NEW YORK BERRY NEWS
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New York Berry News

Cornell University Berry Team

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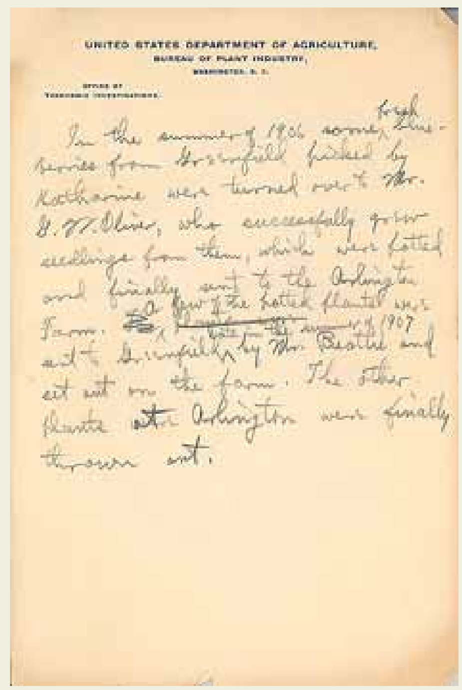
Blueberry Growing Comes to the National Agricultural Library — *Kim Kaplan USDA-ARS*

The path to domestication for most of our crops is lost in the mists of agriculture's 10,000-year history. Blueberries are the exception.



UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF PLANT INDUSTRY,
WASHINGTON, D. C.

In the summer of 1906 some fresh blueberries from Greenfield picked by Katharine were turned over to Mr. G. M. Oliver, who successfully grew seedlings from them, which were potted and finally sent to the Arlington Farm. A few of the potted plants were [illegible] in the summer of 1907 sent to Greenfield by Mr. Beattie and set out on the farm. The other plants at Arlington were finally thrown out.

A note by USDA botanist Frederick Coville describing his pioneering research on domesticating blueberries.

Until 1911, blueberries were picked from the wild, or bushes were dug from the wild that might or might not survive when planted elsewhere. But true domestication—reproduction at the will of a grower and breeding to improve desirable traits—was beyond reach. This makes blueberries among the most recently domesticated crops and one of the few that originated in North America, although they are now grown all over the world.

It was U.S. Department of Agriculture botanist Frederick Coville who set the stage for commercial production by solving the first great mystery of why blueberries could not be cultivated well when he showed, in 1910, that the plants must be grown in moist, very acidic soil. Soon after, he made the first successful crosses designed to improve important traits, such as berry size and flavor. The blueberry was tamed.

Now Coville's handwritten research notes have been added to the Rare and Special Collections at the National Agricultural Library (NAL), in Beltsville, Maryland. The material includes complete descriptions of blueberry plant parentage and field note data as well as daily, penciled entries of his work. There are also more than 1,000 black-and-white photographs of blueberries and more than 100 glass-plate negatives and positives from USDA blueberry research.

The records provide a fascinating look at the USDA research effort that took blueberries from a crop picked from the wild and sold for 14 cents a quart in 1912 to a commercially grown crop worth more than $530 million today.

Coville's notes provide insight into how monumental a task it was to begin transforming blueberries into a domesticated crop. In his June 1, 1907, entry, he quotes a statement that the renowned botanist Liberty Hyde Bailey "once got a bushel of blueberries…and failed to make a single seed grow."

Paging through his observations clearly shows the evolution of his how-to-grow blueberry studies. His records begin with comparing plant growth in alkaline, neutral, and acid soil. By 1908, Coville had pretty much dropped alkaline soil from testing. In growing studies done at Arlington Farm (now the

Upcoming Berry Events

June 22-26, 2011. *10th International Rubus and Ribes Symposium, Zlatibor, Serbia.* For more information contact: Prof. Dr. Mihailo Nikolic, Faculty of Agriculture, University of Belgr, Belgrade, Serbia. Phone: (381)63 801 99 23. Or contact Brankica Tanovic, Pesticide & Environment Research Inst., Belgrade, Serbia. Phone: (381) 11-31-61-773.

June 27-29, 2011. *4th Biennial Berry Health Benefits Symposium.* West Lake Village, CA. Conference focuses on berries and their impact on human health and wellness. Cutting edge research presentations from International scientists in the field. Special one day session for berry industry on how to implement the berry health message into marketing and R & D programs. Visit www.berryhealth.org to learn more or contact Cat McKenzie - catmc@peak.org or call 541-456-2264.

August 16-17, 2011. *North American Strawberry Growers Annual Summer Tour*, Boston, Massachusetts. Details follow. Best Western Hotel Tria, Cambridge, Mass. Contact Kevin Schooley 613-258-4587 or www.nasga.org.

October 11, 2011. *Southern Tier Commercial Berry Growers Workshop*, Belfast Fire Hall, Belfast, NY. Pre-registration required; to register contact Colleen Cavagna at 585-268-7644 ext. 12 or email cc746@cornell.edu**. Deadline for registration: Oct. 3rd, 2011.**

October 16-19, 2011. *ISHS Symposium on High Tunnel Horticultural Crop Production*, Ramada Inn and Conference Center, State College, PA. For more information contact Michael Orzolek at (814) 863-2251 or mdo1@psu.edu or visit http://horticulture.psu.edu/cms/ishs2011/.

December 6-8, 2011. *Great lakes Fruit, Vegetable & Farm Market EXPO,* DeVos Place Convention Center, Grand Rapids, Michigan. For more information: http://www.glexpo.com.

February 18 to 22, 2012. *7th International Strawberry Symposium.* Beijing, China. http://www.iss2012bjchina.org.cn.

NYS Department of Ag and Markets News

Commissioner Reminds Farmers to Only Sell to Licensed Dealers

Agricultural Producers Security Law Protects Farmers from Nonpayment

June 10, 2011. New York State Agriculture Commissioner Darrel J. Aubertine today reminded farmers to only sell to licensed farm product dealers this growing season. Article 20 of the New York State Agriculture and Markets Law, more commonly known as the Agricultural Producers Security Law, requires dealers to be licensed and contribute to a security fund in order to offer protection to farmers in the event of a defaulted payment.

"The Agricultural Producers Security Law has been effective for many years in ensuring that our farmers receive the payment they are owed for the products they produce," the Commissioner said. "In order for farmers to be protected under this important and effective law, they must make sure they are selling to a licensed dealer, and they must notify the Department immediately in the event of nonpayment. It is critical that farmers become familiar with the details of the Agricultural Producers Security Law so they can be protected financially in a swift and effective manner."

Farm product dealers are required to be licensed with the New York State Department of Agriculture and Markets. Dealers' licenses expire on April 30 of each year and must be renewed for the license year beginning May 1. The Department maintains a current list of licensed dealers on its website at http://www.agmkt.state.ny.us/programs/apsf.html and can provide a hard copy upon request.

Article 20 of the New York State Agriculture and Markets Law provides financial protection for farmers against nonpayment for their products sold to licensed dealers. This financial protection consists of security in the form of a bond or letter of credit furnished by the dealer, and supplemental financial coverage from the Agricultural Producers Security Fund, which is funded by licensed dealers. In order to preserve a producer's eligibility for the financial protections available under the Agricultural Producers Security Law, producers must:

1. Sell only to licensed dealers. Only sales to licensed dealers are covered under Article 20. The dealer must be licensed at the time of the transaction.
2. Ensure that the sale of farm products between the producer and dealer, for which a claim is made, has occurred within 120 days from the earliest unpaid transaction date at the time the claim is filed. Unpaid transactions that occur after the 120 day period will not be eligible.
3. File claims of nonpayment with the Department no later than 365 days after the sale and delivery of the farm products. In the event the Department has issued a notice to file claims, they must be submitted by the date specified in the published notice without regard to the 365-day time frame.

A producer can also take advantage of Article 20's trust provision, a legal mechanism that holds a dealer responsible for the full amount owed to a producer. The "Article 20 Trust" is established upon delivery of the producer's farm products to a dealer and ends once the amount due is fully paid. Since the Trust provision requires compliance with specific legal requirements, farmers should consult their attorney to see whether that provision is appropriate for them and, if it is, what they must do to receive its benefits.

The Department recommends that producers consult with their attorney concerning matters involving preservation of their trust benefit, or to enforce the trust.

For up-to-date information about the law, a copy of the brochure or a list of licensed dealers, please visit the Department's website at http://www.agmkt.state.ny.us/programs/apsf.html, or call the Department at 1-800-554-4501.

USDA News

Kim Kaplan, USDA ARS Information Staff, Room 1-2253, 5601 Sunnyside Ave. Beltsville, MD 20705-5128

May 23, 2011 WASHINGTON — Total losses from managed honey bee colonies nationwide were 30 percent from all causes for the 2010/2011 winter, according to the annual survey conducted by the U.S. Department of Agriculture (USDA) and the Apiary Inspectors of America (AIA).

This is roughly similar to total losses reported in similar surveys done in the four previous years: 34 percent for the 2009/2010 winter, 29 percent for 2008/2009; 36 percent for 2007/2008, and 32 percent for 2006/2007.

"The lack of increase in losses is marginally encouraging in the sense that the problem does not appear to be getting worse for honey bees and beekeepers," said Jeff Pettis, an entomologist with USDA's Agricultural Research Service (ARS) who helped conduct the study. "But continued losses of this size put tremendous pressure on the economic sustainability of commercial beekeeping." Pettis is the leader of the Bee Research Laboratory operated in Beltsville, Md., by ARS, the chief scientific research agency of USDA.

The survey, which covered the period from October 2010 to April 2011, was led by Pettis and by AIA past presidents Dennis vanEngelsdorp and Jerry Hayes.

Beekeepers reported that, on average, they felt losses of 13 percent would be economically acceptable. Sixty-one percent of responding beekeepers reported having losses greater than this.

Average colony loss for an individual beekeeper's operation was 38.4 percent. This compares to an average loss of 42.2 percent for individual beekeepers' operations in 2009/2010.

Average loss by operation represents the percentage of loss in each operation added together and divided by the number of beekeeping operations that responded to the survey. This number is affected more by small beekeeping operations, which may only have 10 or fewer colonies, so a loss of just five colonies in a 10-colony operation would represent a 50 percent loss. Total losses were calculated as all colonies reported lost in the survey divided by the total number of bee colonies reported in the survey. This number is affected more by larger operations, which might have 10,000 or more colonies, so a loss of five colonies in a 10,000-colony operation would equal only a 0.05 percent loss.

Among surveyed beekeepers who lost any colonies, 31 percent reported losing at least some of their colonies without finding dead bee bodies—one of the symptoms that defines Colony Collapse Disorder (CCD). As this was an interview-based survey, it was not possible to differentiate between verifiable cases of CCD and colonies lost as the result of other causes that share the "absence of dead bees" as a symptom. The cause of CCD is still unknown.

The beekeepers who reported colony losses with no dead bee bodies present also reported higher average colony losses (61 percent), compared to beekeepers who lost colonies but did not report the absence of dead bees (34 percent in losses).

A total of 5,572 beekeepers, who manage more than 15 percent of the country's estimated 2.68 million colonies, responded to the survey. A complete analysis of the survey data will be published later this year. The abstract can be found at http://www.extension.org/pages/58013/honey-bee-winter-loss-survey .

More information about CCD can be found at www.ars.usda.gov/ccd.

ARS-AIA survey reports honey bees losses holding about steady. *Photo courtesy of Russ Ottens, University of Georgia, Bugwood.org.*

2011 NASGA Summer Tour

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The 2011 NASGA Summer Tour will be held out of the Boston, Massachusetts area. The tour dates will be August 16th and the 17th. Massachusetts has the highest sales of produce at the farm gate in the country so we will be sure to see some fabulous farms and markets.

The Hotel Tria www.hoteltria.com is the host hotel for the tour. It is located in the heart of Cambridge Massachusetts; providing easy access to all of Boston's main activities and points of interest. The rooms contain flat screen televisions with satellite cable channels, a mini refrigerator, wired and wireless internet, and digital climate control of your room. Complimentary breakfast is included, as well as an evening reception on the evening of August 15th. There is a Starbucks and Whole Food's Market located adjacent to the hotel. The bus will pick us up and drop off at the Hotel Tria.

Reservations can be made by calling reservations at 617.491.8000 or toll free at 866.333.TRIA.

All guests must reference the group name **"North American Strawberry Growers Association"** to receive the discounted group rate of $139.00

Day 1 Tuesday August 16th
The first stop on the tour on August 16th will be **Marini's Farm**. This farm is located in Ipswich Massachusetts, and has been around for three generations. Marini's Farm has several greenhouses, a nursery and a farm stand. Strawberry and blueberries are only two of the many crops produced at Marini's Farm. Richardson's Dairy Products, local bakery's, Danver's Butchery Meats and a variety of specialty food items are also sold at the Marini's Farm Stand.

Cider Hill Farm is the next stop on day 1 of the tour, and it is located in Amesbury Massachusetts. Cider Hill Farm has a large diversity of home-grown produce; including strawberries, blueberries and raspberries. They also offer a selection of herbs and flower baskets. A large farm store is located on the farm, which provides an opportunity for customers to purchase produce, bakery items, honey, candy, crafts, gifts and cider.

Parlee Farms is located out of Tyngsboro Massachusetts, and contains almost 100 acres of scenic farmland along the Merrimack River. They produce pick your own strawberries, blueberries and many other types of fruit and vegetables. The farm also contains a farm stand that provides already picked fruit and vegetables, potted flowers, apple cider, bakery items and their very popular donuts!

The final stop on day 1 of the tour is at **Verrill Farm**, located in Concord Massachusetts. This farm is open daily, year round and offers many different festivals and events. It also has a farm stand which features farm-grown produce such as strawberries, and food prepared in the stand kitchen; such as soups, baked goods and award winning pies.

Day 2 Wednesday August 17th
On the second day of the tour, August 17th, the first stop will be at **Wards Berry Farm**, in Sharon Massachusetts. Since 1982, Jim & Bob Ward have offered fresh picked fruits and veggies for sale at their roadside stand. Baked goods, breads, cheeses, jams, fruit baskets, and plans are some of the many other products that Ward's Farm has to offer. Ward's Berry Farm has pick your own strawberries, blueberries and raspberries for all customers to enjoy!

Spring Rain Farm is the second stop on day 2 of the tour, and it is located in East Taunton Massachusetts. It contains 112 acres of farm land, where you can explore cranberry bogs and pick your own strawberries.

