

# The Connecticut Agricultural Experiment Station 106<sup>th</sup> Plant Science Day

Lockwood Farm, Hamden, CT  
Wednesday, August 3, 2016



## CAES

The Connecticut Agricultural Experiment Station  
*Putting Science to Work for Society since 1875*



The Connecticut Agricultural Experiment Station's **Plant Science Day** is held at Lockwood Farm on the first Wednesday of August every year, beginning in 1910. This one-day event features reports on research, field plots, barn exhibits, tours, and other opportunities for Connecticut residents and attendees to discuss many topics of plant science on an informal basis and interact with CAES scientists and staff. While the event only lasts one day, planning for Plant Science Day is a year-round activity spearheaded by the *Plant Science Day Planning Committee*. This committee, chaired by Ms. Vickie M. Bomba-Lewandoski, is comprised of CAES staff members who strive to make this event as meaningful and organized as possible. We acknowledge their hard work and thank them for allowing this historic event to happen each year.

### **Plant Science Day 2016 Planning Committee**

- Dr. Sandra Anagnostakis
- Dr. Adriana Arango-Velez
- Mr. Michael Ammirata
- Dr. Theodore Andreadis
- Ms. Terri Arsenault
- Mr. Joseph Barsky
- Dr. Douglas Brackney
- Ms. Vickie Bomba-Lewandoski
- Mr. Gregory Bugbee
- Ms. Jane Canepa-Morrison
- Ms. Sandra Carney
- Mr. Michael Cavadini
- Mr. Richard Cecarelli
- Dr. Douglas Dingman
- Dr. Brian Eitzer
- Ms. Rose Hiskes
- Ms. Regan Huntley
- Ms. Lisa Kaczenski Corsaro
- Mr. Michael Last
- Dr. Yonghao Li
- Dr. Robert Marra
- Dr. Goudarz Molaei
- Mr. Craig Musante
- Ms. Lindsay Patrick
- Mr. John Ranciato
- Ms. Diane Riddle
- Dr. Gale Ridge
- Dr. Neil Schultes
- Ms. Kathryn Soleski
- Dr. Kirby Stafford
- Mr. Peter Thiel
- Mr. Michael Thomas
- Dr. Jeffrey Ward
- Dr. Jason White

Program booklet created, compiled and edited by Ms. Vickie Bomba-Lewandoski assisted by Ms. Brandi Marks.





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## HISTORY OF LOCKWOOD FARM, HAMDEN

Lockwood Farm is a research facility of The Connecticut Agricultural Experiment Station. The farm was purchased in 1910 with monies provided by the Lockwood Trust Fund, a private endowment. The original farm was 19.6 acres with a barn and a house. Since then, several adjacent tracts of land have been purchased, enlarging the property to 75.0 acres.

The farm is located in the extreme southern portion of the Central Lowland Physiographic Province. This lowland region is underlain by red stratified sandstone and shale of Triassic age from which resistant lava flows project as sharp ridges. One prominent ridge, observed from the farm, is Mount Carmel (the "Sleeping Giant"), which lies to the north. The mountain is composed of diabase, a dense igneous rock which has a fine crystalline texture, having been pushed up as magma close to the surface where it cooled quickly. The "trap rock" of this region is either diabase, or its compositional equivalent basalt which was extruded onto the surface in lava flows that form topographic "trappa" or "trappe" (steps or stairs) and it is commonly used as a building material and ballast for railroad tracks.

The topography of the farm is gently rolling to hilly and was sculpted by the Wisconsin glacier that overrode the area some 10,000 years ago and came to rest in the vicinity of Long Island. A prominent feature of the farm is a large diabase boulder that was moved by flowing ice from its place of origin, and is therefore also known as a Glacial Erratic. The boulder probably fell onto the top of the glacier oozing its way down past the Sleeping Giant's head during the waning stage of the last continental glaciation. It was deposited here, near the toe of the waning glacier, onto "till," an unsorted mass of sandy or silty material mixed with rounded pebbles and boulders that had been pushed in front of, or under, the glacier, and deposited as the ice melted. Most of the boulders around the area, such as those in the nearby stone walls, are rounded and their surfaces have been ground smooth by abrasion beneath the glacier. The boulder came to rest on the crest of a hillock to the south of the upper barns. From this hillock, Sleeping Giant State Park comes into full view and is a favorite spot for photographers and other artists.

The soils of the farm developed on glacial drift are composed primarily of the underlying reddish-brown sedimentary rocks. The soils, characterized by reddish-brown profiles, are the well-drained Cheshire fine sandy loam (67%), the moderately well-drained Watchaug loam (10%) and the shallow-to-bedrock Sunderland fine sandy loam (16%). Along the western edge of the farm, adjacent to the Farmington Canal Greenway, lies a level terrace of stratified glacial drift. There, the well-drained Branford loam and the moderately well-drained Ellington loam (7%) dominate. Elevations on the farm range from 140 to 220 feet above mean sea level.

