6262 or visit www.manainc.com.

UPi adds UV Protection to Devrinol Herbicide

United Phosphorus Inc., Kings of Prussia, Pa., has launched a new formulation of Devrinol DF-XT 50 DF that doesn't break down as quickly in ultraviolet light. The herbicide has been labeled and recommended for use on a variety of vegetables and fruits for decades. In the past, the recommendations included preplant incorporation because of its UV light sensitivity, according to a university grower e-newsletter.

Rainfall or overhead irrigation that causes weeds to germinate is still needed for activation. But none of the Devrinol will be lost waiting for water.

It controls annual grasses and selected broadleaf weeds early in the season. The new formulation will work no differently under black plastic mulch. Where growers will see a difference is between rows of plastic mulch where Devrinol use has been avoided in the past because of difficulty of soil incorporation, according to the newsletter. It is safe on transplants and will not stunt growth when soil temperatures are less than 50 degrees Fahrenheit.

Devrinol provides four to six weeks of control under normal weather conditions—about twice as long in the soil as the original formulation.

See more at: <http://www.thegrower.com/news/UPi-adds-UV-protection-to->

[Devrinol-herbicide-211830261.html](http://www.thegrower.com/news/UPi-adds-UV-protection-to-Devrinol-herbicide-211830261.html)

Devrinol 2-XT labeled for use in NY.

January 28, 2014. Devrinol 2-Xt, a new liquid formulation is now labeled for use in NY.

Blackberries, Blueberries, Raspberries, Elderberries, Currants, and Gooseberries: 2 gallons/A (4 lbs. a.i.). Apply to a weed free soil surface. May be applied to newly planted and established crop. Restrictions: Do not apply more than 2 gallons per acre per crop cycle. *Strawberries and Cranberries:* See label

(<http://128.253.223.36/ppds/537601.pdf>) for various instructions regarding use in these crops, depending on planting page and production method(s).

Note: All rates are given on a broadcast basis, per acre. Reduce rates proportionately for band or strip treatment.

BioSafe Systems Adds Adjuvant, HOLDit, to Product Line

March 18, 2014. BioSafe Systems recently added an adjuvant, HOLDit, to their extensive crop protection solutions produce line.

HOLDit is an effective, easy-to-use product for drift retardation and deposition improvement in spraying operations. The unique polymer formulation of HOLDit actually locks in the active ingredient, allowing the combination to increase the residual of bacterial and fungal controls for plant pathogens.

HOLDit's ability to attach to the active ingredient in BioSafe Systems' products and allow it to stick to the intended target

FOCUS ON PEST MANAGEMENT *(continued)*

will effectively improve deposition and allow for an increased level of product efficacy.

HOLDit improves the performance of BioSafe Systems' activated peroxygen and product formulations by creating a residual for increased contact and kill time. It also reduces the amount of drift and off-target deposition of spray solutions by making the spray particles less susceptible to wind drift. HOLDit is compatible with OxiDate 2.0, OxiPhos, SaniDate 12.0 and AXXE.

For more information on this product, contact BioSafe Systems at 888-273-3088.

Read Only if You're a Grower with Stink Bugs!

Are you a grower? Got stink bugs? We need your help! We're surveying growers across the country to assess the impact of BMSB on crops and gathering information that will help us defeat this pest.

Receive a free "Guide to Stink Bugs"* if you complete the 10-minute BMSB survey:

https://cornell.qualtrics.com/SE/?SID=SV_5ssnjXLNhvp6v1H

Your participation will help us to help you Stop BMSB! The survey will be available until June 30.

Thanks,

The Outreach Team for "StopBMSB," a project focused on the biology, ecology, and management of the brown marmorated stink bug.

For more info: StopBMSB.org.

*See the guide at <https://pubs.ext.vt.edu/444/444-356/444-356.pdf.pdf>

EPA Extends Comment Period for Proposed New Safety Measures to Protect Farm Workers from Pesticide Exposure

WASHINGTON - The U.S. Environmental Protection Agency is extending the comment period for the proposed revisions to the agricultural Worker Protection Standard for an additional 60 days, until August 18, 2014, in response to requests from growers, industry, farmworker advocates and states for additional time to provide input.

"The opportunity to revise the rule may not come again for some time, so we are committed to getting it right," said Jim Jones, Assistant Administrator for the Office of Chemical Safety and Pollution Prevention. "Updating the 20-year old regulation to provide more protections to the nation's two million farm workers and their families from pesticide exposure is a priority for EPA."

The proposed changes provide significant improvements to worker training regarding the safe use of pesticides, including how to prevent and effectively treat pesticide exposure. Increased training from every five years to every year and signage would help farmworkers protect themselves and their families from pesticide exposure.

Workers and others near treated fields would be better protected from pesticide overspray and fumes. In addition, the EPA has proposed that children under 16 be

legally barred from handling all pesticides. These revisions protect workers while ensuring agricultural productivity and preserving the traditions of and exemptions for family members working on family farms.

To learn more and provide comments in English or Spanish:

<http://www.epa.gov/oppfead1/safety/workers/proposed/index.html>.



Berry Diagnostic Tool



PIMS
Product, Ingredient, and
Manufacturer System

WPBR Biology, Ecology, and Management Brief

Steven A. McKay, Retired
Extension Educator, Cornell
Cooperative Extension,
micosta@mhicable.com

Ribes, is a group of berry crops including currants (red and black), and gooseberries that has been recently reintroduced to the Northeast after losing favor due to prohibition of their cultivation in earlier years. When researchers discovered in the early 1900's that black currants, and some red currants and gooseberries are intermediate hosts for white pine blister rust (WPBR), USDA imposed a ban on growing the crops and began eradication programs to try and eliminate *Ribes spp.* in the forest. Officials terminated the program in 1966, and left regulation up to the states when it was discovered that eradication was ineffective in eliminating the disease (and was impossible to eliminate all the *Ribes spp.* in the forest). There are now only seven states that maintain regulations (due to efforts to relax regulations in the late 1990's and early 2000's). Recent discovery that a mutated form of WPBR has been able to overcome immunity in ribes that had been provided by the Cr gene has renewed the discussion of ribes restrictions.