Four Town Farm is located in Seekonk Massachusetts, growing a wide array of produce such as strawberries and blueberries. The farm offers pick your own produce, a farm stand and beautiful flower gardens.

The final stop of the 2011 NASGA Summer Tour is at **Foppema's Farm** in Northbridge Massachusetts. They offer a diverse array of fruits and vegetables, including raspberries, strawberries and blueberries. Every year they try and something new for the customers to try, such as Japanese eggplant, peach and nectarine trees.

For more information visit the NASGA website at www.nasga.org or call Kevin Schooley at 613-258-4587.

Blueberry Growing Comes to the National Agricultural Library (continued from page 1)

south parking lot of the Pentagon), Coville wrote, "Peat was procured yesterday from underneath some Kalmia (mountain laurel) bushes on the Virginia side of the Potomac opposite Plummer's Island." He had remarkable success with this very-low-pH soil. While most plants prefer soil at the neutral pH 7, blueberries only thrive at pH 4.5 to 4.8. It was a novel concept at the time and one that Coville, in his later years, said he considered his greatest discovery.

In 1910, Coville published Experiments in Blueberry Culture (USDA Bulletin 193), with his directions for growing blueberries. He expanded these directions in a number of revisions over the years.

Then Coville went on to solve the second mystery of why blueberries could not be bred as easily as most other plants when he discovered that blueberries are not self-fertile and that they require cross-pollination. He also recognized that each parent must have an equal number of chromosomes, something not necessarily the norm in a genus as variable as Vaccinium.

Coville was also the first to determine how to propagate blueberries, allowing production of thousands of identical plants once a good hybrid was bred. This was critical to the large-scale production of consistent, uniform blueberry fruit. Prior to his research, it was believed that blueberries couldn't be propagated.

In 1911 came his landmark first successful crosses between two wild blueberries—one highbush and one lowbush—that had been selected for their superior qualities from a pasture in Greenfield, New Hampshire. These were named Brooks and Russell. The crosses he made in 1911 and 1913 resulted in 3,000 hybrids. Another cross of Brooks with a wild blueberry named Sooy in 1912 resulted in another 3,000 seedlings.

"From these, over 1,000 seedlings were actually transplanted [to the field] and as many more might easily have been utilized," was the assessment Coville recorded.

These crosses led to the release of the first hybrid, aptly named Pioneer (Brooks x Sooy), in 1920, followed by the release of Cabot and Katherine.

Much of Coville's original wild breeding stock came from his partnership with Elizabeth White of Whitesbog, New Jersey. She acquired high-quality bushes by recruiting native blueberry pickers to locate and tag desirable large-fruited bushes for use as parental stock, and then she personally went out and brought them back to Whitesbog and made them available to Coville.

Coville's crosses continued to be released for many years after his death in 1937 and included Bluecrop, Blueray, and Earliblue, varieties still popular today with gardeners and commercial growers. By 1942, of the 18 blueberry varieties offered by eastern growers, 14 were the result of Coville's selection or breeding. His varieties remain part of the pedigree of most varieties grown today.

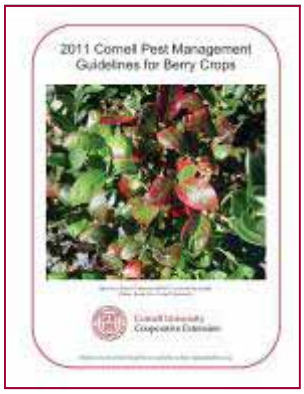
The USDA research program Coville founded in New Jersey continues today, carrying out critical research to protect and expand the U.S. blueberry crop. Consumer demand continues to increase at a rapid pace, especially since the recognition of blueberry's health benefits.
(Right: Bluecrop, released by Coville in 1941, is easy to grow and easy to eat. It remains one of the country's most popular mid- to late-season varieties.)

The NAL's Rare and Special Collections hopes to raise funding to scan the Coville records along with other blueberry material it has recently received so that the records can be available via the Internet. Some of the additional material includes blueberry virus data from 1943 and 1944, USDA pomologist George Darrow's notes and photographs on rest-period requirements for blueberries, and nursery catalogs from 1943 to 1970 with sources listed for a number of cultivars. (*continued on page 28)*

In 1908, Coville selected this wild highbush plant with berries of superior size and flavor to be one of the foundation parents of his breeding program. He named it "Brooks" after Fred Brooks, a neighbor on whose New Hampshire land the bush was growing

This botanical illustration documents Stanley, a mid- to late-season blueberry with dessert-quality berries. USDA botanist Frederick Coville named this plant after his son on whose plantation in New Lisbon, New Jersey, the variety was first shown to produce "good yields of berries of large size." Botanical illustration by James Marion Shull, (1940), Rare and Special Collections, National Agricultural Library.

Catawba was the second albino variety that Coville named. It was bred from the same parents as Redskin, but its red coloring was paler, "more like the color of the Catawba grape," hence the name.



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Product, Ingredient, and Manufacturer System:

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

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

Berry Diagnostic Tool

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

Focus on Pest Management

The Dos and Don'ts of Handling and Applying Pesticide:

Mary Dunckel, Michigan State University Extension

Pesticides-such as insecticides, herbicides, fungicides and rodenticides-are chemicals or biological substances designed to kill or control living organisms such as unwanted plants, insects, disease or animals. Applications of pesticides can expose people, pets, wildlife and the environment to substances that can cause health and environmental effects. Following these do's and don'ts will help protect you, your family, employees and the environment.

DO

- Know your pest(s) and consider alternatives before you treat with pesticides
- Read the label carefully before you purchase the pesticide
- Choose the form of pesticide best suited to your target site and the pest you want to control
- Transport pesticides securely stowed in the car trunk or in the back of a truck away from passengers, groceries and animal feed
- Read the label again before opening the container (each and every time) and follow it to a "T" (It's the law, after all)
- Use the proper safety equipment and protective clothing listed on the label
- Apply the correct dosage
- Apply only to crops (targets) identified on the label
- Keep detailed records of all pesticides used and the environmental conditions at the time of application
- Post all treated areas and follow re-entry directions
- Triple rinse all tools and equipment and apply rinse water to target according to label
- Wash clothing worn when using pesticides separately from other laundry
- Post pesticide emergency contact information near every phone
- Call a doctor or your local poison control center immediately in the case of accidental exposure
- Properly store in original containers that are tightly closed, labeled and securely stored
- Dispose of unused or unwanted pesticides properly (there are 18 Clean Sweep sites in Michigan ready to collect and dispose of these products free of charge)

Be safe, responsible and prepared!

DON'T

- Purchase more than you will use in one season
- Handle or apply pesticides when you are not feeling well
- Smoke or eat while applying pesticides
- Inhale pesticide dusts, sprays or vapors
- Mix or apply a pesticide near a well head
- Endanger the environment by using excess quantities of pesticide, applying to non-targets or applying at the wrong time
- Use on targets not specified on the label (if it is labeled only for fruit trees, do not use it on ornamental shrubs)
- Allow pets or people access to the treated area prior to labeled re-entry time
- Dispose of unused product down the drain, sink or toilet
- Reuse empty pesticide containers as they can be as hazardous as a full one
- Transfer pesticides to other containers, such as empty milk bottles
- Store pesticides with or near food, animal feed or medical supplies or in areas where flooding is possible

Take handling and applying

pesticides lightly-precaution and care need to be front and center!

About the Author: *Mary Dunckel is a statewide Agriculture Literacy educator for Michigan State University Extension. She has been with MSU Extension for nearly 13 years and prior to assuming the statewide role, she was an agriculture educator and county Extension director in Alpena County. Mary was instrumental in securing funding and managing the operation of the Northeast Michigan Household Hazardous Waste and Clean Sweep programs. She is a graduate from the University of Wisconsin-Madison and holds a degree in bacteriology.*

Focus on Pest Management *(continued)*

Disease Snapshot - *Kerik Cox, Cornell University*

Disease Name: Red Stele (Phytophthora Root Rot)

Cause: Phytophthora *fragariae*

When to watch for it: Bloom Spring, Fall

First line of defense: Site preparation to avoid standing water and promote soil drainage. Do not plant adjacent to infected fields.

Summary: Red Stele is named for a sign of Phytophthora infection, which causes the stele of primary roots to become reddish. In the spring, plants infected with Phytophthora may be stunted and chlorotic with marginal leaf scorching and other typical wilt symptoms due to impaired root function. Plants will continue to wilt and die in patches as the soil warms and roots are unable to uptake water and nutrients. Below ground, Phytophthora is destroying all of the fine/feeder roots, and infecting the vascular tissue (the stele) of the primary roots, which causes the root ball to look like a bundle of pale brown "rat tails". If one excavates a dying plant, scrapes away the epidermis from such a 'rat tail', they may find that the stele is reddish from infection. Once the infection has progressed to the point where the plant has died, other saprobic fungi will rapidly colonize dead tissues obscuring these diagnostic symptoms. Phytophthora is an aquatic organism, and as such, the best means of managing the disease is to limit exposure to standing water by avoiding low-lying fields, selecting well-drained sites, and planting on raised beds. Pesticides such as mefenoxam and phosphorous acid-based products can provide control of the disease when used in conjunction with the aforementioned cultural practices.

The Challenges Of Disease Control During Rainy Spells – *Annemiek Schilder, Michigan State University*

Too much rainfall, like the amount growers have been getting, may cause fungicides to wash off crops for several reasons.

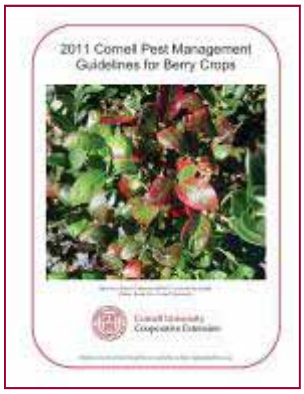
May 24, 2011. Extended periods of wet weather spell "feast" for fungal plant pathogens since they are highly dependent on moisture for spore dispersal and plant infection. While cool temperatures may have slowed down fungal development to some extent, the wet conditions are very conducive to disease development. Repeated or continuous wetting of infected tissues over several days will aid spore production as it allows thorough wetting of infected canes or other overwintering plant parts and promotes spore release. In addition, rains assist rainsplash – dispersed pathogens in splashing the spores to susceptible plant tissues. Furthermore, extended wetness periods (12 to 48 hours) provide ample moisture for spore germination and infection of plant tissues.

Diseases in small fruit crops that are promoted by wet weather include Phomopsis and Botrytis diseases; black rot, downy mildew, and anthracnose of grapes; cane and leaf diseases of raspberries; leaf spots and fruit rots in strawberries; and rusts in raspberries and blueberries. While powdery mildew prefers warm, dry conditions, it does need rainfall in the spring and early summer to release ascospores from overwintered cleistothecia. Therefore, rainy springs will increase powdery mildew disease risk as well, particularly if rains are followed by warm dry weather which will promote successful establishment of the first colonies.

The challenge is to apply sprays before rainfall events. With as much rain as we've had it is difficult to keep the plants covered with fungicide. In addition, with rapid plant growth, new growth may not be covered or the fungicide residue is too diluted to be effective. A study by Xu et al. (2008) showed that when Captan was applied to apple leaves, Captan loss was primarily due to wash-off by rain. As little as 1 mm (1/25 inch) of rain washed off about 50 percent of the Captan. Subsequent rainfall did not result in much more loss of the fungicide. This shows that much of the Captan on fruit or leaf surfaces following an application can be washed off easily, but that the remaining residue is more tenacious and more tightly bound to the plant surface.

Our studies in grapes have shown that 0.1 inch of rain may wash off 20 to 25 percent of protectant fungicides such as Ziram and Penncozeb, but it takes 1 to 2 inches of rain to detect a significant reduction in disease control activity. This suggests that there is usually sufficient amount of active ingredients left after light rain events. But to achieve good to excellent control, one has to reapply the fungicide after a major rain event or when significant plant growth has occurred. And even protectant fungicides require some time to bind to the plant surface and it is advisable not to spray them within a few hours before rain. A spreader sticker may help the fungicide adhere to the plant surface.

During rainy periods, espe-



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Focus on Pest Management *(continued)*

The Challenges Of Disease Control During Rainy Spells *(continued)*

cially when followed or accompanied by windy conditions, it is difficult to get the fungicides on at the right time, e.g., before an infection period. This may be further complicated by fields being flooded, preventing access with spray equipment. Systemic fungicides generally provide better disease control than protectant materials during or after extended rainy periods. Systemic fungicides should be used alone or in a tank-mix with protectant fungicides to get better coverage, improved rainfastness, post-infection (curative) activity, and a broader spectrum of disease control.

The degree of post-infection activity varies by fungicide. Systemic fungicides may be rainfast within a few hours after application, but longer drying periods (e.g., 24 hours if possible) may be better for improved absorption into the plant. When relying on post-infection activity, use fungicides at the highest labeled rate for the crop and make sure coverage is optimized by adjusting nozzles, spray volume, and speed; and by spraying every row if possible.

Surprisingly, even systemic fungicides suffer from wash-off by rain, but less so than protectant materials. Remember that systemic fungicides may also be diluted inside plant tissues due to rapid plant growth and may need to be reapplied sooner during warm periods that promote rapid plant growth.

Dr. Schilder's work is funded in part by MSU's AgBioResearch. Reprinted from MSU Extension News for Agriculture.

Garden Symphylans - *Cathy Heidenreich, Cornell University*

A not-so-common arthropod pest of strawberry and other small fruits has been cropping up in areas of NYS. It's an insect, no, it's a centipede, no, it's a garden symphylan! These soil-dwelling animals are related to insects, centipedes, and millipedes.

Description and Biology: Garden symphylans (sometimes called garden centipedes) are very small, thin white animals with 8 to 12 pairs of legs and very distinctive bead-like antennae. They inhabit soil, spending all of their life cycle underground in the dark (symphylans have no eyes). When soil is disturbed, symphylans run rapidly away, waving their antennae emphatically against intrusion into their subterranean domain.

(Right: Garden symphylan and eggs, photo copyright © 2010 Graham Montgomery)

Symphylans distinguished from other arthropods by their small size (1/8" to 1/4" in length), white color, and other body features (Table 1).