The farm lies in the Coastal Plain Climatological District. The local climate is influenced by its proximity to Long Island Sound, which lies 9 miles to the south. The average frost-free season is 190 days, compared to 180 days at the inland Valley Laboratory in Windsor.

In 1936, a fully instrumented weather station was established on the farm. The weather data are reported to and published by the U.S. Weather Service in their cooperative observer program. The mean annual temperature for the farm is 49.0 F. A record high temperature, 104.0 F, was observed on July 4, 1949. A record low temperature, -24.0 F was recorded on February 16, 1943. The mean annual precipitation for the farm is 52.6 inches. The greatest total precipitation, 74.36 inches, was recorded in 2011. The least precipitation, 30.4 inches, was recorded in 1965. The mean annual snowfall for the farm is 32.3 inches. The greatest total snowfall, 78.5 inches, was recorded during the winter of 1995-1996. The least total snowfall, 10.0 inches, was recorded in 2011-2012.

The farm provides a field laboratory for Experiment Station scientists who learn how to control the pathogens and insects that attack trees, fruit, and vegetables. In some experiments, scientists learn how crops grow and develop strategies for efficient crop production. All field research can be observed at Plant Science Day, held each year on the first Wednesday in August.

Revised: August 2014





## **CENTURY FARM AWARD**

The Century Farm Award is given to a farm that has been in family operation for more than 100 years. The recipient is selected by the Connecticut Agricultural Information Council.

### **Norman Hill Farm Thompson, Connecticut**

*Proclamation from Governor Dannel P. Malloy:*

Norman Hill Farm, located in Thompson, was founded in 1910 by Carl A. Norman, who emigrated from Sweden in 1900. Vegetables, eggs, and butter were produced and sold. He gradually increased the dairy herd and poultry flock, and built three greenhouses to increase vegetable production. One of Carl's sons, Oscar Norman, bought the farm from his mother in 1943 after the death of his father, continuing with the same farm enterprises. Poultry was dropped in 1958 and the last commercial vegetable crop was greenhouse tomatoes in 1980. Oscar and his wife Elizabeth were involved with many organizations including the Killingly Regional Vocational Agricultural Consulting Committee, The New England Vegetable Growers Association, The Connecticut Farm Bureau, 4H, and the Woodstock Green Thumbs Garden Club. They also hosted young people from Costa Rica, India, Taiwan and Zambia as a part of the International Farm Youth Exchange Program.

Roy and Earl Norman, Oscar's sons, and the third generation on the farm, bought the farm in 1976. They each built homes on the farm and now operate strictly as a dairy farm. Currently, Roy and Earl have a 100 cow freestall barn for the milking herd and a 120 cow freestall barn for dry cows and 3 different age groups of heifers. They also produce grass and corn for hay and silage feed. Roy and Earl are members of The Connecticut Farm Bureau, and Roy is very involved with the Fellowship of Christian Farmers Association. Earl serves on the Thompson Agricultural Commission and the New England Dairy Promotion Board. The farm received the Albert R. Todd Conservation Award for improvements in conservation and pollution control practices. Members of the fourth generation of Normans continue to work on the farm and a member of the fifth generation recently joined the Happy Herdsmen 4H Dairy Club, the same club that their grandfather Earl belonged to over 50 years ago.

As Governor, I am pleased to join The Connecticut Agricultural Experiment Station and the Connecticut Agricultural Information Council in presenting this Century Farm Award to Norman Hill Farm, who is most deserving of this honor.





### **THE SAMUEL W. JOHNSON MEMORIAL LECTURE (Pavilion)**

The Experiment Station Board of Control established the lectureship to further discuss issues of concern to Connecticut residents and the Station. Professor Johnson was director of the Experiment Station from 1877 to 1900 and a leader in the establishment of American agricultural experiment stations.

### **ANSWERS TO YOUR QUESTIONS (Plot 20)**

Staff members in the “question and answer” tent are prepared to give information on identification of insects, plant disorders, soils and their management, and other problems of growers and gardeners.

### **KIDS’ KORNER (Plot 25)**

Come to the Kids’ Korner to pick up your child’s passport and a gift. The passport is a special activity for young children to help them enjoy and explore Plant Science Day. There are six different stations located throughout Lockwood Farm that they can visit, where they can ask questions, learn about the topic featured at the station, and then receive a special stamp for their passport. Once the passport is complete, they can go to the Self-Guided Activity Plot (plot 26) to collect a CAES patch.