The relationship between Ribes, pines, and WPBR became a classical illustration in basic college plant pathology courses and texts of a disease that requires the transfer between two species (need for intermediate hosts) to complete its life cycle. Further, if either the pines or the currants are eliminated, the disease life cycle is broken. Over time, this relationship has become ingrained in the training of many horticulturalists and accepted to the point that they believe **Ribes=white pine blister**

rust=death to white pines.

Such a mindset leads plant pathologists to react to the disease without taking time to further understand the biology, ecology, and management options available to control the disease. It also leads to the use of sensationalized language in WPBR articles which exaggerate the potential consequences of the disease.

Plant pathologists working with the berry crops need to take responsibility for looking for solutions and helping to defend a developing industry that has strong economic potential. A number of growers and pomologists disagree with statements made in a November 2013 Cornell article by Northeast plant pathologists, and feel that it is unfair to the developing Ribes industry to sway public opinion against the industry with incorrect statements. Below are some statements from a recent article with rebuttal statements.

"Some states such as Maine prohibit planting Ribes to protect valuable Northeast pines, yet New Hampshire, Connecticut, New York and Massachusetts, among others, have developed currant and gooseberry fruit industries in the last decades using WPBR immune varieties." *Note: Other considerations in addition to immune varieties were used for relaxing the regulations. They were based on management techniques and better understanding of the ecology of the disease.*

"The rust's threat to currant production is minor compared to how devastating it could be to

the Northeast pine industry, said Cox. Infections can ruin entire stands of pines, which take decades to grow, and thereby disrupt the logging industry."

Note: It is rare that mature trees are affected by the disease. Research has shown that 90% of infections on pines take place in the lower 9 feet of the tree. Mature trees don't have needles on the trunk and can't be infected and girdled. Thus stands of pines that took decades to grow can't be easily ruined, and WPBR will not ruin the logging industry. Some foresters say said that white pine weevil, pinewood nematodes (causing pine wilt), and white pine decline (from a soil fungus complex) could be more of a threat for the white pine industry.

'of the mutated WVBR. "If we started looking elsewhere, we might be surprised. It could really damage the white pine industry in five to 10 years," he added.'

Note: It would not damage the forestry industry (as explained above), and if Christmas trees and nurseries maintain a 1000 foot Ribes-free buffer, they have little chance of being affected.

Statements such as those in the article show that our berry industry has a desperate need for education and understanding of the disease so that horticultural workers can be able to defend the Ribes industry rather than threaten it. I would like to present a summary of what we know here regarding the life cycle and ecology of the disease, and management practices available for Ribes plantings, pine forests, and pine

WPBR (continued)

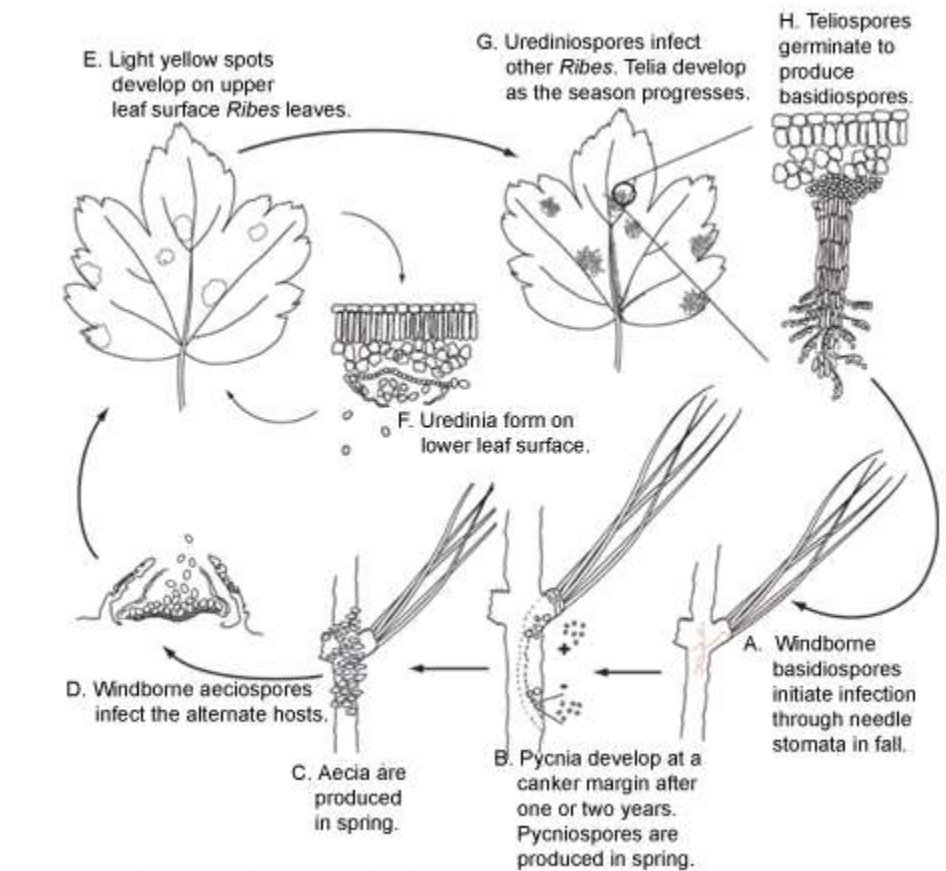
Christmas trees and nurseries. Surprisingly most of the data for this summary comes from research performed by the forest industry.

Disease Life Cycle

This disease cycle (right) is pulled from a forestry publication written by **Otis C. Maloy**, Washington State University, Pullman, WA, and is useful in showing the points where management and control measures can be employed to deal with the disease.