Focus on Pest Management *(continued)*

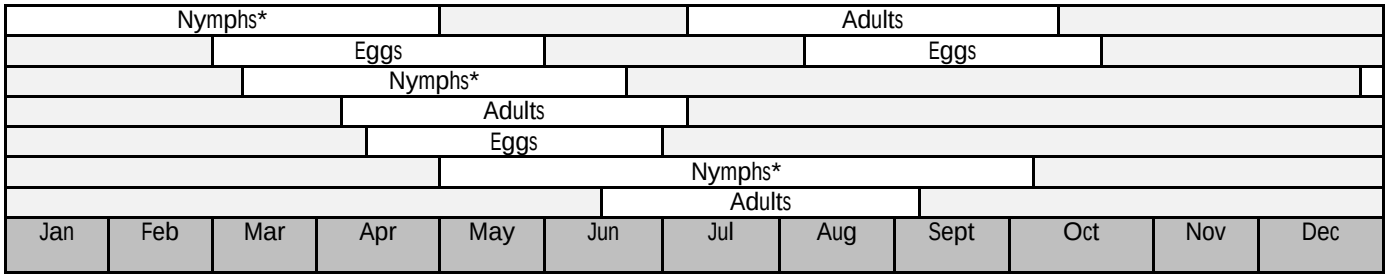
Garden Symphylans - *(continued)*

Table 1: Comparison of arthropods and their distinguishing characteristics

Arthropod	# pairs of legs (# leg pairs/segment)	Rear pair of legs point back-wards	# body segments	Fast-moving	Bite	Antennae
Garden Symphy-lans (Class Symphylla)	nymphs 6, adults 8 to 12 (1)	--	10 to 14 (head, trunk, leg pairs)	Ö	--	Bead-like antennae
Insects (Class Insecta)	3 (3 on thorax)	--	3 (head, thorax, abdomen)	varies	varies	varies
Centipedes (Class Chilopoda)	15 to 177 always odd # (1)	Ö	15 to 177 (not counting head and tail)	Ö	Ö	Large an-tennae
Millipedes (Class Diplopoda)	47 to 375 first 3 segments (1) remaining segments (2)	--	25 to 189 (not counting head and tail)	--	--	Small An-tennae

All stages of symphylans (adults, eggs, nymphs) are present year round, but there are periods during the year when particular stages are reach their highest levels (Table 2). Spring and early summer are when garden symphylans are most active, feeding and laying eggs in the top 5 to 12" in soil. Small, white, ridged eggs are laid in groups of 4 to 25 and hatch approximately 40 days after laying, changing from white to light tan in color. Newly hatched nymphs have 6 pairs of legs; an additional set of legs is developed with each molt. Symphylans go from egg to adult in about 5 months, depending on soil temperature and moisture content; there are 1 to 2 generations per year. Symphylan adults and nymphs move vertically and horizontally through the soil seeking depths with suitable moisture and temperature for feeding and development. Cool temperatures during fall and winter and extreme soil dryness during summer force them deeper into soil. Studies have shown symphylans are capable of surviving in soil 5 years in the absence of living plant material.

Table 2. Garden symphylan life cycle



*Optimum time for treatment if needed.

Occurrence: Symphylans are found in western, northeastern, and north central states. Unlike other soil organisms, they lack the ability to burrow through soil. Instead, they must take advantage of pores, seasonal soil cracks, crevices left by decayed roots, and burrows of other soil-inhabiting animals such as earthworms to move through the soil profile. Thus, practices improving soil health and structure (i.e. addition of organic matter, reduced tillage and use of raised beds) foster increased symphylan populations/damage as these facilitate their movement through soil to underground plant parts. (continued on page 26)

Strawberry Harvest & Storage/Shipping Considerations

Craig Kahlke, LOFT

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

Strawberries Destined for Direct Markets

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

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

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

Strawberries Destined for Long-Distance Markets

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

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

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

About the Author:

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website: http://www.fruit.cornell.edu/lof

Strawberry Harvest & Storage/Shipping Considerations *(continued)*

Resources:

1. Strawberry Production Guide for the Northeast, Midwest, and Eastern /Canada, NRAES-88. 2008
2. Pest Management Guidelines for Berry Crops, Cornell University, Cooperative Extension.
3. Shin, YJ, Liu, R.H., and Watkins, C.B. Temperature and relative humidity effects on quality, total ascorbic acid, phenolics and flavonoid concentrations, and antioxidant activity of strawberry. Post-harvest Biology and Technology 45: 349-357, 2007.
4. USDA, ARS Agriculture Handbook Number 66, The Commercial Storage of Fruits, Vegetables, and Florist and Nursery Stocks.

Heat Illness and Farm Work

Dennis J. Murphy and Cathleen Walker, The Pennsylvania State University

Because of the nature of their profession, farmers spend a lot of time outdoors—especially in the summer, when the ground is thawed and crop production is in full swing. But while the sun helps sustain crops, its intense heat can cause illness, including a potentially fatal illness. To protect themselves, farm workers should be familiar with the different illness caused by exposure to the heat.

Causes of Heat Illness

Heat illness results when one or more of the body's natural cooling mechanisms fail. The body has several ways of cooling itself. *Conduction* occurs when heat is transferred between two objects in contact with each other, such as when ice is applied to the skin. *Convection* occurs when air surrounding the skin is replaced by cooler air, which is why fans make it seem cooler. *Evaporation* rids our bodies of heat through sweat. Finally, *radiation* occurs when the body loses heat to cooler surroundings, which is why air conditioning cools us.

Any of these cooling mechanisms may fail if; the air temperature is warmer than your body's temperature; humidity is high; or the wind is low. The result is heat illness.

Who Is At Risk?

We are all at risk of suffering from heat illness if we don't protect ourselves, but the following groups may run a higher risk:

- the elderly
- infants
- those with circulatory or heart problems
- those who are physically unfit or overweight
- those who have just consumed alcohol and/or drugs (including prescription drugs)
- anyone who isn't fully acclimatized to working in the heat

Types of Heat Illness

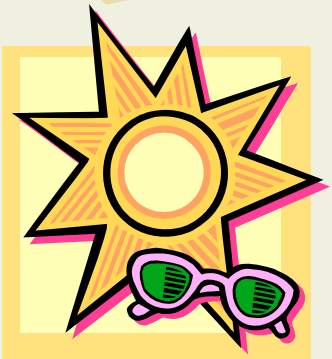
Heat rash is the least severe heat illness. It is caused when sweat fails to evaporate from the skin, thus clogging pores. If severe, heat rash could develop into an infection. To prevent heat rash, wear clothing made from cool, breathable material, such as cotton. Try to keep your skin dry. If heat rash does develop, treat it with corn starch and rest in a cool place.

Heat syncope, or fainting, affects people who aren't used to working in the heat or people who sit or stand for long periods of time. It is caused when the body pumps warm blood to the skin surface to remove heat via conduction, radiation, and convection. If a person remains sedentary, blood may pool in the lower body, reducing blood flow to the brain and causing fainting. It isn't serious, but it can be very scary to the victim or cause secondary injuries from falling.

If a coworker faints, administer the following treatment: get the victim to a cool place, make him/ her

About the Author:

Dennis Murphy is Professor of Agricultural Safety & Health and Extension Safety Specialist. Current program areas that Dennis works in include applied research and education for: tractor and machinery safety issues; youth safety; classification of agricultural deaths and injuries; methods of modifying farm worker safety behavior; evaluating safety interventions; and responding to farm injury emergencies.



Heat Illness and Farm Work *(continued)*

lie down, elevate the victim's feet to facilitate blood re-circulation to the heart and brain, and consult a doctor. Heat syncope can be prevented by moving around periodically when you're doing sedentary work outside, taking periodic breaks, and adjusting gradually to working in heat.

Heat cramps usually affect the stomach and legs and can be excruciatingly painful. They're caused by a loss of body fluids and electrolytes via sweating, which can upset the body's chemical balance. Cramps can happen during or after physical activity. To treat them, drink lots of water and massage affected muscles. *Don't eat salt tablets!* Doctors used to think that because cramps resulted when our bodies lose water and salt via sweating, salt tablets would help prevent them. They now know, however, that too much salt in our system may aggravate heat illness, as it causes the body to retain water instead of sweating it away. We get enough salt naturally through our diets.

Heat exhaustion is caused by a loss of body fluids and salts from sweating, and decreased blood flow to the brain and other organs. Symptoms include cool, pale, clammy skin; dizziness; headache; cramps; nausea or vomiting; weakness; confusion; or even unconsciousness. To treat heat exhaustion, move the victim to a cool place, elevate his/her feet, and call for medical help immediately. If the victim is able to drink, give him/her plenty of cool fluids while waiting for help to arrive.

Heat stroke, a complete failure of the body's temperature-regulating mechanisms, is a **medical emergency**. Symptoms include hot, dry skin; a 105- degree temperature or higher; confusion; anger; chills; nausea; dizziness; unconsciousness; convulsions; and delirium. The victim may even fall into a coma. **Heat stroke can be fatal if not treated immediately**. If someone around you experiences any of these symptoms, call for medical help immediately. Remove the victim's outer clothing and immerse him/ her in cold water. If a pool of water is not available, sponge the victim's body with cold water until help arrives. **Do not** give the victim anything to drink.

Preventing Heat Illness

To prevent heat illness from happening, follow the guidelines listed below when working in the heat:

1. Drink water periodically as you work—about every 15 minutes or so. Don't wait until you're thirsty.
2. Avoid caffeinated and alcoholic drinks, as they cause the body to dehydrate faster.
3. Wear lightweight, loose clothing and light colors that reflect sunlight.
4. Save strenuous work for the cool times of day, such as early morning or evening.
5. Take periodic breaks in the shade—don't push yourself.
6. Adjust gradually to working in the heat. No matter how young or how physically fit you are, you are still susceptible to heat illness.

Summary

Heat illness is a potentially fatal disease affecting those in the farm community. But it can be kept under control. When working outdoors in the summer, drink plenty of water before and during work, take occasional rests in the shade, and pace yourself— adjust gradually to working in the heat.

Heat Illness	Symptoms	Proper Treatment
Heat Rash	Red, blotchy skin rash	Treat with corn starch; rest in a cool place
Heat Syncope	Fainting	Move victim to a cool place; lie down and elevate feet
Heat Cramps	Pain in stomach and legs	Drink lots of water; massage affected muscles
Heat Exhaustion	Cool, pale, clammy skin; dizziness; headache; cramps; nausea or vomiting; weakness; confusion or unconsciousness	If conscious, give plenty of cool fluids; call for assistance
Heat Stroke	Hot, dry skin; 105°F or higher body temperature; confusion; anger; chills; nausea; dizziness unconsciousness; convulsions; and delirium.	Call for assistance immediately; remove outer clothing; immerse or sponge body with cold water

July is Berry Month

Steven McKay, Cornell Cooperative Extension

July is berry month. It's the time to take advantage of the bounty of berries that becomes available before tree fruits begin to hit their peak. Spring strawberries are finishing their productive season in June, but the day neutral varieties will continue to produce fruit until the Fall. Black raspberries will peak in the first half of the month, and will be available for about two weeks, while red raspberries start at the beginning of the month and continue production through the fall.

Blueberries, gooseberries, and red or black currants produce throughout the month of July.

As mentioned, spring strawberry production ends in July, but the relatively new day-neutral varieties of strawberries will assure that we can have local strawberries all summer and fall. Spring plants have their production end in the summer because long day lengths shut off flower/fruit production. Day neutral plants are not sensitive to day length, so the changing day lengths have no effect on production. Temperatures over 90 F tend to shut down production temporarily in older day-neutral varieties, but newer varieties are less sensitive to high temperature as well. In addition, growers have learned how to extend season with these berries by using a spun plastic product called row cover to protect plants from early fall frosts.

Black raspberries are a delicacy in ice cream, other desserts, and even plain. They are high in antioxidants, so are good for you. The production season is short, even though the traditional 'Jewel" variety is accompanied by a newer variety, 'Black Mac' to extend season. Black raspberries are also known as black caps, and they are the same. Wild plants in the forest tend to be seedier, wile the cultivated varieties are fleshier and juicier.

Enjoy these berries while they make their short appearance.

Red raspberries start production around the fourth of July and there are many varieties now available that extend the season through frost. High tunnels can extend season, and greenhouse production has been shown feasible for the winter in New York. Red raspberries vary in size and color depending on varieties. Some are deep purplish red, while others are more emerald red. They can have a shiny appearance, or be dull if the variety has small hairs covering the drupelets. Try yellow raspberries if you get a chance. They have unique flavor, and no, they are not "unripe" red raspberries. They are truly yellow when ripe.

You may see purple raspberries available infrequently. They are large- sized, almost like a blackberry. Eaten fresh, they are not as tasty as a red raspberry, but I have found that left to sit in a bit of sugar and vodka, they produce a very fragrant syrup that can be used for cooking.

Blueberries debut in July, and will continue to be available through the summer. This is because many new varieties have been developed to have a long season. The berries vary in size from small pea to the width of a quarter. Size is not an indicator of flavor (some folks feel that large-sized fruit have no flavor), and in fact most of the large fruits are very good. Blueberries keep well in the refrigerator, and can also be easily frozen in plastic bags for use off-season.

Gooseberries and currants are classified as a group called ribes. This comes from their genus name. There are many size, shape, and color variations for this fruit. Gooseberries will ripen off the vine, and are truly sweet if they are allowed to ripen. If you see some pink currants on the market (a form of red currants) be sure to give them a try. They are the sweetest of the red currants and are a pleasure to eat out of hand.

Most black and red currants are best if cooked or sweetened before eating.

Nutrition Facts

Serving Size: 1 cup of strawberries

Calories: 50	
Protein: 1g	
Fat: 0g	
Fiber: 2g	
	% Daily Value*
Vitamin C:	160%
Folic Acid:	9%
Iron:	2%
Calcium:	2%
ORAC* Value: 3,577	

* Oxygen Radical Absorbance Capacity measures antioxidant levels

What Is Sustainable Agriculture?

Congressional definition
As defined by Congress, sustainable agriculture is an integrated system of plant and animal production practices having a site-specific application that will, over the long term:

- Satisfy human food and fiber needs
- Enhance environmental quality and the natural resource base upon which the agricultural economy depends
- Make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls
- Sustain the economic viability of farm operations
- Enhance the quality of life for farmers and society as a whole

Additional points

We can add to this by saying that sustainable agriculture is economically viable. If it is not profitable, it is not sustainable.