### **SELF-GUIDED ACTIVITY FOR ALL CHILDREN, INCLUDING GIRL SCOUTS (Plot 26)**

Girl Scouts and older children should be directed to this plot. A self-guided worksheet is available for all children, and it is better suited for older children than the passport. The activity will guide them to interact with some of the many people here today helping to put science to work for society. In addition, Girl Scouts may use the activity to complete steps towards their Naturalist Legacy badge. Once the activity is completed, all children can return to this plot to collect either a Girl Scout or CAES patch. Children with completed passports should return here to collect their badges as well.

### **CONNECTICUT PESTICIDE CREDITS (Registration, R)**

Connecticut pesticide credits will be offered for attending Plant Science Day. If you are interested in obtaining pesticide credits, you must sign in at the registration desk (R) at the start of the day, between 9:30 a.m.-10:00 a.m., collect signatures for the talks, demonstration, and tours you attended, and sign out to pick up your pesticide credit form at 3:25 p.m. at the registration desk (R).

Connecticut Pesticide Credits Offered: **ALL SUPERVISOR CATEGORIES and PRIVATE APPLICATOR (PA) CATEGORY / 4.50 Credit Hours.**







Keep current with The Connecticut Agricultural Experiment Station by using our SOCIAL MEDIA and E-ALERT resources.

### SOCIAL MEDIA LINKS

 Facebook ([www.facebook.com/CT.CAES](http://www.facebook.com/CT.CAES))

 Twitter ([www.twitter.com/CT\\_CAES](http://www.twitter.com/CT_CAES))

 YouTube ([www.youtube.com/user/CTAGEXPSTATION](http://www.youtube.com/user/CTAGEXPSTATION))



([http://en.wikipedia.org/wiki/Connecticut Agricultural Experiment Station](http://en.wikipedia.org/wiki/Connecticut_Agricultural_Experiment_Station))

To visit our webpage, go to [www.ct.gov/CAES](http://www.ct.gov/CAES),  
or just scan our QR code below with your smartphone.



### E-ALERTS

The Connecticut Agricultural Experiment Station (CAES) E-ALERT service. We are inviting you to subscribe to our free E-ALERT e-mail service to receive CAES news updates by e-mail. Go to our website, scroll to the bottom left hand corner of our page,

and click  to get started.

Once you have created your CT.gov profile you can now subscribe to our e-alerts.





**NO PETS, PLEASE. SERVICE ANIMALS ONLY.**

**JUST A REMINDER THAT LOCKWOOD FARM IS A WORKING FARM  
WITH ACTIVE RESEARCH BEING CONDUCTED, SO PLEASE  
RESPECT THE SCIENTISTS' WORK.**

After the lecture, visitors may remain in the pavilion to eat lunch. Coffee and cold drinks are free.



**CAES**

The Connecticut Agricultural Experiment Station

*Putting Science to Work for Society since 1875*







## 106<sup>th</sup> PLANT SCIENCE DAY

Gates open at 9:30 a.m.  
Program begins at 10:00 a.m.  
Event 10:00 a.m. – 4:00 p.m.

### AGENDA

Moderator – Ms. Vickie M. Bomba-Lewandoski, Information Officer

- 10:00 a.m. – 10:15 a.m. PAVILION**  
***MORNING GREETING AND OPENING REMARKS***  
**Dr. Theodore G. Andreadis, Director**  
**The Connecticut Agricultural Experiment Station**
- 10:15 a.m. - 10:45 a.m. PAVILION**  
**Dr. Philip M. Armstrong, Virologist/Medical Entomologist, Center for Vector Biology & Zoonotic Diseases, Department of Environmental Sciences**  
***Mosquitoes and Zika Virus: Assessing the Threat***  
Zika virus was first discovered in 1947 and remained an obscure mosquito-borne virus until it spread to Brazil in 2015 where it infected unprecedented numbers of people and caused thousands of birth defects. The virus has subsequently spread to other parts of Latin America and the Caribbean, and is expected to infect millions of people within this region. In this presentation, Dr. Armstrong will give historical background about the global expansion of Zika virus, review the mosquito biology and transmission cycle of this virus, and discuss the role of the Connecticut Agricultural Experiment Station (CAES) in monitoring mosquitoes for Zika virus in Connecticut. The primary mosquito species that is involved in the current epidemic in Latin America does not occur in Connecticut; it's called the yellow fever mosquito (*Aedes aegypti*) and its distribution is limited to the tropics and southern U.S. However, another mosquito species, the Asian tiger mosquito (*Ae. albopictus*), has been shown to be a competent vector of Zika virus and has a more temperate distribution in the U.S. that includes parts of southern Connecticut. Most mosquito-mediated transmission in the U.S. would likely occur via *Ae. aegypti*, which should limit geographic spread to southern regions where this mosquito occurs. Nevertheless, the capacity for *Ae. albopictus* to transmit Zika virus provides potential for localized transmission in more northern regions of the U.S., including Connecticut. CAES scientists are currently monitoring mosquitoes and virus activity at 91 trapping sites located throughout the state as a part of a comprehensive statewide surveillance program for mosquito-transmitted diseases. All mosquitoes collected in the state of Connecticut are being tested for a number of mosquito-borne pathogens including Zika virus.
- 10:15 a.m. – 10:35 a.m. TECHNICAL DEMONSTRATION TENT**  
*(20 minute demonstration, repeated twice during the day, 10:15 a.m. & 2:30 p.m.)*  
**Dr. Jatinder S. Aulakh, Assistant Weed Scientist, Valley Laboratory, Windsor**  
***Know Your Weeds-Identification and Control***  
This demo will provide information on identification of non-native invasive plants and key weed species in ornamental plants, home-lawns, and chemical and non-chemical measures for their control. Live specimens of weeds and non-native invasive plants will be displayed and supplementary literature will be available.
- 10:40 a.m. – 11:00 a.m. TECHNICAL DEMONSTRATION TENT**  
*(20 minute demonstration, repeated twice during the day, 10:40 a.m. & 3:00 p.m.)*  
**Dr. Kimberly A. Stoner, Entomologist, Department of Entomology**  
***Planting for the Bees' Needs***  
One of the most effective ways you can help bees – both native wild bees and honey bees – is to plant flowering plants that supply the nectar and pollen the bees need. Dr. Stoner will discuss how to choose plants that will benefit a wide range of bees over the entire growing season.