The blister rust cycle starts in the fall when pine needles are infected by basidiospores from the alternate host (*Ribes* spp.) (A). The basidiospores germinate, and the fungus mycelium enters the needles through stomata and grows down the needle into the branch. The fungus continues to develop between the cells of the inner bark, and nutrient absorbing haustoria penetrate into the phloem cells. The mycelial network continues to develop both lengthwise and laterally in a spindle-shaped pattern to produce a swollen canker (B).

In the spring of the second year, pycnia are produced in the margins of the infected area. The following year aecia are produced and erupt through the bark where pycnia were produced the previous year (C). This disruption of the bark leads to drying and death of the inner bark and this dead area enlarges over several years to become a blister rust canker. The two or three year latent period between initial infection and appearance of symptoms or signs allows the disease to become established in a forest stand before it is



White Pine Blister Rust Disease Cycle (Drawing by Vickie Brewster).

detected. Aeciospores (D) can survive for several months and are wind-borne for long distances where they infect the alternate hosts (*Ribes* spp.).

A few weeks after the *Ribes* are infected, light yellow spots develop on the upper leaf surface (E) and uredinia (F) develop on the undersides of infected leaves. This is the repeating stage of the rust, and urediniospores infect other *Ribes* bushes in the general area as far as 1.6 km (one mile) distant, perhaps farther. Telial columns also develop on the underside of leaves (G), usually from uredinial pustules, and may start forming soon after the uredinia appear, increasing in number as the season

progresses. The individual teliospores that make up the telial column germinate (H) to produce basidiospores that infect the pine hosts, completing the disease cycle.

Disease Ecology

Blister rust infection is favored by cool, moist conditions, and the disease tends to be more prevalent in low-lying areas such as creek bottoms, swampy depressions and openings in timber stands. Besides providing conditions favorable for infection, air currents carrying basidiospores are more likely to flow into and settle in these depressions. Studies in the Great Lakes Region and elsewhere have recognized rust hazard

WPBR (continued)

zones based on topography that are now used to formulate disease management systems in different areas.

Summer temperatures also determine the potential infection in the fall, since high temperatures greatly reduce or eliminate the fungus on ribes by “burning out” and destroying stages E-G in the life cycle. Thus in a hot or dry year, there is less potential for infection.

Another epidemiological factor is the relative susceptibility of the different pine species and of different age classes of the same species. Of the three commercial species, sugar pine (*Pinus lambertiana*) is the most susceptible, western white pine (*P. monticola*) intermediate, and eastern white pine (*P. strobus*) least susceptible. Of all the white pines, whitebark pine (*P. albicaulis*) is most susceptible.

Young white pines, both saplings and pole size trees, are more severely infected and damaged than older trees for several reasons. On young trees the branches are closer to the ground, where conditions are more favorable for infection, and the needles are closer to the main trunk so that less time is needed for infections to get into the main stems and kill the trees.

Mature trees can be infected, but these trees are not killed as rapidly and usually can be harvested before they die and deteriorate. Also, cankers seldom progress more than a foot back toward the trunk, and infected distal extremities of the branches normally die and are sloughed off before the canker reached the trunk.

Factors important to development of wild *Ribes* include any soil disturbance, such as fire, logging, and snow and wind damage, which stimulates dormant *Ribes* seeds to germinate. Birds do not appear to be important in spreading *Ribes* seeds as they are for barberry, the alternate host of stem rust of wheat.

Consider that *Ribes* plants are present in the forest naturally, and the disease is not managed with horticultural practices such as in a commercial planting, where farmers want to maintain healthy plants for efficient production. Instead, natural selection in the forest will eliminate disease susceptible *Ribes spp.* through summer defoliation, fall re-growth, and winter kill due to tender plant parts and weakened plants.

Thus it could be argued that maintained commercial plantings of ribes are less of a threat to pines than the ever-present forest ribes.

Some additional factors to consider

1. Fungus gnats help to reduce fungus infections on ribes leaves by eating the fungus.
2. Aeciospores can travel over 300 miles in dry conditions from infected pines to ribes, while the basidiospores that travel from ribes to pines normally travel no further than 1000 feet. Basidiospores are killed by strong light, or low humidity and heat. They need to contact moist pine needles or they will

not develop. In low hazard zones, ribes plants can grow next to pine trees without danger of infection.

3. Pines are understory trees, and if seedlings are growing as understory trees, there is less possibility of free moisture on needles, and less possibility they can become infected.
4. 20% of white pines seedlings from seed from unselected sources will have natural immunity to WPBR.
5. WPBR does not overwinter in ribes. Ribes plants must be re-infected by pines each year.
6. Gooseberries are susceptible to gooseberry rust and appear to be more resistant to WPBR.

Management practices have been developed to allow safe cultivation for both pines and ribes. I have placed letters that correspond to the points in the disease cycle above where the cycle is broken.

Ribes Planting Management Practices

An understanding of the disease cycle and ecology allow ribes to be grown free of WPBR.