Sustainable agriculture is ecologically sound. We recognize that we must preserve the resource base that sustains us all.

Sustainable agriculture is socially supportive. A premise of sustainability is that the quality of life of farmers, farm families, and their communities is important.

Sustainable agriculture is a holistic approach to farming, and is an integral part of pest management, cultural practices, soil health, and long-term farm viability.

Mountains Out of Molehills

Vern Grubinger, University of Vermont

In the greater scheme of things, the SARE program isn't all that big. Sure, each of our four regions will provide about $3 million in grants this year, which is real money in my neck of the woods, but that pales in comparison to larger federal programs, some of which make single awards for many millions of dollars. However, SARE's investments are often magnified over time, in several different ways.

With some SARE-funded research, a seed is sown when innovative concepts are explored and shown to have potential. Non-SARE funds are then obtained from new sources to expand the scope and duration of the original work. For example, a 2002 grant taught New York dairy farmers how to add value to their milk by making farmstead cheeses using a prototype mobile processing unit that brought needed equipment to the farm; in 2004, the New York State Assembly created a line item in budget to fund the building of the first factory-built "cheesemobile" for farmer training, then an engineering firm adapted the prototype design to manufacture mobile processing units with approval for use in all fifty states. So one characteristic of many research projects is that they continue to generate useful information long after the original project ends, attracting support from a range of sources.

In other cases, SARE project leaders build on their own work by winning repeat grant awards to address related issues. This is the case with several Partnership Grant projects that have, in essence, answered a series of questions, one after the other, in projects logically connected over time. Eventually the results of these projects get bundled into a comprehensive understanding of an agricultural problem and its solutions. Several years of work on onion production in muck soils in western New York, which continues this year, is one example; another is work in MA and nearby states on alternative farm financing, which began with two modest Sustainable Community awards and progresses this year with a larger Research and Education Grant.

Farmers and farm advisors sometimes take an idea from a SARE project and try it again in a new place or with a new twist, so that the same idea may be circulating through several SARE projects at the same time. This creates synergy and a shared purpose, which can culminate in new farm organizations like Northeast Organic Wheat and the Northern New England Local Bread Wheat Project. These are linked, cooperating coalitions of farmers, bakers, and retailers who want to grow, use, and sell heritage grains and grain products. We may not think of the Northeast as a breadbasket, but now there are about 1,500 acres of bread-quality wheat in Vermont and Maine. The Kneading Conference, which grew naturally out of this wider effort, has also used Northeast SARE speaker funds to bring keynote and workshop speakers to this annual event.

Sometimes a farmer will take on a problem and become, over time, a recognized expert in a specific field--for example, a farmer from Lancaster, Pennsylvania, used several consecutive Farmer Grants to figure out how to manage the grape root borer, a pest that feeds on the grapevine's root system for two or perhaps three years before the adult moth emerges. He speaks at events around the region and the country, taking his expertise--along with samples of dead vines, devastated roots, and insects--to show to fellow growers, and shares his understanding of his own results and the most recent research.

Agritourism is a way for farmers to develop new revenue streams by becoming a recreational destination, and a multi-state Research and Education project from 2008 has laid some of the groundwork for a new Professional Development award on the same topic. This cross-pollination is a form of enrichment, since this 2011 effort brings the leader of the earlier grant in as a cooperator. This assures that results and insights aren't lost, even when the audience--initially farmers--migrates to a training effort for Cooperative Extension staff around the region.

Less specifically, but perhaps more importantly, are those projects that help with transformative change by getting a big idea off the ground. SARE can't claim all the credit when this happens, but our funding did help in many cases. For example, our support of a regional CSA conference in the 1990's helped spread the word about this then-new marketing system, and in 1998 Northeast SARE partnered with Chelsea Green Publishing to produce Sharing the Harvest, a comprehensive guide to CSA management. This book has recently been released in an expanded second edition.

Other grants promoted in-depth intensive pasture management education for agricultural professionals have influenced the ability of land grant personnel to serve pasture-based livestock farms.

Mountains Out of Molehills (continued)

Several well-established organic research and outreach programs got early support from SARE grants, such as the University of West Virginia's Organic Farm, the Rodale Research Center's organic orchard, and the more recent support for organic and agroecosystems research at the University of New Hampshire and Pennsylvania State University. Non-profits like PASA, MOFGA, and the region's NOFAs have benefitted from SARE funding as they spread their educational wings in recent decades.

Looking back on the growth of earlier projects adds excitement to making grants today. As you read the summaries of this year's hatchlings perhaps you'll join me in wondering what kind of path they will take towards enduring impacts.

NEW YORK 2011 NE SARE AWARDS

CNE11-086 Increasing farm profitability through value-added training and certification
Alison Clarke, Small-Scale Food Processors Association of New York, Rochester NY
Direct sales are a growing segment of the farm economy, and the project manager will develop and deliver an "Adirondack Certified" curriculum that will train farmers in marketing and adding value, and then follow up with support services and one-to-one mentoring. Outreach will be via extension and agency newsletters and the agricultural media. $14,699

CNE11-089 Creating a local fair trade label *Kristina Keefe-Perry, Northeast Organic Farming Association of New York, Rochester NY*
Consumers have shown willingness to pay a premium for products that benefit low-income farmers in developing countries, yet many are not aware of the economic struggle of farmers close to home. The project manager will test a local fair trade labeling campaign to see if consumers will also pay a premium to local farmers who pledge to pay living wages to their workers and adhere to fair trade standards developed by previous SARE grant. Outreach will be through the organic and agricultural media, conference workshops, and through an expanded purchasing guide that will identify fair trade farmers for consumers. $14,956

FNE11-713 Grass pellet fuel for electricity production *David Dolan, Flying Rabbit Farm, Otego NY*
Marginal farmland tends to support only native grasses and weeds, and this project will explore whether these otherwise unusable acres can be used to produce grass-based electricity. The farmer will build and test a gasification unit that will convert grass pellets into a biofuel that runs a small engine and produces electricity; waste heat from the engine will be diverted to a greenhouse. The overall goal is to explore whether grasses on marginal land can be converted to a new crop that reduces reliance on fossil fuels. Outreach will be through the regional agricultural media and a nonprofit network that reaches a wider audience of consumers and farm activists. $15,000

FNE11-715 A mechanical hops picker for small-scale acreage *Larry Fisher, Foothill Hops, Munnsville NY*
Hops are a valuable crop that can be profitable on small acreage, but there is a lot of labor involved in hand-picking the crop and the harvest window is very short. Right now, mechanical hops harvesters are large, immobile, and unsuitable for sharing across multiple small farms; to address this gap, the farmer has spent several years developing and refining a mechanical harvest prototype suitable for a small farm. The farmer will refine his design for a small-scale hops harvester that can be manufactured in small quantities and offer detailed plans, including materials, costs, labor, and other key information. He will then track the number of harvesters purchased or built by others using his plans, and outreach will be through grower networks, conferences, and prototype demonstrations. $14,770

FNE11-717 A multipurpose tool for small farmers *Fred Forsburg, Honeyhill Farm, Livonia NY*
Garlic grown on small farms is generally planted by hand, which is labor intensive, and the farmer has developed a prototype garlic planter platform tool to address the time and effort involved in planting cloves each fall. Early results show a fivefold increase in planting speed and dramatic labor reductions. To refine the multifunctional design for maximum simplicity, affordabil-

NE SARE AT A GLANCE

What they do
SARE offers competitive grants to projects that explore and address key issues affecting the sustainability and future economic viability of agriculture. The program is authorized under Subtitle B of Title XVI of the Food, Agriculture, Conservation, and Trade Act of 1990.

Where they do it
The Northeast region is made up of Connecticut, Delaware, Maine, Massachusetts, Maryland, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, West Virginia, Vermont, and Washington, D.C. There are three other SARE regions--West, South, and North Central.

Grant offerings
Northeast SARE offers two different tiers of grant funding.

Projects with smaller budgets
One tier is for projects with smaller budgets (from $1,000 to $15,000) that normally run a year or two. This currently includes Farmer, Partnership, Sustainable Community, and Graduate Student grants.

Projects with larger budgets
The other tier is for large projects with larger budgets, often in the $35,000 to $250,000 range, depending on the complexity, duration, and performance targets of the project. This currently includes Research and Education, Professional Development, and Agroecosystems grants, although we aren't accepting Agroecosystems proposals right now.

These projects are awarded using an outcome-based approach and focus on developing and delivering training in sustainable agriculture, conducting research, and working cooperatively with farmers to test new sustainable techniques.

These larger grants normally run two to four years, and the application process involves submitting a preproposal.

A description of each grant offering, and more information about applying, can be found on their website: http://nesare.org/.

Mountains Out of Molehills (continued)

ity, and ease of use, the farmer will build and test a general base unit and garlic-specific and potato-specific platforms, and he will then work with an engineer to develop plans, costs, and material lists. Testing will include measuring performance, ease of operation, safety, adjustability, and other refinements, and outreach will be through farm field days, demonstrations, workshops, and the agricultural media. $13,021

FNE11-722 Growing scab-free apples without fungicides *Louis Lego, Elderberry Pond Farm, Auburn NY*
Apple production is very difficult without organic or chemical fungicides to control scab, but these applications are costly, time consuming, and can affect beneficial insects and soil health. The farmer will test whether intensive mowing, vacuuming, and pruning can reduce or eliminate scab in an orchard with mixed resistance planted on a wider grid for improved air circulation. The goal is to test a combination of a farmer design for improved vacuuming and an OMRI-approved compost to speed decomposition of remaining orchard debris, and then compare resulting leaf and fruit health against controls. Outreach will be through workshops, both at conferences and on the farm, papers and presentations, and via the farm website. $6,732

FNE11-723 Investigating effects of beneficial microbial inoculants on potatoes *Marina Machahelles, Shoving Leopard Farm, Red Hook NY*
Research indicates symbiotic relationships between certain plants and certain nitrogen-fixing bacterial and fungal mycorrhizae that can promote fertility. The farmer will test a mix of beneficial inoculants against a control to see if these treatments affect the emergence, growth, leaf sap, texture, flavor, and tuber Brix of Red Norland potatoes, and track whether improved yield and quality will improve income. Outreach will be through grower websites and newsletters, farmer education events, and the farm's website and newsletter. $3,798

FNE11-724 Organic Brussels sprouts in the Northeast: Variety, pest control, and storage trials *Robin Ostfeld, Blue Heron Farm, Lodi NY*
Brussels sprouts are in high demand from the first frost to December, but they are prone to problems with yield, quality, disease, and aphids, depending on conditions. The farmer will grow six varieties new to the farm to evaluate their disease and heat resistance and storage characteristics; a seventh variety that has been grown before will be tested separately for response to Neem and Safer against an untreated control. The overall goal is to gather more information on production performance and losses across many varieties, and then summarize the results in a format other farmers can use. Outreach will be through an organic newsletter, a university farm quarterly, and the farm website; if the results warrant it, she will also seek opportunities to present at grower conferences. $6,134

FNE11-725 Increasing maple productivity through dropline and spout replacement *Michael Parker, Parker Family Maple Farm, West Chazy NY*
Research on new designs for spouts and tubing used in maple production have been conducted in controlled settings on a limited scale, and the farmer will conduct real-world, larger-scale trials of these emerging devices that may improve sap yield. Building on information gathered in 2010, the farmer will map and label the different mainline and tubing systems over nine separate sugarbushes, each with its own tank, and track yield, sugar concentration, and vacuum levels. He will also calculate the labor and other costs to determine optimal configurations. Outreach will be through research and extension, producer media, producer conferences and workshops, and a webinar. $6,920

ONE11-133 Identification, characterization, and management of an emerging mastitis pathogen, Lactococcus lactis, subspecies lactis *Michelle Barrett, Keseca Veterinary Clinic, Geneva NY*
Mastitis costs farmers about $1.8 billion in lost sales, and a new pathogen has emerged in western New York. Initially overlooked, the strain may correlate to cows that respond poorly to treatment; testing for this pathogen is also expensive. The project manager will see if there is a simpler and more cost-effective way to identify the presence of the bacteria and, at the same time, establish its prevalence, possible prevention, and sensitivity to antimicrobials. The goal is to build a foundation of knowledge about Lactococcus, and outreach will be through an existing veterinary practice, grower associations, milk industry professionals, and national conferences. $14,445

ONE11-134 Evaluating overall health and physical movement of dairy heifers in confinement vs. management intensive grazing *Fay Benson, Cortland County Cornell Extension, Cortland NY*
More understanding of the health effects of managed intensive grazing will likely support more farmer transition, and the project manager will compare the overall health of three groups of 60 heifers on managed grazing to heifers of comparable age in confinement, specifically evaluating conception, longevity, milk production, and health issues. He will also use an new wireless pedometer to measure heifer movement, and results will be available through winter meetings, print media, and on the web. $11,650

ONE11-135 Customer identification and communication education for scale-specific commodities *Laura Biasillo, Cornell Cooperative Extension of Broome County, Binghamton NY*
New and small-scale farmers can benefit from growing for niche and local food markets, but often need enterprise-specific information on how to reach customers and the key components of a marketing plan. The project manager will work with seven farms doing some form of direct marketing to assess current effectiveness, customer perceptions, and the overall communications and marketing plan for each enterprise. The goal is to improve sales, income, and customer relations, and outreach will be through extension, conferences, a training video, educational handouts, and the media. $14,986

ONE07-138 Integrating ground cover crops and new herbicide strategies (conventional and organic) for tree growth and soil health *Deborah Breth, Cornell Cooperative Extension Lake Ontario Fruit Program, Albion NY*
High-density orchards of up to 2000 trees per acre have production challenges specific to ground covers, resistant weed management,

Mountains Out of Molehills (continued)

residual pollution, tree vigor, and soil health in restricted root systems. The project manager will adapt existing research on semi-dwarf trees to high-density systems and measure the effect of different ground covers and herbicides on tree growth, health, and production. Outreach will be through summer tours, winter fruit schools, a statewide growers conference, an extension newsletter, and the agricultural media. $15,000

ONE11-142 Control of spider mites in eggplants and thrips in sweet peppers using guardian plants and predators
Carol Glenister, IPM Laboratories, Inc., Locke NY
Beneficial insects and mites are effective in controlling thrips in greenhouse peppers because pepper flowers support continuous reproduction of predator species and marigolds can be used to attract the thrips before the peppers begin to flower. The project manager will now take these techniques out of the greenhouse and into the field, and she will also follow up on a preliminary trial that indicated that beans can be an effective guardian plant against spider mites in eggplant. Outreach will be via twilight meetings, fliers, presentations at grower meetings, and through resources and results posted to the web. $13,275