- 10:45 a.m. - 11:05 a.m. PAVILION**  
**CENTURY FARM AWARD**  
Norman Hill Farm, Thompson, Connecticut
- 11:05 a.m. – 11:10 a.m. PAVILION**  
**EXPERIMENT STATION ASSOCIATES**  
Ms. Anne Rowlands, *President, Experiment Station Associates*
- 11:10 a.m. – 12:00 noon PAVILION**  
**THE SAMUEL W. JOHNSON MEMORIAL LECTURE**  
David K. Leff  
Essayist; Environmentalist; Former Deputy Commissioner, Connecticut Department of Environmental Protection  
*The Positive Power of Plants: Frederick Law Olmsted in Connecticut*
- 1:15 p.m.-1:45 p.m. PAVILION**  
**Dr. Katja Maurer, Agricultural Post-Doctoral Scientist, Valley Laboratory, Windsor**  
***Hops: A Specialty Crop for Connecticut***  
Hop (*Humulus lupulus*) cultivation has a long tradition in the northeastern United States, but disappeared for a century because of disease pressure and the enactment of Prohibition. Subsequently, it was established in the Pacific Northwest, which is currently one of the largest production areas worldwide. However, interest in hop production in New England is on the rise again. The popularity of microbrew culture, local brewpubs, home brewing, and the growing demand for regional products has increased interest in producing high quality hops on a small scale in New England. Hop production has just started in Connecticut. The hop plant is both fascinating and challenging. Perennial vines, which are called bines, climb every season on 16 to 18 feet trellis systems. Growth averages 4 inches per day, but can be as high as 12 inches per day under certain conditions. The plant typically reaches heights of 20 to 30 feet. In spring the rootstocks are crowned, a few bines are trained on balling twines, and the rest of the plant is pruned back. Summer tasks include fertilizing, irrigating, and scouting for and controlling diseases and insects. Harvest time is from mid-August to mid-September. The female cones (hops), the desired product, contain alpha and beta acids, as well as essential oils, which help preserve beer and provide it with its characteristic bitter and aromatic flavor. Growing hops in the humid Northeast creates some challenges, but with good start-up capital, a well-prepared work plan, and a rigorous integrated pest management program, hops are a promising crop for farming in Connecticut.
- 1:45 p.m.-2:15 p.m. PAVILION**  
**Dr. Adriana L. Arango-Velez, Tree Physiologist, Department of Forestry and Horticulture**  
***Climate Change and Invasive Pests and Pathogens***  
Climate change and invasive species are two of the most important ecological issues facing forests and agriculture. Despite the natural climatic fluctuations that occur on a regular basis, anthropogenic pollutants are causing significant effects on precipitation cycles and temperature. As a result, pronounced droughts and mild winters are occurring, affecting the development, survival, range and abundance of insects and pathogens, as well as decreasing plants' capacities to respond to those stressors. Dr. Arango will discuss how economically important insects are establishing in northern regions, where environmental conditions were previously unsuitable for their reproduction and establishment.
- 2:15 p.m. PAVILION**  
Adjourn Main Talks
- 2:30 p.m. – 2:50 p.m. TECHNICAL DEMONSTRATION TENT**  
*(20 minute demonstration, repeated twice during the day, 10:15 a.m. & 2:30 p.m.)*  
**Dr. Jatinder S. Aulakh, Assistant Weed Scientist, Valley Laboratory, Windsor**  
***Know Your Weeds-Identification and Control***  
This demo will provide information on identification of non-native invasive plants and key weed species in ornamental plants, home-lawns, and chemical and non-chemical measures for their control. Live specimens of weeds and non-native invasive plants will be displayed and supplementary literature will be available.