Following are some suggestions:

1. Grow ribes in low hazard zones and areas designated as ribes growing areas. Planting in high hazard areas should be okay too since white pines should not be planted

WPBR (continued)

there. (A,E)

2. Separate ribes plantings with a buffer of about 1000 feet from young pines. Mature pines should be of little concern. (A)
3. Control infections of WPBR early so it does not establish itself and become a potential problem for the whole season. WPBR will be controlled by your sprays for anthracnose and powdery mildew (Rely). Anthracnose is a disease that is critical to control, and by doing so, you should not have to worry about WPBR. Remember that spores for WPBR can come in from as far as 300 miles away. (E-G)
4. Use WPBR immune varieties as available. (E)

Forest Management Practices

1. Plant seedlings in an understory. (A)
2. Plant resistant seedlings. (A)
3. Make dense plantings that can be thinned (or will self thin through disease infection, deer, insects, pine weevils, etc.)
4. Prune lower branches and infected branches (which will result in higher quality trees). (A, B-D)
5. Plant in low hazard areas. (A)

Christmas Tree and Pine Nursery Management Practices

1. Plant resistant selections. (A)

2. Maintain a ribes-free buffer zone of at least 1000 feet. (A)
3. Plant in low hazard zones. (A)

Summary

By studying the life cycle and ecology of WPBR, it is possible to see that many management options exist for growing pines and ribes, even without immune ribes varieties. It is my hope that pathologists, educators, and growers can educate themselves in these relatively simple management practices so they can also help the public to understand that **ribes does not equal WPBR does not equal instant doom and death for pines.**

References

Maloy, O.C... 2003. White pine blister rust. *The Plant Health Instructor*. DOI:10.1094/PHI-I-2003-0908-01 Updated 2008.

Editor's Note: to read the article referred to in the article above see [NY Berry News Vol. 13 No. 2](#) February 19, 2014.

Below, WPBR on black currant in late summer, photo courtesy C. Heidenreich.



For Profitable Yields, Investing in Pollination of Highbush Blueberries is Crucial

– Rufus Isaacs, Jason Gibbs, and Emily May, Michigan State University, Department of Entomology; Eric Hanson and Jim Hancock, Michigan State University, Department of Horticulture

May 6, 2014. Northern highbush blueberries (*Vaccinium corymbosum*) are common throughout the northern United States and Canada, and are native to eastern North America. They require pollination to ensure that flowers present at bloom turn into large, harvestable berries later in the season. Pollination is achieved by the movement of pollen by bees.

By planning ahead for how fields will be pollinated, growers can help ensure they receive the maximum return on their investments in land, bushes and other management inputs. Given the high per-acre input costs of blueberry production, spending money to ensure high levels of pollination makes sound business sense. Other things being equal, well-pollinated fields have larger berries, higher yields, and more even ripening than fields with sub-optimal pollination.

Across Michigan's blueberry industry, most pollination is by managed honey bees that are brought to fields in hives. Many of these colonies have been overwintered in warmer states and they arrive back in Michigan as fruit crops start blooming in Southwest Michigan. Bumble bee colonies can also be purchased for placement in fields and there are many other wild bee species that nest in and around crop fields. By combining these pollinators into an integrated crop pollination strategy, the risk of poor pollination may be minimized.

Pollen is moved by bees

For pollination to occur, sufficient compatible blueberry pollen must be moved from the male part of flowers (anthers) to the female part (stigma) while the flowers are receptive. Bees are responsible for this movement of pollen, so blueberry pollination depends on having enough bees active in the field during bloom to deliver pollen. Each flower must be visited once by a bumble bee or most native bees, or three times by honey bees to get enough pollen so that berries will grow to maximum size. There can be 10 million flowers per acre, so there is a lot of work for bees to do!



Photo 1 (right). Comparisons of blueberries picked on the same day in July from clusters that had either been bagged to exclude pollinators (left) or were uncovered during bloom (right), allowing bees to visit. Both sets had the same number of blooms during flower.

The pollen produced by blueberry flowers is relatively heavy and doesn't waft on the wind. It is held inside the flower by salt shaker-like structures called anthers until bees visit. They may release the pollen by jiggling the flower with their legs, as is the case for honey bees. Bumble bees and some other native bees are better adapted to release the pollen using a vibration behavior known as "buzz pollination." When the bees shake the anthers, the pollen collects on their bodies. As the bees move from flower to flower, pollen grains are transferred to the stigma. Flowers are receptive to pollen immediately on opening, and their chance of turning into a berry declines after three days with flowers unlikely to turn into fruit after five to six days. Once compatible pollen is deposited on the stigma, the pollen germinates and fertilizes the ovules that produce the tiny seeds. Fertilized seeds release hormones that stimulate berry growth, leading to larger berries.

Things to know before planting

Northern highbush blueberry bushes can produce berries even when there is no or limited pollen deposition by bees. This means that some proportion of the flowers can turn into berries, even if there are poor pollination conditions or low bee activity during bloom. However, these berries will be small, slow to ripen, may drop off early, and most would not be considered marketable (Photo 1, above).

Investing in Pollination *(continued)*

To reach maximum potential yield, it is important that the flowers are visited by bees during bloom to transfer sufficient pollen to the stigma while the flower is still viable so that fertilization can occur, leading to seed set, berry expansion, and larger berries (Photo 1). If designing a blueberry field of any appreciable size over a few acres, make sure there will be space for a beekeeper to drop hives on pallets near the field.

For some cultivars, it is not sufficient just to get high rates of pollen transfer from bees because the type of pollen can be important. Some cultivars benefit from the transfer of cross-compatible pollen, meaning that the field should be designed to have a combination of cultivars that bloom around the same time and that are compatible. For cultivars dependent on having cross-pollination for full yields, this can provide a 10-20 percent increase in yield from the improved fruit set and berry size. Table 1 provides a guide to cultivars and their level of dependence on this cross pollination for full yields. However, many popular northern highbush blueberry cultivars are self-fruitful, meaning they can be fertilized by pollen from the same cultivar (High group in the table), and this is one reason why solid blocks of some cultivars can be highly productive. Other cultivars are intermediate, meaning that a benefit can be gained by interplanting with another cultivar, but for many commercial settings growers might consider the increased complications in management outweigh the benefits.