ONE11-143 Preventing erosion of muck soils by reducing tillage in onion production, part II *Christine Hoepting, Cornell Cooperative Extension Regional Vegetable Program, Ithaca NY*
Erosion of muck soils in conventional tillage can carry off a foot of soil every ten years, affecting the environment and long-term sustainability. Building on a previous award, the project manager will evaluate critical improvements needed for commercial onion production using minimum till, combined with the optimal use of cover crops, to evaluate nutrient availability, the potential to reduce the need for fertilizer, and the use of in-furrow fungicides to minimize losses from damping off. Outreach will be through the local media, a statewide grower conference, extension, the web, and an international grower magazine. $15,000

ONE11-144 Determining the potential for organic material use in Northeast commercial pear production *Peter Jentsch, Cornell, New York State Agricultural Experiment Station, Hudson Valley Lab, Highland NY*
Pear psylla and leaf spot are two major pests in pears, causing defoliation in smaller fruit, reduced quality and yield, and the premature decline or death of trees. Synthetic insecticides can trigger resistance, but two newly developed OMRI treatments--a kaolin product and a refined horticultural oil--have performed well in recent experiment station studies. The project manager will see if these OMRI products can augment commercial pest management tools in an on-farm setting, and will also compare and evaluate spray nozzles for drift. Outreach will be through a web-based video, field meetings, and winter fruit schools. $14,778

ONE11-145 Development of marketing channel assessment tools for livestock producers *Matthew LeRoux, Cornell Cooperative Extension, Tomkins County, Ithaca NY*
Livestock and value-added dairy farmers in the local food movement use several different direct and wholesale marketing channels, and these farmers have joined with the project manager to identify six factors in marketing performance, quantified in a way that avoids making heavy demands on farm recordkeeping. The project manager will test and refine these marketing assessment tools on four farms, and outreach will be in the regional agricultural media, through producer events and conferences, and through case studies prepared for each participating farm. $12,162

ONE11-149 Managing garlic bloat nematode using biofumigant cover crops *Crystal Stewart, Cornell University, Johnstown NY*
Garlic bloat nematode reduces yield and quality of food-grade garlic and infested garlic can't be sold as seed, an important market for many growers. Infestation can range from minor to devastating, with up to 80 percent crop loss. The project manager will test the effectiveness of sorghum-sudangrass and mustard in eliminating the nematode from the soil and also determine how long the nematode survives in the soil without a host plant. Outreach will be at winter grower meetings, a garlic festival, e-mail, a handout, and the agricultural media. $14,988

ENE11-120 Soil management in berry crops as a model for management education *Marvin Pritts, Cornell University, College of Agriculture and Life Sciences, Ithaca NY*
Commercial berry growers do not always embrace the established guidelines for analysis-based fertilizer use or improved soil health practices, even though research confirms the benefits are significant. At the same time, extension educators are often asked to cover practices outside their specific areas of expertise, and there is currently no single, comprehensive resource on berry crop soil management for them to draw on. The project manager will provide in-depth berry crop and soil management training to educators throughout the Northeast and will also develop a consolidated web-based resource for farm service providers that emphasizes a whole-farm approach to nutrient management specific to commercial berries. Of the 50 educators who participate in the training, 15 will develop and deliver outreach on this topic, reaching 150 growers who manage 750 acres of berry crops; 50 growers will benefit from nutrient testing and one-on-one consultation and will subsequently adopt analysis-based fertilization and soil health practices. $78,534

LNE11-307 Potassium and sulfur management of alfalfa: Farmer-driven testing of management methods *Quirine Ketterings, Cornell University, Ithaca NY*
Potassium (K) and sulfur (S) are key nutrients, but it's not clear whether K and S applied with manure in corn years will suffice during subsequent alfalfa years in a rotation, or how best to test if K and S are needed. The project manager will build on current research by adding field-testing for K, S, and micronutrients in alfalfa over two years, do stand assessment, and evaluate impact so that participating farmers can manage K and S more efficiently, with a potential savings of $100 an acre or more. Of the 300 farms surveyed at the end of the project, 90 will express an interest in improved K and S management and ten will use their newly gained skills in alternative management

Mountains Out of Molehills (continued)

practices. $119,984

LNE11-308 Precision feed management for improved profitability and environmental stewardship in Yates County NY
Peter Landre, Cornell Cooperative Extension of Yates County, Penn Yan NY
Precision feeding on dairy farms can protect water quality and while improving herd health, milk yield, and operating costs. The project manager will offer benchmarks and spreadsheets that allow farmers to track feed nitrogen and phosphorus inputs, feed costs, milk production, herd health, forage intake, and manure management, and then quantify income over feed costs and nitrogen and phosphorus efficiencies over time. As a result, 20 farmers will adopt precision feeding for 1,200 dairy cattle, improving profits by 5 percent, while decreasing environmental nitrogen by 443,250 pounds and phosphorus by 42,750 pounds. $69,672.

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Blueberries and Your Health: Scientists Study Nutrition Secrets of Popular Fruit

Marcia Woods, USDA-ARS

No doubt about it. America loves blueberries. We each eat about three times more fresh blueberries today than we did 10 years ago.

Blueberries pack a lot of nutritional punch: They're low in calories and rich in vitamin C.

Studies by Agricultural Research Service scientists are expanding our science-based knowledge of this plump little fruit. The research, conducted primarily with laboratory animals or cell cultures, may provide a useful foundation for follow-up studies with humans. Such clinical trials are essential in order to determine whether responses to blueberry compounds observed in lab animals or cells also occur in people.

Hamster Study Examines Blueberries and Cholesterol

ARS chemist Wallace H. Yokoyama, for example, is studying gene-based mechanisms that may explain cholesterol-lowering effects seen in laboratory animals. He is with the agency's Western Regional Research Center in Albany, California.
Yokoyama, along with former postdoctoral research associate Hyunsook Kim at Albany and chemist Agnes M. Rimando, at Oxford, Mississippi, collaborated in a recent study using laboratory hamsters. "Hamsters make a good model for our research because they, like us, can develop high cholesterol from eating high-fat foods," says Yokoyama.

At ARS's Western Regional Research Center in Albany, California, chemists Wallace Yokoyama (left) and Glenn Bartley use real-time PCR to analyze the activity of lab animal genes that may affect cholesterol level.

All the hamsters were fed high-fat rations. For some of the animals, the rations were supplemented with one of three different kinds of blueberry juice byproducts: blueberry skins (peels) left over after the berries were pressed for juice and then freeze-dried for the experiment; fiber extracted from the peels; or natural compounds known as "polyphenols," also extracted from the peels. Blueberry polyphenols give the fruit its purple, blue, and red coloration.

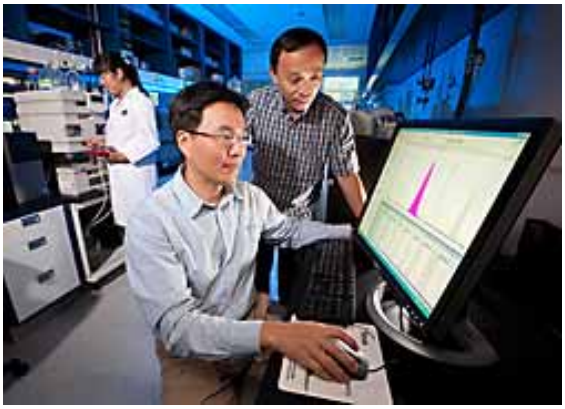
In an article published in a 2010 issue of the *Journal of Agricultural and Food Chemistry,* the scientists reported that all the hamsters that were fed blueberry-enhanced rations had from 22 to 27 percent lower total plasma cholesterol than hamsters whose feed wasn't spiked with blueberry juice byproducts.

Levels of VLDL (very low density lipoprotein)—a form of "bad" cholesterol—were about 44 percent lower in the blueberry-fed hamsters.

To learn about the genetic mechanisms responsible for these effects, the scientists used a procedure known as "real-time reverse transcription polymerase chain reaction." The approach allowed them to pinpoint differences in the level of activity of certain liver genes, referred to as "differential expression."

Why the interest in liver genes? In hamsters—and humans—the liver both makes and breaks down cholesterol. "Assay results suggest that activity of some liver genes that either produce or use cholesterol resulted in the lower blood cholesterol levels," says Yokoyama. "This

Blueberries and Your Health: Scientists Study Nutrition Secrets of Popular Fruit *(continued)*



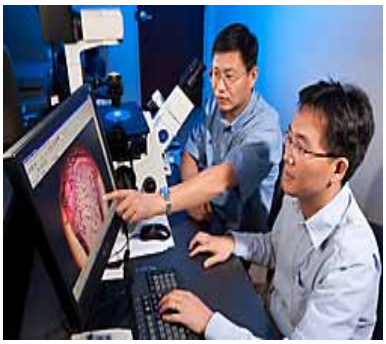
At the Arkansas Children's Nutrition Center, Little Rock, Arkansas, left to right, postdoctoral research associate Jie Kang, investigator Xianli Wu, and research assistant Yudong Tong use HPLC-MS to analyze blueberry compounds and the biomarkers related to atheroprotective effects of blueberries.

study is, to the best of our knowledge, the first published account of cholesterol-lowering effects in laboratory hamsters fed blueberry peels or fiber or polyphenols extracted from those peels."

Not all pieces of the cholesterol puzzle are in place. The researchers don't yet know which berry compound or compounds activated the liver genes, or which parts of the berry have the highest levels of these compounds. Yokoyama's ongoing research may answer those and other questions.

Blueberries Help Mouse Cardio Health, Too

High cholesterol can increase risk of cardiovascular disease—America's number-one killer. At the Arkansas Children's Nutrition Center (ACNC) in Little Rock, Xianli Wu is determining whether compounds in blueberries are involved in reducing risk of atherosclerosis. Wu is a principal investigator at the center, head of its Analytical Laboratory, and a research assistant professor with the University of Arkansas for Medical Sciences—also in Little Rock.



At Little Rock, Arkansas, investigators Jin-Ran Chen (left) and Xianli Wu use a fluorescent microscope to view inside a rat bone in studies to evaluate the effects of blueberries on bone function.

Atherosclerosis is sometimes described as "hardening of the arteries." It can set the stage for two leading forms of cardiovascular disease—heart attack and stroke.

Atherosclerosis is characterized by unhealthy deposits of fats (lipids) inside blood vessels. These deposits form lesions known as "plaques" and can increase risk of cardiovascular disease.

Wu has chosen, as his research model, laboratory mice that are predisposed to developing these atherosclerotic plaques. Medical researchers worldwide regard the plaques developed in this mouse model as similar to those that can form in human arteries.

In a 2010 issue of the *Journal of Nutrition,* Wu and co-investigators suggest that, based on their studies in mice, blueberries may play a role in reducing the formation of atherosclerotic plaques.

"Our study provides the first evidence of its kind that blueberries can help prevent atherosclerotic plaques from increasing in size in arteries of laboratory animals," says Wu. Specifically, Wu's team compared the size, or area, of plaques in 30 of the mice. Half of the animals were fed rations that included freeze-dried whole blueberries in the form of a powder. Rations for the other mice didn't contain the berry powder.

The researchers measured the size of plaques in the aorta, the large artery that—in mice and humans—extends from the heart to other, smaller arteries, transporting oxygen-rich blood.

Plaque area, measured at two aortal sites, was 39 and 58 percent less in the blueberry-fed mice than in those not fed the blueberry powder.

Now, Wu's group wants to uncover the mechanisms that played a role in control of plaque size in the research animals. His team's real-time polymerase chain reaction tests and other assays suggest that antioxidant enzymes may be involved.

As their name suggests, those enzymes help counteract oxidative damage caused by molecules known as "free radicals."

The results showed that levels of genes associated with four of these enzymes, and the activity of the enzymes themselves, increased in the

Blueberries and Your Health: Scientists Study Nutrition Secrets of Popular Fruit (continued)

blueberry-fed mice.

Wu collaborated in the investigation with Little Rock colleagues, including Thomas M. Badger, ACNC director and professor at the University of Arkansas for Medical Sciences, and Shanmugam Nagarajan, a principal investigator at ACNC and associate professor at the university.

"It's already known that oxidative stress can increase atherosclerosis risk," says Wu, "so the beneficial interactions of blueberries with these antioxidant enzymes are of interest to us. Since our center specializes in children's nutrition research, we also want to determine whether blueberry-based interventions early in life could prevent atherosclerosis from developing in later years. If Mom eats blueberries during her pregnancy and feeds blueberries to her child, would that have a protective effect for the child? We don't know, but that's something we'd like to determine."

Can Blueberries Fight Breast Cancer?

Mom's nutrition and its effects on baby are also of interest to colleague Rosalia C. M. Simmen, a senior investigator who leads ACNC's Breast Development Laboratory and who is also a professor at the university. Her studies of mammary gland development in laboratory rats may help medical researchers who are studying breast cancer, a leading cause of cancer-related deaths in women.

Simmen and coinvestigators determined that several indicators of rat mammary gland health were improved in the offspring (pups) of mothers (dams) that had been fed 5-percent blueberry powder in their rations during pregnancy and during the weeks that they nursed their pups. The powder comprised 5 percent of the total weight of the feed.

Simmen's team evaluated several structural indicators of normal mammary gland development, including branching of the gland. There was significantly more branching in the offspring of the 5-percent group than in offspring of dams fed rations containing 2.5-percent or 10-percent blueberry powder.

"Branching occurs when cells specialize or differentiate," says Simmen. "Differentiation is generally preferable to rapid proliferation of undifferentiated cells, which can be a risk factor for breast cancer."

The team also analyzed several biochemical indicators and found, for instance, that the level of a tumor-suppressing protein, PTEN (which stands for "phosphatase and tensin homolog deleted in chromosome 10") was significantly higher in mammary tissues of offspring of dams on the 5-percent regimen. That's a plus, because PTEN is thought to help protect against cancer.

In contrast, *decreases* in PTEN "are associated with development of many kinds of cancers in humans," Simmen explains.

"The 5-percent regimen was sufficient to significantly influence mammary gland health," Simmen points out. "The effect was lost with the higher, 10-percent blueberry rations."