- 3:00 p.m.-3:20 p.m.**      **TECHNICAL DEMONSTRATION TENT**  
*(20 minute demonstration, repeated twice during the day, 10:40 a.m. & 3:00 p.m.)*  
**Dr. Kimberly A. Stoner, Entomologist, Department of Entomology**  
***Planting for the Bees' Needs***  
One of the most effective ways you can help bees – both native wild bees and honey bees – is to plant flowering plants that supply the nectar and pollen the bees need. Dr. Stoner will discuss how to choose plants that will benefit a wide range of bees over the entire growing season.
- 3:20 p.m.**                      **TECHNICAL DEMONSTRATION TENT**  
Adjourn Technical Demonstrations
- 3:25 p.m. SIGN-OUT**      **(for those requesting pesticide credits) (R)**  
Attendees pick up Pesticide Credit forms at the registration table (R).





## **PESTICIDE CREDIT TOUR**

**(Meet at Barn A)**

**12:00 p.m.-1:00 p.m.**

**12:00 p.m. - 1:00 p.m. MEET AT BARN A:**

**Dr. Robert E. Marra, Forest Pathologist, Department of Plant Pathology and Ecology**

A one-hour guided tour of selected field plots. Participants can discuss experiments and topics with scientists at each station on the tour.

### **STOPS ON TOUR:**

- **Use of Nanoparticles of Metal Oxides to Suppress Soil-Borne Diseases of Eggplants and Watermelons**  
*Dr. Wade Elmer, Department of Plant Pathology & Ecology*  
(Plot #14)
- **The Effect of Chloride Nutrition on Fusarium Head Blight of Spring Barley**  
*Dr. Wade Elmer, Department of Plant Pathology & Ecology*  
(Plot #5)
- **Environmentally-Friendly Control of Powdery Mildew on Vegetable Plants**  
*Dr. Francis Ferrandino, Department of Plant Pathology & Ecology*  
(Plot #40)

## **TOUR OF NATIVE WOODY SHRUBS (PLOT 38)**

**1:00 p.m.-1:30 p.m.**

**1:00 p.m. - 1:30 p.m. MEET AT THE WOOD ARBOR OF THE NATIVE WOODY SHRUBS (Plot 38):**

**Dr. Jeffrey S. Ward, Station Forester and Head, Department of Forestry and Horticulture**

A ½ hour guided tour of our Native Shrub planting. Learn about using native shrubs for naturalistic landscapes without the use of pesticides and fertilizers.

## **LOCKWOOD FARM WALKING TOUR**

**(Meet at the Registration Desk, R)**

**2:35 p.m.–3:35 p.m.**

**2:35 p.m. - 3:35 p.m. MEET AT REGISTRATION DESK (R):**

**Dr. Robert E. Marra, Forest Pathologist, Department of Plant Pathology and Ecology**

A one-hour guided tour of selected field plots. Participants can discuss experiments and topics with scientists at each station on the tour.

**STOPS ON WALKING TOUR:** Approximately ½ mile, moderately hilly

- **The Rock**  
*(Plot 52)*
- **Hybrid and Vinifera Winegrape Cultivar Trials and Pinot Gris Cultural Trials**  
*Dr. Francis Ferrandino, Department of Plant Pathology & Ecology*

*Ms. Joan Bravo, Department of Forestry & Horticulture  
(Plots 50, 51)*

- **Kabocha Squash, Okra, Brussels Sprouts, and Sweet Potato Trials**

*Dr. Abigail Maynard, Department of Forestry & Horticulture  
(Plots 46, 47, 48, 49)*

- **Hops - A New Crop for Connecticut**

*Drs. James LaMondia and Katja Maurer, Valley Laboratory  
(Plot 61)*

## **BUS TOUR (B)**

### **EVERY HALF HOUR, 10:15 a.m. to 3:30 p.m.**

**EVERY HALF HOUR** This is a great way to see the farm. Join us on an air conditioned bus ride around the farm for approximately 30 minutes. You can be dropped off at any plot, and picked up the next time the bus comes around. Dr. Neil Schultes and Mr. Michael Cavadini will narrate the ride.  
10:15 a.m. – 3:30 p.m. The bus will be suspended during the guest lecture from 11:10 a.m. – 12:00 p.m.