Table 1. Variation among highbush blueberry cultivars in the need for a pollinizing cultivar to provide cross-compatible pollen during bloom

Dependence on a pollinizing cultivar	Cultivar
Low: no pollinizer needed	Duke, Draper, Bluejay, Nelson and Rubel
Intermediate: pollinizer beneficial	Bluecrop, Legacy, Jersey, Liberty, Elliott and Aurora
High: pollinizer needed	Brigitta, Spartan, Chippewa, Polaris and Toro

In a third group, cross-pollination is needed, and this is achieved by bees moving pollen between cultivars as they fly from row to row. In this situation, planting fields with alternating blocks of co-blooming and



Photo 2 (above). A honey bee drinking nectar from a blueberry flower. This is the workhorse of blueberry pollination, and to achieve high yields the fields must be stocked with sufficient numbers of healthy colonies during bloom to ensure there are enough bees for sufficient transfer of pollen between flowers. Photo credit: Jason Gibbs, MSU.

compatible cultivars ensures cross-pollination. While alternate rows of two compatible cultivars would be the best for pollination, it would also cause difficulties with harvesting and spraying. Alternating blocks of up to eight rows allows pollen exchange and is easier to manage. Alternating blocks of larger sizes will result in too few exchanges between cultivars that need cross-pollination. Before purchasing blueberry plants, check with your nursery to determine the need for planting fields with alternating cultivars.

Using honey bees for blueberry pollination

Wait until bloom has started to bring in bees.

Flowers of blueberries are generally less attractive to honey bees than other flowers due to the relatively low nectar reward. Because of this, it is best to bring in bees once the crop has started to bloom so that bees forage more on blueberries than other flowers (*Photo 2*). If brought in too early, bees may learn to forage elsewhere, reducing their focus on your crop fields. Move bees into blueberry fields after 5 percent bloom, but before 25 percent of full bloom. Placement near to the blueberry field can also help to keep them focused on the crop. Still, some cultivars, notably Jersey, have low attractiveness, and bees may still fly over this cultivar to reach another.

Investing in Pollination – *(continued)*

Renting healthy colonies. If you are renting honey bee hives, you should expect to receive healthy and vigorous bees. A healthy colony contains around 30,000 worker honey bees and will have six frames of brood. Having weak hives will affect how much pollination the fields receive, so it is worth taking time to ensure you have strong hives. If you suspect weak colonies, talk to your beekeeper about getting additional hives or replacing them. One strong hive of 30,000 bees will provide better pollination than two 15,000 bee hives because there will be more worker bees that fly to visit flowers. One way for growers to ensure they receive strong colonies is to establish a pollination agreement that lays out the grower’s expectations. This can include the strength of the colonies and how quickly the colonies will be taken out of the field after bloom. Example pollination contracts are available online.

Honey bee stocking densities. There have been many changes in blueberry production and in bees over the past few decades, and yet many people still refer to bee stocking recommendations published in 1992. We consider those to be suitable for fields with lower bloom density, such as in a field affected by frost or when it is still establishing, and these can also be used in small fields surrounded by natural lands that will have higher populations of wild bees. However, if fields have a high flower density as some of the newer cultivars and intensive production systems provide or if field sizes are large without wild habitat nearby, then these recommendations are too low.

The last few decades have also seen the loss of feral honey bee colonies due to the parasitic Varroa mites, so those colonies are no longer contributing to blueberry pollination. All of these factors can make fruit production more dependent than ever on managed bees, so it is important to stock fields with sufficient bees to supply enough visits to flowers while they are most viable, such as in the first three days after opening.

A final point to make here is that if the weather is hot during bloom and flowers open quickly, this increases the chance that they will not get visited before they lose viability. Higher stocking densities can counteract this potential limiting factor.

Research and experience in blueberries has shown variation across northern highbush cultivars in their needs for bee pollination (*Table 2*) due to the relative

attractiveness of different cultivars and their degree of self-compatibility. The table below shows a range of stocking densities from the lower rates recommended two decades ago to the updated double rate that [Michigan State University Extension](#) considers the required stocking density for fully productive modern fields. This shows five hives per acre for Jersey and Earliblue, but some growers are using up to eight colonies per acre to ensure good pollination if spring weather is cool and there are only a few good days for honey bee activity. These higher stocking densities can also be considered a form of pollination insurance to make sure that whatever the spring brings there will be the best chance of good pollination.

Table 2. Recommended stocking density of honey bees for highbush blueberry pollination. Cultivars have varying rates of need for honey bees, and within each group we show a range of hives per acre to stock at, ranging from low rates for use in young, frost-damaged, or small fields to high rates for use in mature, healthy, or large fields. Adapted from Pritts & Hancock, 1992.

Cultivar	Honey bee hives per acre	
	Low rate	High rate
Rubel, Rancocas	0.5	1.0
Weymouth, Bluetta, Blueray	1.0	2.0
Bluecrop	1.5	3.0
Elliot, Coville, Berkeley, Stanley	2.0	4.0
Jersey, Earliblue	2.5	5.0

A rule of thumb is that you’ll need four to eight honey bees per bush in the warmest part of the day during bloom to get blueberries pollinated. Also, if you see flowers turning brown and discolored on the bush, pollination was not sufficient; in well-pollinated fields, the corollas fall off when they are still bright white. Check your fields this season and if needed you can try to get additional hives from a beekeeper or plan on increased stocking next spring.

Investing in Pollination – *(continued)*

Hive placement. If possible, place the colonies in sheltered locations with the entrances facing east or south. This will encourage earlier activity as the hive warms in the morning sun. Hives should be spread out around the farm to maximize floral visitation with a maximum of 300 yards between hives. Placement in an open area slightly away from the edge of the fields also reduces the risk of pesticide drifting onto colonies being disturbed by a tractor.

Using Bumble Bee Colonies

Bumble bees are very efficient at pollinating blueberries with activity at lower temperatures than honey bees, faster visits to flowers, and higher rates of pollen transfer per flower visit. A single visit of a bumble bee to a blueberry flower can deposit sufficient pollen to get full pollination, whereas three visits are needed by honey bees.