Lab animal studies of blueberries' potential role in preventing breast cancer date back to 2006. But Simmen's investigation, published in *Nutrition Research* in 2009, provides the first evidence, from a lab animal study, of the early influence that the mother's blueberry consumption can have on normal, healthy development of the mammary gland in her offspring.

Simmen collaborated in the research with Xianli Wu; Ronald L. Prior, formerly a chemist and principal investigator with the center; and Ph.D. student Omar Rahal.

The effects noted in the study have not been shown in humans and have not yet been traced to a particular blueberry compound. But if the findings indeed turn out to hold true for humans, they would suggest that "maternal diet and, specifically, fruit consumption, can change the course of breast development in offspring," according to Simmen. "The study provides strong support for the idea that early exposure, even in the womb, to healthy eating may profoundly affect the health of the unborn child. In short, you are what your mother eats."

In Lab Rats, Blueberries Help Build Strong Bones

If you were asked, "What foods build strong bones?" blueberries might not be the first food that comes to mind. But color-imparting polyphenols might turn out to have a powerful effect on formation of strong, healthy bones.

This idea is being explored by Jin-Ran Chen, M.D., and his ACNC colleagues. Chen is a principal investigator and lead scientist in the Skeletal Development Laboratory at the center and is an assistant professor at the university. He specializes in research on how what we eat, during infancy, childhood, and early adulthood affects growth and development of our bones and our risk of developing osteoporosis or

Blueberries and Your Health: Scientists Study Nutrition Secrets of Popular Fruit (continued)

A weakening of bone that can lead to painful deformities, osteoporosis affects an estimated 10 million Americans. Another 34 million are at risk of developing the disease.

Chen's recent studies with young, rapidly growing laboratory rats suggest that blueberries might aid in building strong bones. The work has paved the way for new studies that might reveal whether blueberries could, in the future, be used in treatments to boost development of peak bone mass and to help prevent osteoporosis.

Published in the *Journal of Bone and Mineral Research* in 2010, the investigation showed that animals fed rations that contained 10 percent freeze-dried blueberry powder had significantly more bone mass than their counterparts whose rations were blueberry free.

Exploring further, the researchers exposed laboratory cultures of bone-forming cells (osteoblasts) to blood (serum) from the animals. Serum from the blueberry-fed rats was associated with an increase in development of osteoblasts into mature, functional bone cells.

Serum in the blueberry-fed rats was high in phenolic acids, derived from blueberry polyphenols. The research suggests that the phenolic acids are responsible for the bone-building effects documented by the scientists.

Chen's team has also found a potential mechanism of action, or sequence of steps, by which blueberry-derived phenolic acids stimulate bone building in the rats. Their tests suggest that the pathway involves, for example, two genes, *TCF* and *LEF*, and a protein, beta-catenin. Beta-catenin is responsible for prompting osteoblasts to become mature and functional. *TCF,* or T-cell factor, and *LEF,* or lymphoid-enhancer binding factor, are responsible for promoting synthesis of beta-catenin.

Agricultural engineer Rebecca Milczarek prepares for a taste test of blueberry placebo powder that looks, tastes, and smells the same as freeze-dried blueberry powder. The placebo was developed for use as a standard in human nutrition studies

Chen's collaborators in the study included Badger and Wu; and ACNC principal investigators and university faculty members Martin J. J. Ronis and Kartik Shankar.

The idea that blueberries may help to reduce our risk of disease, in ways yet unproven, continues to intrigue nutrition researchers across the country and around the world. As this array of lab-animal and cell-culture studies demonstrates, ARS scientists are no exception. Researchers, and blueberry's many fans everywhere, await the outcome of follow-up studies—with volunteers—that will clearly define the blueberry's role in improving our health.

This research supports the USDA priority of improving children's nutrition and health and is part of Human Nutrition (#107) and Quality and Utilization of Agricultural Products (#306), two ARS national programs described at www.nps.ars.usda.gov.

New Blueberry Powder Placebo: A Boon for Nutrition Research

Let's say you volunteer for a study of blueberries and your health. You and your fellow volunteers might be handed little packets of a sweet-tasting, purple-blue powder to sprinkle on your breakfast cereal.

You'll know, at the start of the study, that the powder some of you will be given is made of fresh, whole blueberries that have been freeze-dried. Other packets, for the rest of you, will have an imitation—a look-alike powder that serves as a placebo.

Thanks to Agricultural Research Service scientists in Albany, California, there's a new placebo that is the first to capture the look, taste, texture, and aroma of real blueberry powder.

The placebo is the work of Tara H. McHugh, a food technologist and research leader of the ARS Processed Foods Research Unit, and colleague Donald A. Olson, a support scientist in McHugh's team. Both are with the ARS Western Regional Research Center in Albany. (*Blueberry powder on vanilla yogurt, right)*

A few years ago, the Folsom, California-based U.S. Highbush Blueberry Council, which administers marketing and research programs for growers and importers of blueberries, sought McHugh's help in developing a new placebo that would match the Council's own freeze-dried

Blueberries and Your Health: Scientists Study Nutrition Secrets of Popular Fruit *(continued)*

blueberry powder. “Now we can offer the placebo to scientists who are using our blueberry powder in research that we fund,” says Leslie Wada, a registered dietitian and research administrator for the Blueberry Council.

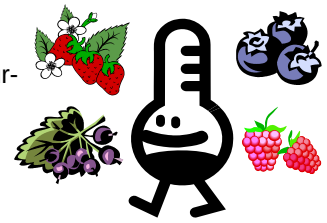
For some scientific investigations, a powder may be a better choice than fresh, whole berries. “Using a powder can help eliminate some of the natural variation that can occur in fresh berries from one harvest to the next as well as from region to region,” says Wada. “Though such variation may be minor, the uniformity of a standard powder may provide a more consistent, scientifically sound basis of comparison among results from different research institutions.

“Placebo-controlled studies are the gold standard in human nutrition research. Now there’s a superior placebo for pairing with our blueberry powder in this kind of research.”

The placebo is already being used in studies with elderly volunteers to determine the effects of blueberries in counteracting age-associated changes in brain function

Student intern Bumjeun Kim (left) and food technologist Don Olson prepare the blueberry placebo for packaging.

June Berry Barometer – *Cathy Heidenreich, Cornell University*



This from the June 3, 2011 Cornell Chronicle, **“Soggy April And May Breaks Rain Records in Nine Cities**. April and May were the wettest on record for nine cities in the Northeast and mid-Atlantic, reports climatologist Jessica Rennels of Cornell's Northeast Regional Climate Center. More than a foot of rain fell during the two months in Huntington, W.Va.; Burlington, Vt.; Williamsport, Pa.; Binghamton, N.Y.; Erie, Pa.; Harrisburg, Pa.; Buffalo, N.Y.; and Ithaca, N.Y. The other record-setting city in April and May was Rochester, N.Y., which had just less than 11 inches of rain. "A repeated pattern of frontal systems bringing rain and strong thunderstorms producing heavy rainfall has contributed to these record-breaking months," said Rennels. In the same period, Washington, Boston and some other cities in the region went through a dry spell.”

Is it any wonder that confusion is the order of the day this season? Berry growers, small fruit crops and berry pests alike were strongly impacted by the extremely wet start to the 2011 season. All three have been equally unpredictable in their response(s) to the deluge. Bloom was delayed/extended in some cases; fruit set seemed sporadic/erratic. Pollination – was it good or bad?! Diseases seemed to be favored; arthropod pests some numbers up, some down, some suffered a delay of game from the cold wet weather. Some growers were unable to finish winter pruning, make early season pest management applications, or get new plantings into the ground in a timely fashion.

“I’ve never seen berries do this before” one grower after another tells me by phone or e-mail. Pictures of berry problems and samples pouring in: “Is this a nutrient deficiency brought on by too much rain?!” “Couldn’t spray for 10 days – fields too wet, rain falling every day – missed the early bloom window – just look at that _____ (you fill in the disease). “ Just made an application and the sky opened up… 1.5” in a couple of hours – now what should I do?!”

The news isn’t all bad however – for the first time in many years and in many areas of the state, no frost protection was needed during

B

June Berry Barometer – (continued)

strawberry bloom. We're still on track for the most part in terms of degree days and phenology. Strawberries are in harvest across the state, raspberries in fruit set, blueberry fruit sizing. Growers are reporting good strawberry crops in most areas (apart from some problem fields that suffered standing water). Berry size, yields, flavor good, no serious fruit rot issues so far, berries selling well. Prices so far have ranged from $3.50 to $6/quart with an average price in most locations of $4 to $4.50/qt.

ALL BERRY CROPS:

Fertilization – Hopefully you have completed those split applications for established blueberries, currants, gooseberries, and raspberries.

Weed management – Hand-weeding or spot applications to control weeds. Get out that wick wiper, flame thrower, 2-gallon garden sprayer and walk those plantings- spot treatments now can prevent major problems later!

Pest management –There's more rain in the forecast for this month. Be sure to re-apply if you had an instance of more than 1.5 to 2 inches of rain. Check preharvest intervals and REI's for any materials to be applied as harvest is either ongoing or right around the corner for most crops. Need help in identifying the culprits? Check out the berry diagnostic tool (http://www.fruit.cornell.edu/berrytool/ Need help with management strategies? See the berry pest management guidelines for control strategies (http://ipmguidelines.org/BerryCrops/).

Irrigation –. Seems like an unlikely topic given the extremely wet spring but remember it's the current soil moisture content and weekly accumulation you need to be tracking. Keep water on berry crops as needed during fruit development and harvest. Strawberries and blueberries typically need 1-2 inches of water per week either in the form of rain or irrigation.

Wildlife – Lots of reports coming in of both the winged and 4 footed kind:

Birds - Those lovely cedar waxwings that avid birders so enjoy are in full migration. They have moved to the top of the Strawberry Public Enemy number one list this month with damage reported from several areas of NY and New England. One grower facing a 15 to 25% crop loss is thinking about throwing in the towel on strawberry production. For best results, be sure to get your bird management tactics in place before fruit starts to ripen. Use more than one tactic at a time and change them up frequently to keep birds off guard. For more information on bird management:

Bye Bye Birdie: Bird Management Strategies for Small Fruit
The Blueberry Bird Problem - Options for Control
Bird Damage Prevention for Northern New England Fruit Growers

Deer – This year's crop of fleet- footed "Bambis" are apparently much less discriminating than usual in terms of their berry crop diet. Damage reports have been received for strawberries, raspberries, blueberries, currants, gooseberries, and hardy kiwifruit. Fencing is one of the most effective management approaches, but is also one of the most expensive. An excellent informational resource on deer management may be found here:

Managing White-Tailed Deer in Suburban Environments: A Technical Guide

Harvest/Post Harvest – Got your market lined up? Your pickers? Plenty of harvest-related supplies in stock? Cold room fired up and ready to go?

STRAWBERRIES:

Established plantings:

Diseases – After the hot weather we experienced last week both anthracnose and gray mold may be an issue. One confirmed report of anthracnose has been received from central NY already. Switch, Cabrio, Pristine, and others have a 0 DTH and 12 hr. REI.

ripening fruit, similar to slug injury. The beetles are about 1/8 inch long and dark brown in color. They are usually found in the holes they've chewed into ripe fruit, but they often drop to the ground when disturbed. The best management strategy for sap beetles is good sanitation. Keep the field free of overripe fruit by picking them thoroughly and regularly. Products labeled for sap beetle management include Brigade with O DTH interval and a 12 hour REI; Assail with 1 DTH and REI of 12 hours and Danitol with 2 DTH and a 24 hour REI.

Other pests reported are root weevils and garden symphylans. Options for root weevil control may be found here: http://ipmguidelines.org/BerryCrops/content/CH06/default-3.asp#_Toc285629425. One product is labeled for use for garden symphylans on strawberry in NYS: Lorsban Advanced EPA No. 62719-591 (http://132.236.168.120/ppds/523825.pdf). For more on biology and management of these pests:

Root weevils –

Strawberry Root Beetles (http://www.ipm.ucdavis.edu/PMG/r734300311.html)
Strawberry Root Weevils (http://pmo.umext.maine.edu/factsht/Strawpro2.htm)
Beneficial Nematodes for Black Vine Weevil Control in Strawberry (http://www.uvm.edu/vtvegandberry/factsheets/blackvineweevil.html)

Garden symphylans

See article on beginning on page 8 for details.

Slugs and Snails – Moist conditions and mulch encourage the presence of slugs. Slugs usually feed at night. Evidence of slug and snail

June Berry Barometer – (continued)

activity includes large holes and tunnels in ripening fruit and shiny slime trails on leaves. Options for slug management may be found in the berry pest management guidelines. Sluggo (iron phosphate), one of the products listed, is an OMRI approved product labeled for organic use. Slugs overwinter in the egg stage. If you have slug problems this season, plan to apply baits to fields in mid-September to reduce egg-laying.

Harvest/Post harvest – See article in this issue by Craig Kahlke for more on this important topic.

New plantings:

Plant establishment – More of the same…runners need good soil contact to root. Keep the 18" planting strip weed free by hand weeding or using cultivation equipment for good runner establishment. Direct runner plants from aisles back into planting row area. Remove blossoms as they open to encourage good plant establishment and growth.

BLUEBERRIES:

Established plantings:

Diseases – If you had mummyberry shoot strikes, blossom and green fruit protection is a must. Anthracnose is the other fruit rot worry for blueberries, especially coming out of a period of warm temperatures and abundant rainfall. See the berry guidelines for more details and management strategies.

Insects and mites– Insects of concern for the petal fall/post bloom period include fruitworms, leafrollers, Blueberry tip borer, and Plum curculio. Blueberry maggot is a concern as fruit begins to turn blue. For more on these insect pests:

Blueberry Fruit Worm Monitoring
Blueberry Maggot Monitoring
Michigan Blueberry Facts - Insects
Cornell Pest Management Guidelines for Berry Crops

New plantings:

Plant establishment – Continue to remove emerging flower buds by rubbing them off between the palms of the hands to promote good plant growth and establishment.