## **BARN EXHIBITS (BARN B)**

### **Integrated Tick Management**

*Departments:* Entomology, Forestry and Horticulture, and Environmental Science

*Investigators:* Dr. Kirby C. Stafford III, Dr. Scott C. Williams, and Dr. Goudarz Molaei

*Assisted by:* Ms. Heidi Stuber, Ms. Megan Linske, Mr. Michael Short, Ms. Sarah McQuade, Ms. Megan Carroll, Ms. Erica Rayack, and Ms. Magali Bazzano.

*Abstract:* An integrated tick management project in Redding, CT, funded by the Centers for Disease Control and Prevention (CDC) is now in its fourth year. This project focused on examining how a combination of biopesticides (entomopathogenic fungus *Metarhizium anisopliae*), fipronil-based rodent bait boxes, and deer reduction can reduce the risk of Lyme disease in select neighborhoods. The combination of the Met52 and bait boxes has resulted in a reduction in tick abundance and the number of ticks on white-footed mice. The second component of our tick management studies in Redding, CT is the evaluation of an oral Lyme disease rodent-targeted vaccine (RTV) bait. We previously found that the bait is highly accepted by the mice and distribution of the vaccine bait began in 2015.

### **Biological Control of Fire Blight**

*Department:* Plant Pathology and Ecology

*Investigators:* Dr. Quan Zeng and Dr. Neil Schultes

*Abstract:* Fire blight is a devastating disease of apples and pears caused by a bacterial pathogen *Erwinia amylovora*. Currently, the application of the antibiotic streptomycin at bloom is the most effective management option for fire blight. However, the intensive, long-term use of streptomycin comes at both biological and societal costs. First, it leads to streptomycin resistance in the pathogen population reducing control effectivity. Second, there are increased concerns regarding the impact of antibiotic use on the environment and human health. On October 21<sup>st</sup> 2014, the National Organic Standards Board (NOSB) terminated the use of streptomycin in organic fruit production in the U.S. The need to develop effective, non-antibiotic control alternatives for the pome fruit industry, particularly the organic pome fruit industry, is clear. One option is the use of biological control methods. Biological control agents are microorganisms that antagonistically inhibit the growth of pathogens by producing antimicrobial compounds and/or competing with the pathogens for nutrients and space on plants. Although the use of bio-control agents in fire blight management has been explored, efficacy is inconsistent and is largely affected by the climate and growing conditions of specific regions. We are exploring methods to increase the efficacy of the existing biocontrol agents by combining the use of the biocontrol with other organic materials. We are also identifying novel biocontrol strains that work more effectively in the humid growing conditions in the Eastern United States.

### **Ensuring the Safety of Connecticut's Food Supply**

*Department:* Analytical Chemistry

*Investigators:* Dr. Brian D. Eitzer, Dr. Walter J. Krol, Dr. Christina S. Robb, Dr. Sanghamitra Majumdar, and Dr. Jason C. White

*Assisted by:* Ms. Terri Arsenault, Mr. Craig Musante, Mr. John Ranciato, Ms. Kitty Prapayotin-Riveros, Mr. Joseph Hawthorne, and Mr. Michael Cavadini

*Abstract:* The Analytical Chemistry Department has been working closing with the US Food and Drug Administration (FDA) since 2005 to ensure the safety of the CT and national food supply. Current work falls under 3 funded cooperative agreements. The first is the FDA Food Emergency Response Network (FERN); the Department of Analytical Chemistry was one of 8 laboratories invited to join this network in 2005 and was recently funded for a third cycle (2015-2020). The FERN was established in response to threats of chemical terrorism and the food supply but has also been involved in other incidents of national significance (Deepwater Horizon oil spill, melamine in pet and human food, arsenic in juice and rice). Since 2005, total program funding has been in excess of \$3.7 million, with an additional \$2 million in equipment. A second 5 year project concludes in 2017 and focuses on bringing the CAES market basket program (pesticide and arsenic surveillance in food) under ISO Accreditation. A third 5-year project started in 2015 and involves bringing mycotoxin analysis in animal feed under ISO Accreditation. The close involvement of CAES with the FDA has provided critical resources to the state so as to ensure safety of the food supply and has also allowed our unique scientific expertise to be utilized on problems of national and international significance.

**Neonicotinoid Exposure of Honey Bees**

*Department:* Valley Laboratory, Entomology and Analytical Chemistry

*Investigators:* Dr. Rich Cowles, Dr. Kimberly Stoner, and Dr. Brian D. Eitzer

*Abstract:* Neonicotinoid insecticides are commonly used in nurseries and in the landscape to manage various insect pests. The potential impact of these insects on honey bee health is very controversial. On one hand, these products are systemic and can reach any portion of the plant, including nectar or pollen. On the other hand, they may never reach concentrations in either nectar or pollen to be of concern to bee health. The latest assessment by the U. S. EPA of neonicotinoid toxicity to bees suggests that concentrations below 25 ppb (parts per billion) will not harm bees. Monitoring of bee-collected pollen in MA and WA states by other researchers has found average contamination of about 2 ppb for imidacloprid, and the equivalent of 6 ppb for the combined toxicity of all neonicotinoid residues. We have been investigating the concentration of neonicotinoids found in nectar and pollen from various nursery plants, both through direct manual collection of pollen or nectar, or by using pollen traps from bee hives housed at cooperating nurseries. These samples are then processed according to the QuEChERS procedure, and then either analyzed by HPLC/MS/MS or through ELISA methods to quantify the degree of contamination of these floral resources by neonicotinoids.