The common Eastern bumble bee, *Bombus impatiens* (Photo 3), has been reared for use as a crop pollinator. These insects are available commercially and can be shipped directly to the farm in eastern United States and Canada. [Koppert](#) is one supplier based in Michigan that provides the bees in Quads, each containing four colonies housed within a weather-proof box. Our evaluations with this species in commercial Jersey fields found they provided comparable yield and fruit set to honey bees when tested in small fields at the recommended stocking density of three colonies per acre.

Growers may also purchase bumble bees to integrate with honey bees, thereby diversifying pollination sources. This approach should help ensure movement of pollen between flowers during conditions that are unsuitable for honey bees. Rearing bumble bees takes time, so orders should be made 14-16 weeks in advance to guarantee delivery. Place Quads through the farm and well away from honey bee hives. A door on the box of the Quads can be used to collect the bees and move them before spraying.

Wild bee pollinators

While ants, butterflies and hover flies will visit blueberry flowers to gather nectar, bees are the most effective at moving pollen. Over 150 wild bee species have been found in Michigan blueberry fields, and about 10 of these were sufficiently abundant during bloom and carried enough pollen to be considered valuable crop pollinators. These bees do best in



Photo 3 (right). Bumble bees are efficient pollinators of blueberry, so they should be encouraged on the farm. They can also be purchased from commercial suppliers and their colony boxes placed near fields to provide crop pollination. Photo credit: Jason Gibbs, MSU

farms with flowers for them to visit outside the crop bloom period and in farms where there are some undisturbed areas for nesting (Photos 4-5), and farms can be managed to enhance their abundance.

Wild bees fall into several major categories, including bumble bees, miner bees, sweat bees, mason bees and carpenter bees. Bumble bees and some sweat bees form social colonies later in the summer, but in spring during blueberry bloom these bees are in a solitary phase. Miner bees, mason bees and carpenter bees are solitary: each nest is built by a single female. Miner bees are abundant during the spring, and some species, such as *Andrena carolina*, are specialists on blueberries.

Wild bees nest in different areas in and around blueberry fields. Miner bees and most sweat bees make underground nests. A female bee tunnels into the soil, preparing brood cells for her young on side branches from the main tunnel. Pollen and nectar is collected and shaped into a ball placed in each cell. A single egg is laid on each pollen ball that provides food for the developing larva. These bees need untilled soil and have been seen nesting underneath blueberry bushes in the weed-free strip. Thick layers of mulch can prevent ground nesting bees from digging tunnels.

Investing in Pollination – *(continued)*



Photos 4-5. Many wild bee species require flowers to visit when the crop is not in bloom and areas of undisturbed soil for nesting. Left, a miner bee gathering pollen from an early spring flower. Right, a sweat bee searching for a place to nest in the soil. Photo credits: Jason Gibbs, MSU.

Some bees also nest in the undisturbed soil in nearby woods. Bumble bees also need undisturbed soil to nest in abandoned rodent burrows or grass tussocks, but they will also use old mattresses, compost piles and other protected sites with small entrances. Finally, some wild bees such as carpenter bees, some sweat bees and mason bees, prefer to nest in twigs, dead wood or pre-existing cavities. Brambles, logs and tree stumps in adjacent habitat and fence rows can be useful nesting sites for these bees.

In small blueberry fields surrounded by natural habitat, wild bees can provide the majority of pollination. However, as blueberry farm size and intensity increase, the high abundance of flowers and the small amount of natural area results in too few native bees for full pollination, and so growers rent honey bees. Still, by creating bee habitat that includes a mix of plants that bloom before and after blueberries, growers can help support native bees as part of an integrated crop pollination strategy.

For more on native plants to support pollinators in the Great Lakes region, visit [MSU's Native Plants and Ecosystem Services](#) website. Every little bit of habitat will help, so consider this a long-term process of building bee habitat back into the farm landscape. The [Natural Resources Conservation Service](#) (NRCS) can provide cost share for growers interested in establishing pollinator habitat in their farms. See your [local NRCS office](#) for details of programs that can support this.

Pest management during pollination

Most insecticides have some level of toxicity to bees, so there are restrictions on their use during bloom. Not spraying while honey bees are in the field is the most effective way to avoid any risk of poisoning, so monitoring for pest problems carefully before and during bloom can help minimize the need for pest control at this time of the season. However, insect outbreaks do occur and this time of the season is an important one for control of mummy berry. If a pesticide application is necessary during bloom, the compounds that are least toxic to bees should be used with careful observation of the pollinator restrictions on the label. Two insecticides that can be applied during bloom for control of moth larvae in blueberries are products containing *Bacillus thuringiensis* (Bt), such as Dipel and Javelin, and the insect growth regulators Intrepid and Confirm.

The [U.S. Environmental Protection Agency](#) (EPA) has developed new pesticide labeling guidelines for certain insecticides that limit their use where honey bees are present. This information is gradually being added to the labels of some insecticides, including neonicotinoids and the new product Exirel. Since these pesticides have never been labeled for use during bloom in blueberries, this is not a significant change, but it provides more information. EPA's infographic can be downloaded here: [The New EPA Bee Advisory Box](#).

If spraying during the bloom period, one of the most

Investing in Pollination – *(continued)*

important things growers can do to minimize effects on bees is to apply when the bees are not foraging. Late evening is the best time to apply sprays during bloom because the compounds have time to be absorbed and for the residues to dry before bees are active the following morning. Dust formulations must be avoided because particles can be picked up easily by the bees' hairy bodies.

Recent research has also found that certain fungicides have effects on bees, harming their gut microbes and making them more susceptible to parasite infections. This can in turn result in reduced colony health and increased mortality. Follow the same basic principles of spraying only when necessary and when bees are not foraging to reduce the potential for harming bees during bloom.

More information and a list of pesticides with their toxicity to bees are available from a recently-updated extension bulletin from Oregon State University titled "[How to Reduce Bee Poisoning from Pesticides.](#)" This document also contains a list of insecticides and fungicides ranked by their relative risk to bees and plenty of other good information on how to prevent bee poisoning.