RASPBERRIES AND BLACKBERRIES:

Established plantings:

Diseases – Red and purple raspberries are most susceptible to Gray Mold. Remember the first gray mold spray should go on at 5-10% bloom followed by a second at full bloom. If conditions persist for disease development subsequent applications should follow at 10-14 day intervals. Fungicide options include Cabrio, Captevate, Elevate, Pristine, Rovral, or Switch. Do not make more than 2 sequential sprays of any of these materials; do not make more than one sequential spray with Pristine. Be sure to check PHI restrictions, REI's and maximum allowed rates per season. Hot humid weather may bring out powdery mildew on brambles. Watch undersides of leaves, flower buds, and developing fruit for white powdery mycelium (fungal growth).

Insects and mites –Reports of sap beetle activity are coming in. These insects chew small holes in **Insects and mites–** Insects of concern during late pre-bloom to bloom include Raspberry fruitworm, Raspberry sawfly, Tarnished Plant Bug and Japanese Beetle. Pyrethrins and Sevin have activity against all 4 pests.

Irrigation – Did you know a raspberry plant in summer can use up to ¼" of water per day? Available moisture can be depleted in just a few days after a heavy rainfall. Brambles need a continuous (*but not excessive*) supply of water throughout the growing season – about 1-2" per week.

New plantings:

Plant establishment – Avoid cultivation or herbicides until plants are well-established. Apply a dilute liquid fertilizer once new growth appears.

Irrigation - same as for established plantings.

CURRANTS AND GOOSEBERRIES:

New and Established plantings

Diseases – Watch for leaf diseases such as white pine blister rust (yellow-orange powdery spots), powdery mildew (white powdery spots), or leaf spots (black necrotic spots) on leaves. Be sure to check both upper and lower leaf surfaces.

Insects – Preharvest insects of concern include Gooseberry Fruitworm, Currant Borer, Imported Currant Worm, Japanese Beetles, and Two-Spotted Spider Mites. A report of gooseberry fruitworm has come in from Northern NY so chances are they are out and about further south as well.

Irrigation - Ribes require less water than many other small fruit crops – about ½ -1" per week. On drought-susceptible soils more irrigation may be needed.

Weather Reports

NEW YORK CROP WEATHER SERVICE NOTES

Week ending May 15th: The week began with a cool and dry northerly flow of air around the west side of a low pressure system off the New England coast. This pattern persisted through much of the week and resulted partly to mostly sunny weather across the state. Temperatures averaged close to normal with highs rising into the mid to upper 70's by Thursday. Initially, the northerly flow brought cool air resulting in below freezing temperatures in the North Country on the morning of the 9th and 10th. The growing season does not normally start in this area until around May 25th. An approaching frontal boundary brought cloudiness into the region on Friday with rain developing in some areas late Friday into Saturday especially across northern and western New York. Rainfall varied from over an inch across northern and western areas to less than a quarter inch over the southern tier and southeast part of the state. Strawberry fields looked good. The plants were lush and green, and flower buds and blooms were prolific. In Albany County, strawberries began to bloom.

Week ending May 22nd: A slow moving low pressure system near the Mid-Atlantic region produced periods of rainfall during the entire week. Some thunderstorms developed Thursday and Friday associated with the cut-off low pressure system with very heavy rainfall. The thunderstorms repeatedly moved over the same area resulting in some flash flooding in central and eastern New York. A cold front moved through late Saturday with a brief period of dry weather to close the week. Precipitation was much above normal for the week and temperatures finished close to normal. With the heavy rains, pollinator activity has been minimal.

Week ending May 29th: The week started out fairly dry and cool before a warm front brought isolated showers and thunderstorms Monday night into Tuesday. A warm front lifted north of northern New York and New England on Tuesday. A cold front passed through around Tuesday night with high pressure ridging in south of Hudson Bay with a brief return to seasonable temperatures during the mid week. By Thursday, the cold front lifted north as a warm front with a very active stretch of weather to close the week. Strong to severe thunderstorms impacted much of upstate New York as several waves of low pressure moved along the boundary that became stationary near the St. Lawrence River Valley. The heaviest rainfall from the showers and thunderstorms occurred over the Niagara Frontier, Finger Lakes Region, Adirondacks, and northern New York. The front began to move south of the region by late in the day on Saturday. Precipitation varied widely across the state with the lowest totals across the Capital Region, portions of central New York, and Long Island. Temperatures ended up finishing well above normal for the week. In Ontario County, mold and mildew were problems for strawberries, fruit trees, and grapes. Some ripe strawberries were spotted and growers were picking their first crop over Memorial Day weekend. Also, large leaf spots caused by the fungal pathogen Phomopsis were observed in a strawberry crop being scouted by the IPM program.

Week ending June 5th: A slow moving low pressure system near the Mid-Atlantic region produced periods of rainfall during the entire week. Some thunderstorms developed Thursday and Friday associated with the cut-off low pressure system with very heavy rainfall. The thunderstorms repeatedly moved over the same area resulting in some flash flooding in central and eastern New York. A cold front moved through late Saturday with a brief period of dry weather to close the week. Precipitation was much above normal for the week and temperatures finished close to normal. With the heavy rains, pollinator activity has been minimal.

Week ending June 12th: The week started out with temperatures below normal with some scattered showers ahead of a warm front. Rainfall was very scattered and below a tenth of an inch where it did fall. Once the warm front pushed north of the region Monday well above average temperatures occurred Monday through Thursday with highs well into the 80's and lower 90's. Scattered showers and thunderstorms occurred Wednesday and Thursday ahead of a cold front with many areas receiving a tenth of an inch to a half inch of rain. A cold front tracked through the region late Thursday and early Friday cooling temperatures back to normal, in the upper 70's to lower 80's. The cold front stalled over the region and an upper level disturbance and wave of low pressure tracked through our region later Friday and Saturday. Temperatures were below normal Saturday with highs in the 60's to near 70. Rainfall Friday night through Saturday ranged from a few tenths of an inch in western and northern New York to 1 to 2 inches in eastern and southern New York. Strawberry conditions were 3 percent poor, 23 percent fair, 58 percent good, and 16 percent excellent. In Dutchess and Ulster Counties, golf ball sized hail damaged strawberries, and blueberries. In Albany, strawberry harvest begun on with u-pick operations.

Weather Data for Week Ending Sunday, May 15, 2011

Station	Temperature (°F)				Growing Degree Days Base 50° 1/			Precipitation (Inches) 1/			
	High	Low	Avg	Dep. from Norm	Week	Season	Dep. from Norm	Week	Dep. from Norm	Season	Dep. from Norm
Hudson Valley											
Albany	77	43	60	+4	69	213	+94	0.12	-0.65	5.53	+0.95
Glens Falls	76	40	57	+3	49	145	+57	0.13	-0.69	5.95	+1.27
Poughkeepsie	78	40	60	+3	70	244	+97	0.18	-0.80	5.78	+0.20
Mohawk Valley											
Boonville	75	36	54	+4	35	78	+18	0.54	-0.44	11.41	+4.66
Champlain Valley											
Plattsburgh	75	41	56	+3	45	117	+28	1.01	+0.38	8.98	+4.83
St. Lawrence Valley											
Canton	76	37	56	+4	44	136	+61	1.01	+0.38	8.20	+3.94
Massena	77	41	57	+4	49	134	+48	1.10	+0.54	7.29	+3.44
Great Lakes											
Buffalo	85	43	62	+7	83	192	+82	1.29	+0.59	8.32	+3.98
Wales	82	35	59	+6	63	134	+58	1.42	+0.65	9.35	+3.88
Niagara Falls	81	40	59	+4	64	156	+35	0.64	+0.01	6.97	+2.41
Rochester	81	40	58	+3	61	170	+43	0.76	+0.18	7.28	+3.40
Watertown	77	33	57	+5	50	127	+49	1.20	+0.61	7.97	+4.21
Central Lakes											
Dansville	87	37	62	+8	87	220	+106	0.29	-0.34	6.06	+1.90
Geneva	78	39	59	+5	64	153	+48	0.31	-0.32	8.11	+3.82
Honeoye	86	35	60	+5	69	158	+50	0.45	-0.16	7.15	+2.87
Ithaca	79	34	58	+5	57	146	+57	0.02	-0.69	8.31	+3.89
Penn Yan	78	38	60	+6	72	172	+67	0.10	-0.53	7.02	+2.73
Syracuse	81	40	63	+8	94	244	+119	0.24	-0.46	10.00	+5.11
Warsaw	80	38	57	+6	54	110	+45	0.86	+0.09	9.40	+4.38
Western Plateau											
Angelica	80	37	59	+7	62	138	+74	2.35	+1.73	10.95	+6.87
Elmira	81	34	59	+5	66	165	+67	0.15	-0.55	7.32	+3.16
Franklinville	83	32	57	+7	54	110	+61	2.57	+1.80	10.66	+5.73
Jamestown	83	37	60	+8	69	145	+78	1.37	+0.53	10.00	+4.36
Eastern Plateau											
Binghamton	75	43	58	+5	61	154	+61	0.01	-0.76	10.93	+6.20
Cobleskill	74	38	56	+3	41	121	+40	0.18	-0.61	6.98	+2.02
Morrisville	75	40	57	+5	52	114	+39	0.01	-0.82	8.67	+3.87
Norwich	81	35	57	+3	48	126	+41	0.00	-0.84	9.67	+4.53
Oneonta	78	36	56	+4	42	125	+53	0.12	-0.86	9.69	+4.16
Coastal											
Bridgehamton	71	43	58	+3	55	164	+75	0.18	-0.67	3.36	-2.50
New York	72	52	62	+2	85	298	+74	0.42	-0.44	6.05	+0.36

1/ Season accumulations are for April 1st to date. Weekly accumulations are through 7:00 AM Sunday Morning. Data courtesy NY NASS.

Weather Data for Week Ending Sunday, May 22, 2011

Station	Temperature (°F)				Growing Degree Days Base 50° 1/			Precipitation (Inches) 1/			
	High	Low	Avg	Dep. from Norm	Week	Season	Dep. from Norm	Week	Dep. from Norm	Season	Dep. from Norm
Hudson Valley											
Albany	76	51	61	3	80	293	112	3.73	2.96	9.26	3.91
Glens Falls	76	49	60	3	70	215	77	3.32	2.48	9.27	3.75
Poughkeepsie	78	52	63	3	90	334	119	3.75	2.77	9.53	2.97
Mohawk Valley											
Boonville	74	43	56	3	50	128	33	2.65	1.67	14.06	6.33
Champlain Valley											
Plattsburgh	75	45	57	1	56	173	34	1.96	1.33	10.94	6.16
St. Lawrence Valley											
Canton	73	44	57	2	53	187	69	2.39	1.72	10.59	5.66
Massena	76	44	58	2	61	195	61	1.60	1.04	8.89	4.48
Great Lakes											
Buffalo	73	43	55	-4	42	234	67	2.65	1.95	10.97	5.93
Wales	74	42	53	-3	33	167	47	1.58	0.78	10.93	4.66
Niagara Falls	76	43	55	-4	47	203	22	2.88	2.24	9.85	4.65
Rochester	76	42	56	-3	57	227	40	1.59	0.96	8.87	4.36
Watertown	74	43	57	3	60	187	65	1.43	0.80	9.40	5.01
Central Lakes											
Dansville	80	45	59	2	63	283	112	1.47	0.84	7.53	2.74
Geneva	76	43	57	0	59	218	58	1.43	0.76	8.67	3.71
Honeoye	76	42	56	-3	50	208	44	1.61	0.98	8.76	3.85
Ithaca	76	44	58	3	60	206	69	3.25	2.48	11.56	6.37
Penn Yan	77	44	59	2	63	235	75	1.25	0.58	8.27	3.31
Syracuse	79	50	62	5	88	332	145	1.61	0.88	11.61	5.99
Warsaw	74	39	52	-3	38	148	44	1.57	0.80	10.97	5.18
Western Plateau											
Angelica	76	41	55	-1	43	165	44	1.81	1.11	11.22	6.51
Elmira	79	46	60	4	69	234	83	2.36	1.64	9.68	4.80
Franklinville	76	42	55	3	40	150	69	2.86	2.08	13.52	7.81
Jamestown	76	43	55	2	43	188	82	1.4	0.5	11.4	4.86
Eastern Plateau											
Binghamton	75	47	58	1	57	211	67	2.36	1.59	13.29	7.79
Cobleskill	73	48	58	2	54	173	46	1.76	0.92	8.74	2.94
Morrisville	75	48	58	3	57	171	52	1.57	0.73	10.24	4.60
Norwich	80	51	61	5	78	204	73	2.14	1.30	11.81	5.83
Oneonta	76	51	60	6	70	195	82	3.95	2.97	13.64	7.13
Coastal											
Bridgehamton	73	50	59	2	61	225	84	2.97	2.13	6.33	-0.37
New York	76	51	60	-3	75	373	58	2.80	1.96	8.85	2.32

1/ Season accumulations are for April 1st to date. Weekly accumulations are through 7:00 AM Sunday Morning. Data courtesy NY NASS.