**Microbiology in Agriculture, the Environment, and Public Health**

*Department:* Environmental Sciences

*Investigators:* Dr. Blaire Steven, Dr. Doug Brackney and Dr. Quan Zeng

*Assisted by:* Agatha Carneiro and Ariana Trease

*Abstract:* As a consequence of their small size, microorganisms are everywhere. Microorganisms play essential roles in nutrient cycling, climate change, and animal and plant health. At the CAES we are using microbial ecology to explore the role of microorganisms in a diverse set of environments including soils from coastal wetlands, agriculture, and urban streets. We are also investigating the role of microorganisms in protecting apples from disease and in mosquito development and disease transmission. This research highlights the multiple and diverse functions microorganisms play in a multitude of systems.







**THE CONNECTICUT AGRICULTURAL EXPERIMENT STATION**

The experiments exhibited here depict only a portion of the work performed by Experiment Station scientists. In addition to Lockwood Farm, Griswold Research Center, and laboratories in New Haven and Windsor, Station scientists use state forests, private orchards, lakes, and farms for their experiments. Experiments and surveys are conducted in many widely separated towns of the state.

**THE EXPERIMENT STATION WEB PAGE: [WWW.CT.GOV/CAES](http://WWW.CT.GOV/CAES)**

**TO RECEIVE A COMPLETE LIST OF STATION SPEAKERS:**

Inquire at the publications table in BARN A, or write to:  
Publications; The Connecticut Agricultural Experiment Station; P.O. Box 1106; New Haven, CT 06504-1106, phone 203-974-8447, fax 203-974-8502, e-mail [Vickie.Bomba-Lewandoski@ct.gov](mailto:Vickie.Bomba-Lewandoski@ct.gov), or on the web at <http://www.ct.gov/caes/speakers>

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**CAES**

The Connecticut Agricultural Experiment Station  
*Putting Science to Work for Society since 1875*