Another important aspect of reducing the chance for pesticide incidents during bloom is to have good communication with your beekeeper. This should start in the winter with a discussion about how many hives you plan to rent, where they should be put, and when they should be delivered and removed. Another important aspect of reducing the chance for pesticide incidents during bloom is to have good communication with your beekeeper. This should start in the winter with a discussion about how many hives you plan to rent, where they should be put, and when they should be delivered and removed. Read the recent MSU Extension article on "[Minimizing pesticide exposure to bees in fruit crops.](#)"

Summary

Pollination is an essential component of growing blueberries. To attain high levels of fruit set with large, evenly-ripening berries requires bees to deposit enough pollen on stigmas during bloom. This can be done by honey bees, other managed bees and wild bees. As with pest management, reliance on one strategy may not be the most sustainable approach, so diversifying pollination sources can spread risk to ensure consistent pollination and profitable yields every year.

Whichever bees are visiting flowers during bloom, ensuring the health and safety of these insects is an important part of maintaining good pollination. Follow label restrictions and practice good pollinator stewardship so they can provide the all-important transfer of pollen that will lead to large berries and high yields.

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(Reprinted from: [MSU Extension News](#))



Pollinators and Pesticide Sprays during Bloom in Fruit Plantings - *D.*

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April 30, 2014. Recently, there has been a lot of press related to pollinator health, and some troubling information indicates that certain fungicides, when used during bloom, can negatively affect the health of honey bees. This is a complicated problem with the solutions relying on understanding the detailed relationships among chemicals, pollinators and pest management needs. It is not prudent to treat this topic with a broad brush with statements such as "All neonicotinoid insecticides are bad for all pollinator species," or "No fungicides should be sprayed during bloom." Research is on-going, and we do not know all of the details yet.

We do know that there are another 4,000 species of bees in the US in addition to the honey bee and they also play an important role in pollinating many crops. In Pennsylvania fruit plantings, many growers large and small, have forgone the use of honey bees completely and rely solely on about 50 species of solitary bees, bumble bees and feral honey bees. It has been shown that the susceptibility of honey bees, the most tested type of bee, is not a very accurate predictor of the responses of wild bees like the mason bees (*Osmia*), leafcutter bees or bumble bees to pesticides and that susceptibility varies by bee species and pesticide. For example, one of our recent trials showed that our Japanese orchard bee was 26 times less susceptible to contact by Provado than the honey bee, but 12 times more susceptible to Assail. Both products are neonicotinoid insecticides and in the same pesticide class.

The purpose of fungicide sprays applied during bloom has been to protect plants from diseases that can infect future fruit tissue through the blossom; thus, fungicide sprays during bloom can decrease or negate the need for fungicides closer to or during harvest. The period from just prior to bloom to just after petal fall are critical times during the disease cycles of pathogens such as apple scab, botrytis, powdery mildew, cherry leafspot, brown rot and cedar apple rust. These are major disease problems, which if left untreated during this time, will devastate the quality of a tree fruit or strawberry (for botrytis and powdery mildew) crop. Some can cause the decline and eventual death of trees. In the case of apple scab, controlling the early season form called primary scab, which attacks foliage mostly until just after bloom, prevents the buildup of secondary scab which



attacks the fruit during the summer. The need to control secondary scab would require 3 to 4 times more fungicide sprays (and cost) than if the disease was stopped as primary scab. Now it turns out that practices long utilized to minimize fungicide residues on the fruit are being questioned. So, what is a grower (or field researcher, for that matter) to do?

It might help to understand why this shift in thinking came about, especially since fungicides had previously been thought to be quite safe for bees. For decades, we've known not to apply most insecticides during bloom – except for a very few with unique modes of action – and fungicides alone still appear to be safe, but now it's feared that the combination of some fungicides in special cases with other materials may synergize their toxicity. The first of the situations are with the neonicotinoid insecticides such as Assail, Calypso, Actara and Belay that can be used pre-bloom in some crops. Because they are to varying degrees systemic and move through the plant tissues, we have found them in apple pollen and nectar at low levels where they can be ingested along with fungicides even though these insecticides were not sprayed during bloom. This systemic movement can also be found in some fungicides to varying degrees which helps their efficacy against pathogens. We have had many other systemic insecticides in the past (e.g., Orthene, Mitac, Swat, Lannate, Vydate, etc.) that were not neonics, but they were usually used much later in the season and not a problem to pollinators. Spraying at night may help with many pesticides as they are less toxic when dried, but not

Pollinators and Pesticide Sprays - *(continued)*

with systemic pesticides that are ingested in the nectar and pollen. So much for the “do not spray when bees are actively foraging” clause of many pesticide labels.

Our work at the Penn State Fruit Research and Extension Center has measured the movement of most registered neonicotinoid insecticides into the pollen and nectar of apple from pink sprays (i.e., closed blossom) and has shown that Assail and Calypso, which are also much less toxic to bees than the other compounds of the same class, are also much less systemic with little movement into the nectar and pollen. We did find, however, higher levels of the fungicide Nova/Rally in the nectar and pollen from the same pink application. When we say “higher,” it is relative. A typical application of a neonicotinoid insecticide would be applied at 100-150 parts per million in the spray tank. Pollen and nectar samples taken 5 days later at about 25% bloom, however, were at the 1-5 parts per billion level. This is up to 100,000 times less than what was in the spray tank. While in most cases, we know that these levels are below what is toxic to the honey bee when exposed to this pesticide alone, it is not well understood how combinations of pesticides affect the long term health of bees, especially the 4,000 other species of bees in the US besides the honey bee. So why use neonicotinoids pre-bloom? With apples, the intent is to control the Rosy Apple Aphid which has resistance to organophosphate and pyrethroid sprays and can only be controlled by these pesticides at this critical time. Sprays after bloom are “revenge” sprays that may kill the aphids, but don’t prevent the stunting of the fruit that happens from feeding during bloom.