Weather Data for Week Ending Sunday, May 29, 2011

Station	Temperature (°F)				Growing Degree Days Base 50° 1/			Precipitation (Inches) 1/			
	High	Low	Avg	Dep. from Norm	Week	Season	Dep. from Norm	Week	Dep. from Norm	Season	Dep. from Norm
Hudson Valley											
Albany	86	54	69	+9	137	430	+172	0.08	-0.73	9.34	+3.18
Glens Falls	86	52	68	+9	124	339	+137	0.34	-0.50	9.61	+3.25
Poughkeepsie	87	53	69	+8	134	468	+171	0.21	-0.77	9.74	+2.20
Mohawk Valley											
Boonville	80	48	62	+7	86	213	+72	2.07	+1.06	16.13	+7.39
Champlain Valley											
Plattsburgh	78	49	62	+4	87	260	+56	3.41	+2.72	14.35	+8.88
St. Lawrence Valley											
Canton	76	47	62	+5	88	275	+102	1.63	+0.93	12.22	+6.59
Massena	82	47	63	+5	93	288	+94	1.70	+1.11	10.59	+5.59
Great Lakes											
Buffalo	78	52	65	+6	108	342	+104	2.63	+1.88	13.60	+7.81
Wales	77	48	64	+7	96	263	+88	1.87	+1.02	12.80	+5.68
Niagara Falls	76	50	64	+4	97	300	+45	1.21	+0.51	11.06	+5.16
Rochester	80	51	65	+5	107	334	+75	1.34	+0.71	10.21	+5.07
Watertown	78	49	63	+7	96	283	+106	1.01	+0.38	10.41	+5.39
Central Lakes											
Dansville	86	55	71	+12	146	429	+188	1.26	+0.55	8.79	+3.29
Geneva	85	51	66	+8	115	333	+105	1.21	+0.48	9.88	+4.19
Honeoye	86	50	68	+9	128	336	+102	1.17	+0.49	9.93	+4.34
Ithaca	85	48	66	+9	117	322	+124	1.60	+0.81	12.96	+6.98
Penn Yan	86	51	68	+9	126	361	+133	0.67	-0.06	8.94	+3.25
Syracuse	90	52	71	+11	148	480	+219	0.76	-0.01	12.37	+5.98
Warsaw	77	47	63	+8	96	244	+88	2.71	+1.86	13.68	+7.04
Western Plateau											
Angelica	84	50	66	+9	117	283	+107	1.62	+0.89	12.85	+7.41
Elmira	86	48	68	+10	128	362	+145	1.34	+0.57	11.02	+5.37
Franklinville	79	48	65	+11	108	258	+134	1.61	+0.76	15.13	+8.57
Jamestown	80	51	65	+10	109	297	+141	2.00	+1.06	13.40	+5.92
Eastern Plateau											
Binghamton	83	50	66	+8	115	326	+118	2.43	+1.66	15.72	+9.45
Cobleskill	84	49	67	+9	119	292	+107	0.33	-0.55	9.07	+2.39
Morrisville	81	48	64	+8	102	273	+99	1.23	+0.33	11.40	+4.86
Norwich	85	48	65	+8	109	313	+123	1.42	+0.54	13.23	+6.37
Oneonta	87	49	66	+10	115	310	+144	0.75	-0.23	14.39	+6.90
Coastal											
Bridgehamton	79	50	65	+6	103	328	+122	0.24	-0.60	6.57	-0.97
New York	83	53	69	+5	137	510	+90	0.02	-0.82	8.87	+1.50

1/ Season accumulations are for April 1st to date. Weekly accumulations are through 7:00 AM Sunday Morning. Data courtesy NY NASS.

Weather Data for Week Ending Sunday, June 5, 2011

Station	Temperature (°F)				Growing Degree Days Base 50° 1/			Precipitation (Inches) 1/			
	High	Low	Avg	Dep. from Norm	Week	Season	Dep. from Norm	Week	Dep. from Norm	Season	Dep. from Norm
Hudson Valley											
Albany	93	43	70	+7	141	571	+222	0.00	-0.84	9.34	+2.34
Glens Falls	89	43	67	+6	119	458	+178	0.00	-0.78	9.61	+2.47
Poughkeepsie	90	46	70	+7	141	609	+215	0.24	-0.70	9.98	+1.50
Mohawk Valley											
Boonville	83	42	62	+5	87	300	+102	0.21	-0.84	16.34	+6.55
Champlain Valley											
Plattsburgh	89	44	65	+4	104	364	+81	0.08	-0.62	14.43	+8.26
St. Lawrence Valley											
Canton	85	43	64	+4	98	373	+131	0.24	-0.49	12.46	+6.10
Massena	87	40	66	+6	113	401	+134	0.00	-0.66	10.59	+4.93
Great Lakes											
Buffalo	83	47	66	+5	116	458	+134	0.57	-0.25	14.17	+7.56
Wales	86	41	64	+6	102	365	+123	0.55	-0.38	13.35	+5.30
Niagara Falls	86	46	66	+5	114	414	+73	1.00	+0.24	12.06	+5.40
Rochester	91	45	68	+7	128	462	+120	0.46	-0.23	10.67	+4.84
Watertown	86	39	64	+5	97	380	+136	0.05	-0.60	10.46	+4.79
Central Lakes											
Dansville	93	44	71	+9	145	574	+249	0.80	-0.02	9.59	+3.27
Geneva	91	48	68	+7	128	461	+151	0.34	-0.46	10.22	+3.73
Honeoye	90	41	67	+6	121	472	+153	0.78	-0.02	10.44	+4.05
Ithaca	89	40	66	+6	113	439	+137	0.66	-0.18	13.69	+6.87
Penn Yan	91	50	69	+8	136	497	+187	0.38	-0.42	9.32	+2.83
Syracuse	92	48	69	+8	135	615	+269	0.11	-0.70	12.48	+5.28
Warsaw	85	45	65	+7	105	349	+131	1.26	+0.32	14.94	+7.36
Western Plateau											
Angelica	90	41	66	+7	113	396	+152	0.86	+0.06	13.71	+7.47
Elmira	91	40	67	+7	124	486	+190	0.83	-0.01	11.85	+5.36
Franklinville	88	37	64	+8	100	358	+179	1.06	+0.12	16.19	+8.69
Jamestown	89	41	66	+8	114	411	+191	0.74	-0.27	14.14	+5.65
Eastern Plateau											
Binghamton	87	46	66	+6	115	441	+157	0.33	-0.49	16.05	+8.96
Cobleskill	87	45	65	+6	107	399	+143	0.00	-0.96	9.07	+1.43
Morrisville	85	43	62	+4	87	360	+120	0.09	-0.82	11.49	+4.04
Norwich	90	40	64	+4	97	412	+152	0.26	-0.66	13.34	+5.56
Oneonta	88	41	64	+6	101	409	+179	0.07	-0.93	14.79	+6.30
Coastal											
Bridgehamton	81	46	67	+6	121	449	+161	0.47	-0.40	7.04	-1.37
New York	90	56	73	+6	165	675	+134	0.23	-0.61	9.10	+0.89

1/ Season accumulations are for April 1st to date. Weekly accumulations are through 7:00 AM Sunday Morning. Data courtesy NY NASS.

Weather Data for Week Ending Sunday, June 12, 2011

Station	Temperature (°F)				Growing Degree Days Base 50° 1/			Precipitation (Inches) 1/			
	High	Low	Avg	Dep. from Norm	Week	Season	Dep. from Norm	Week	Dep. from Norm	Season	Dep. from Norm
Hudson Valley											
Albany	93	54	70	+6	143	714	+259	2.30	+1.43	11.64	+3.77
Glens Falls	91	50	68	+5	124	582	+210	1.01	+0.24	10.62	+2.71
Poughkeepsie	95	54	72	+7	157	766	+263	1.10	+0.19	11.08	+1.69
Mohawk Valley											
Boonville	86	49	65	+5	104	404	+137	0.62	-0.49	16.96	+6.06
Champlain Valley											
Plattsburgh	94	47	66	+4	116	480	+102	0.76	+0.04	15.19	+8.30
St. Lawrence Valley											
Canton	88	51	67	+6	119	492	+169	0.85	+0.08	13.31	+6.18
Massena	89	52	70	+9	142	543	+187	0.21	-0.49	10.80	+4.44
Great Lakes											
Buffalo	84	56	70	+6	141	599	+175	0.19	-0.65	14.36	+6.91
Wales	86	52	67	+7	123	488	+166	0.47	-0.51	13.82	+4.79
Niagara Falls	87	53	70	+6	140	554	+112	0.30	-0.51	12.36	+4.89
Rochester	91	56	72	+9	153	615	+178	0.00	-0.70	10.67	+4.14
Watertown	85	46	67	+7	122	502	+179	0.87	+0.17	11.33	+4.96
Central Lakes											
Dansville	95	55	74	+11	169	743	+320	0.71	-0.20	10.30	+3.07
Geneva	92	53	70	+7	143	604	+199	0.72	-0.15	10.94	+3.58
Honeoye	92	51	70	+7	145	617	+199	0.72	-0.15	11.16	+3.90
Ithaca	92	49	70	+8	141	580	+220	0.67	-0.21	14.32	+6.62
Penn Yan	94	55	72	+10	156	653	+248	0.28	-0.59	9.60	+2.24
Syracuse	97	54	70	+10	159	774	+331	0.12	-0.74	12.60	+4.54
Warsaw	85	51	66	+6	117	466	+174	0.65	-0.35	15.59	+7.01
Western Plateau											
Angelica	92	48	69	+8	133	529	+204	0.87	+0.03	14.58	+7.50
Elmira	93	48	71	+9	148	634	+246	1.03	+0.16	12.88	+5.52
Franklinville	88	49	69	+10	131	489	+244	0.60	-0.39	16.79	+8.30
Jamestown	91	51	70	+9	138	547	+252	0.68	-0.38	15.87	+6.32
Eastern Plateau											
Binghamton	91	55	71	+9	147	588	+215	1.37	+0.53	16.42	+8.49
Cobleskill	90	50	67	+6	120	519	+180	1.93	+0.95	11.00	+2.38
Morrisville	87	52	66	+6	117	477	+160	1.22	+0.24	12.71	+4.28
Norwich	93	48	69	+8	136	547	+206	1.20	+0.22	14.54	+5.78
Oneonta	91	48	68	+9	131	540	+234	0.62	-0.36	15.41	+5.94
Coastal											
Bridgehamton	89	55	70	+7	142	591	+207	1.89	+1.02	8.93	-0.35
New York	97	57	75	+6	178	847	+170	0.89	+0.08	9.99	+0.97

1/ Season accumulations are for April 1st to date. Weekly accumulations are through 7:00 AM Sunday Morning. Data courtesy NY NASS.

Garden Symphylans (continued from page 8)

Symphylans are commonly found in fine-textured heavy soils, rather than sandy soils, unless these have been heavily amended with organic matter, and often occur on ridges or high areas of the field. Symphylans may also be commonly found in alluvial soils and are spread by flooding. Hot spots in fields occur, and often remain relatively consistent from year to year with little to no lateral spread, depending on the soil type.

Soil pH doesn't not appear to affect occurrence of garden symphylans; they have been found in very acid soils (i.e. blueberry soils) to relatively alkaline soils (pH 8 or higher).

Damage: Symphylans feed on germinating vegetable and weed seeds, roots and root hairs of plants. Sometimes feeder roots are completely cut off by symphylan feeding, leaving brown stubs were the roots should be. Feeding on roots interferes with plant growth and yield, and causes plant stunting.

Damage may also lead to wilting on warm days and in some instances, plant death. Symphylans sometimes chew holes in larger roots, underground tubers (like potatoes) and strawberry fruit. Damage may also occur to above ground plant parts in contact with soil. Chewing injuries then become infection courts for soil-borne diseases. *(Above, plant stunting and death of whole row sections caused by symphylan feeding).*

Detection and Management: Three types of sampling have been used for symphylans and are summarized briefly in Table 3. The indirect method is used primarily for determining presence/absence of symphylans in fields. Soil and bait methods are used for determining population levels

Garden Symphylans (continued)

Table 3: Sampling for symphylans

Indirect Sampling Method	Soil Sampling Method	Bait Sampling Method
Comparison of plant growth	Sample location: top 6 to 12" soil	Soil surface
Observe plant growth.	Best sample timing: warm, moist soil prior to tillage	2 to 3 weeks after tillage, but before plants are established.
Dig up 5 to 10 damaged plants to detect symphylan presence in fields	Typical sampling units: 1 ft cube of soil; 6" square, 1 ft deep of soil; or a "shovelful". Several sample sites per field for a total of 35 soil samples	Place cut potato or beet half on soil surface; cover with protective cover (4" white PVC pot or PVC cap) for a total of 50 bait samples.
Look for signs of symphylan feeding on root systems.	Place sample on dark piece of plastic or cloth. Break apart aggregates.	Wait 1-3 days; lift cover. Count symphylans on soil surface, then on bait.
--	Count symphylans numbers present, calculate average # per sample.	Calculate average # per bait.
Healthy plants – low population levels ; unhealthy, stunted plants – high levels	Action threshold 5 to 20 per shovelful of soil for moderate to highly susceptible crops; conventional systems 2 to 3 per sq. ft. soil	Action threshold 5 to 20 per shovelful of soil for moderate to highly susceptible crops; conventional systems 2 to 3 per sq. ft. soil

Management: There are no silver bullets in symphylan management. Some management tactics that have been observed to be successful in reducing populations/damage are listed below:

Frequent cultivation: Deep, thorough cultivation between crops to destroy earthworm tunnels, symphylans and eggs present. Reports indicate 2 to 3 tillings per week for 3 to 4 weeks prior to planting have been recorded as being successful in reducing symphylan numbers.

Pre-plant fumigation: Telone II, Telone C17, and Vapam HL are all registered for preplant fumigation use in NYS for to reduce symphylans in soils. Telone is a restricted use product. Vapam HL may be applied through irrigation systems. See product labels for rates and application instructions.

Preplant soil treatment Apply Lorsban Advanced at a rate of 2 qt/A in sufficient water to ensure uniform soil coverage and incorporate into soil in spring for protection of strawberries the following year.

Firm packing of soil around newly planted plants.

Crop rotation: Populations have been demonstrated to decrease significantly following potato crops; allowing growth of a more susceptible crop afterwards. While no other cover crops reduce population numbers as much as potatoes, spring oats also showed reduced numbers. Conversely, numbers were higher following mustard and spinach crops.

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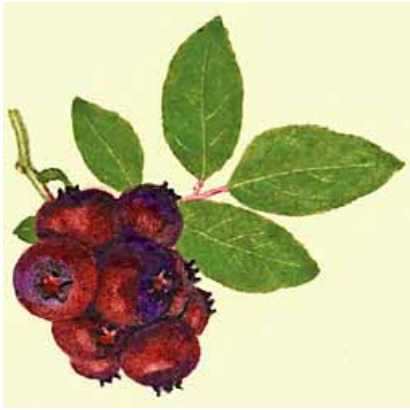
Blueberry Growing Comes to the National Agricultural Library

(continued from page 5)

"Coville's research notes give historians and scientists an opportunity to follow both the thinking and progress of one of the foremost breeders in the world as he developed the first blueberry cultivars," says Robert Griesbach, a plant geneticist who is currently deputy assistant administrator for ARS's Office of Technology Transfer. "These notes are quite detailed, and besides the observations on genetic advances, they provide insights into the original breeding approaches taken for disease control, production, and the development of the new industry."

For more information on this blueberry research collection, contact Sara B. Lee, USDA-ARS National Agricultural Library, Rare and Special Collections, 10301 Baltimore Ave., Beltsville, MD 20705; (301) 504-5876.



Redskin blueberry is an albino, where the berries become red on the side exposed to the sun. Coville released the variety as a horticultural curiosity that might be desirable for the home garden

A note by USDA botanist Frederick Coville describing his pioneering research on domesticating blueberries.

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