By the way, Lorsban applied just before bloom is also very toxic to bees through its high vapor pressure “fumigating” the orchard and from residues on flowers in the ground cover. Some private business recommendations from NY seem to be pushing for the pink application of Lorsban for control of Rosy Apple Aphid. Most growers in Pennsylvania not only face complete resistance to Lorsban for this pest (and to pyrethroids, which is why Assail and Calypso are critical here), but this is an illegal application. The label allows prebloom sprays in strawberries, but only allows for Lorsban applications until delayed dormant in tree fruit. For those relying on wild bees for their pollination, we had a large kill of the Japanese Orchard Bee (*Osmia*) last year from this type of treatment.

The second special situation where spraying

fungicides during bloom can cause problems is where the honey bee keepers are using the insecticide/miticide amitraz for control of varroa mites in the hive. Most tree fruit growers will remember amitraz as Mitac which was used heavily for pear psylla control in the past. This product was routinely used for synergizing organophosphate and pyrethroid insecticides in crops like cotton where key pests had developed resistance, because it shut down the enzymes insects used to detoxify pesticides. This raises concerns about amitraz being used to treat mites in honey bee hives. While it may be effective in controlling varroa mites now that they have quickly developed resistance to the organophosphate coumophos and the pyrethroid fluvalinate, adding this synergist to a hive basically shuts off a bee’s immune system to pretty much any pesticide with which it later comes into contact. In addition, work presented by Dr. Jeff Pettis, from USDA-ARS in Beltsville, MD indicates that amitraz interferes with mating in honey bees. Finding a replacement for amitraz in controlling varroa mites should be another research priority.

A key point is that most fungicides are still considered pretty safe to bees even in combination with other pesticides. We refuted a previous lab study with technical product dissolved in acetone that implied synergism of over 1,000-fold when a sterol inhibitor fungicide such as Rally or Indar was mixed with a neonicotinoid insecticide. When we tested formulated product of Assail and Provado with field rates of the sterol inhibitor fungicide Indar in water, we found synergism to be barely significant at a 5-fold level with Assail and non-significant for Provado. We now consider almost all fungicides with the exceptions of captan (Captan, Captec, CaptEvate), chlorothalonil (Bravo) and mancozeb (Penncozeb, Dithane etc.), to be safe even in combinations, until we see further data showing otherwise.

What about Captan, Bravo and Penncozeb? All are old products that are still the mainstays of disease control and resistance management in many crops because they have multiple modes of action. They are also not systemic, so the chances of the bees coming in contact with them from pre-bloom sprays are nil and spraying at night to give the residues time to dry also helps reduce short-term toxic effects. All of these products are suspected to be synergists for other pesticides, and both captan and mancozeb are somewhat insecticidal by themselves at the highest rates (this is typically 6 lb/acre, depending on the formulation). This toxicity is thought to be from

Pollinators and Pesticide Sprays - *(continued)*

chronic long term ingestion exposure of bees of all types feeding on contaminated pollen during their development. The best solution until we know more about the effects of these compounds on bees is to restrict their use to the half rate that is used in combination with other fungicides rather than the full rates or the extensive use of the combination of both Captan and Penncozeb, commonly referred to by growers as "Captozeb".

Also, since captan, chlorothalonil and mancozeb seem to be the fungicides most implicated, at least for the time being, their use should be avoided when bees are actively flying. Instead, they should only be used when contact with pollinators is avoidable. Other fungicides that might be used during bloom appear to be relatively safe, though any of this information could change as we learn more. Thus, if possible, fungicides other than captan, chlorothalonil, and mancozeb should be utilized in bloom sprays, remembering to alternate among modes of action. One additional restriction relating to fungicides is the use of sulfur and lime sulfur around or during bloom as the odor is repellent to bees for up to 48 hours, depending on the rate and formulation. Most growers would not use lime sulfur during bloom anyway as it is caustic to the flowers.

Fortunately, we also now have a new table that was put together for tree fruit growers that lists toxicities of primarily insecticides and miticides to bees, and also provides useful guidelines to follow to protect all pollinators in general. All growers should follow these guidelines, and avoid the materials that are toxic to bees during bloom or when blooming weeds that bees visit are present in the field. The table can be found here: <http://extension.psu.edu/plants/tree-fruit/commercial-tree-fruit-production/honeybees>.

(Reprinted from: The Pennsylvania State University Vegetable and Small Fruit Gazette)

La seguridad de la Enfermedad de Lyme Lyme Disease Safety



Las picaduras de las garrapatas infectadas causan la enfermedad del Lyme.

Lyme Disease can be contracted by the bite of an infected deer tick.

- Los que trabajan al aire libre tienen más riesgo
- Vístase con ropa de colores claros, camisa de mangas largas, pantalones largos y calcetines.
- Meta la camisa en el pantalón y use ropa suelta.
- Utilice repelente de insectos de acuerdo con las instrucciones de uso
- Vaya a ver su médico si nota una reacción en el área de la picadura que dura más que unos días

- Outdoor workers are at highest risk
- Wear light colored clothing, long sleeve shirt, long pants and socks
- Tuck in loose clothing
- Use insect repellent only as directed
- See a doctor if reaction occurs to a tick bite that lasts longer than a few days



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New York Berry News (NYBN) is a monthly commercial berry production newsletter provided by Cornell berry team members. It is designed to help promote and strengthen commercial berry crop production in New York State. NYBN is available free of charge in pdf format at:

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Visit the NYBN web site to view back issues or to subscribe to monthly e-mail notices with table of contents and a link to the most current issue.

More on individual team members and their areas of expertise may be found at: <http://www.fruit.cornell.edu/berry/berryteam.htm>.

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Upcoming Events

October 3 2014. *Save the Date! Cornell Small Fruit Open House, Cornell Orchard, Dryden Road, Ithaca, NY. More information to follow.*