The Connecticut Agricultural Experiment Station  
**Lockwood Farm**

Pavilion

- Century Farm Award
- Johnson Lecture
- Short Talks

Barn A

- Experiment Station Associates
- Publications & Information
- First Aid

Barn B

- Barn Exhibits
- Rest Rooms



Registration



Parking for physically challenged



Food Concessions



Coffee & Cold Drinks



Rest Rooms



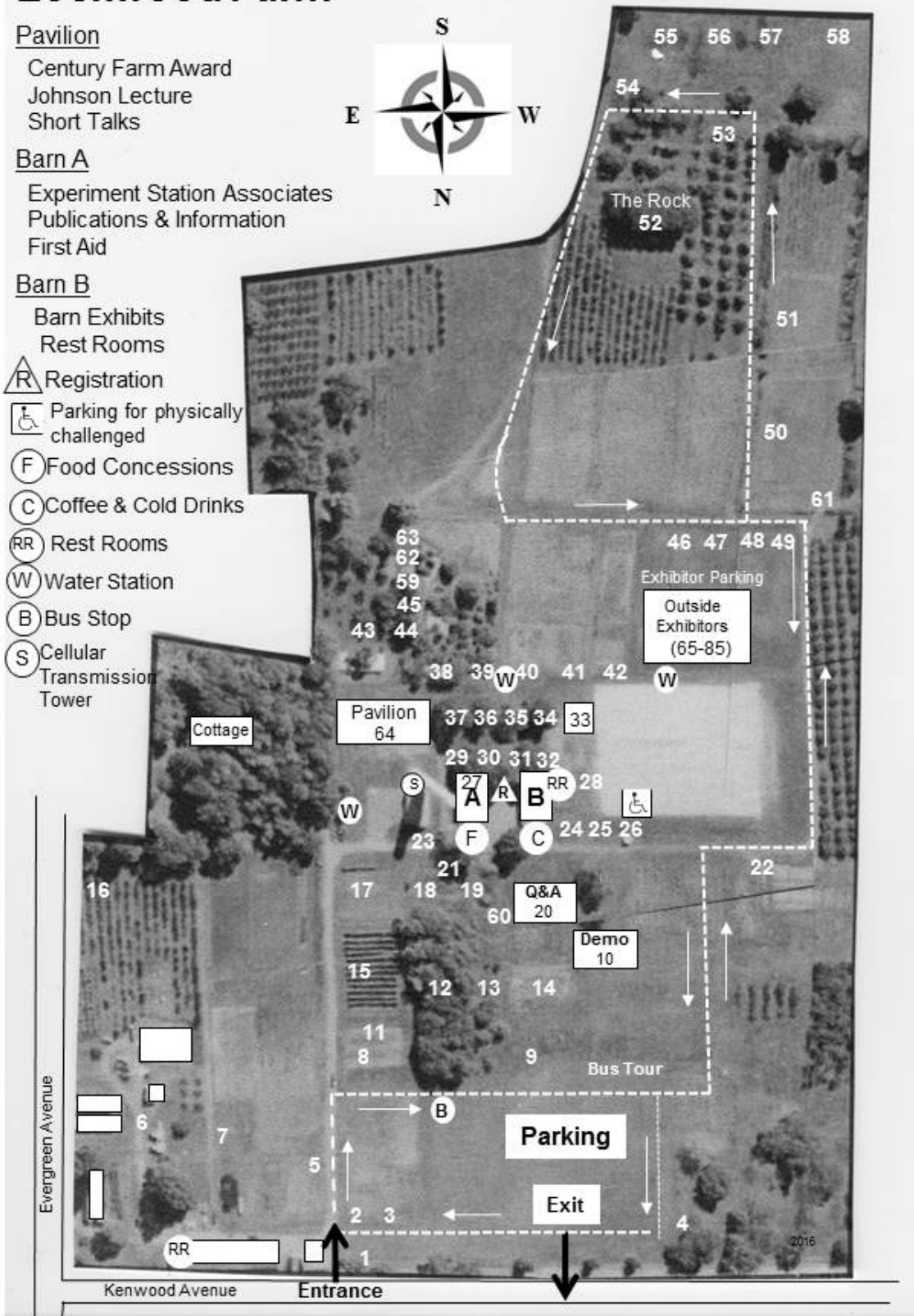
Water Station



Bus Stop



Cellular Transmission Tower





## **FIELD PLOT LISTING**

*Outside Exhibitors (Plots 21, 23, 24, 65-85) are invited to participate.*

The plots at Lockwood Farm are planted and maintained by The Connecticut Agricultural Experiment Station's scientists and technical staff along with the help of Farm Manager Mr. Richard Cecarelli and his Research Technicians Mr. Rollin Hannan and Mr. Michael McHill as well as seasonal resource assistants Mr. Frank Cervo and Mr. Steve Gerard.

- 1. Chinese Chestnut Trees**
- 2. Sheet Composting with Oak and Maple Leaves**
- 3. Curiosity Garden**
- 4. Nut Orchard**
- 5. The Effect of Chloride Nutrition on Fusarium Head Blight of Spring Barley**
- 6. Greenhouse Production of Figs in Self-Watering Planters**
- 7. Use of Copper Oxide Nanoparticles on Fusarium Crown Rot of Asparagus**
- 8. Commercial Chestnut Cultivars**
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- 12. Control of Blight on American Chestnuts**
- 13. New Hybrid Chestnut Orchard**
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  - a. **The "Deer" Tick *Ixodes Scapularis***
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35. **Sudden Vegetation Dieback of Connecticut Salt Marshes**
36. **Invasive Insects in the Northeast**
37. ***Stachybotrys* Species Found in Indoor Environments**
38. **Native Woody Shrubs**
39. **Bird and Butterfly Garden**
40. **Environmentally-Friendly Control of Powdery Mildew on Vegetable Plants**
41. **Pollinator Habitat on Connecticut Vegetable Farms**
42. **Invasive Aquatic Plant Program**
43. **Chestnut Species and Hybrids**
44. **Healthy Plants—Healthy Business: Support of the Green Industry by Inspection**

45. **The Cooperative Agricultural Pest Survey (CAPS) Program and Farm Bill Surveys**
46. **Kabocha Squash Trials**
47. **Okra Trials**
48. **Brussels Sprouts Trials**
49. **Sweet Potato Trials**
50. **Hybrid and Vinifera Winegrape Cultivar Trial**
51. **Pinot Gris Cultural Trials**
52. **The Rock**
53. **Rocky Hill American Chestnut Trees**
54. **Asian Chestnut Gall Wasp on Chestnut**
55. **Beach Plum Trials**
56. **Pawpaw Trials**
57. **Japanese Plum Variety Trials**
58. **Hybrid Elm Trees**
59. **Management of Boxwood Blight, A New Disease of Boxwood and Pachysandra**
60. **Know Your Weeds-Identification and Control**
61. **Hops – A New Crop for Connecticut**
62. **Biological Control of Hemlock Woolly Adelgid and Mile-a-Minute Weed in Connecticut**
63. **Emerald Ash Borer Research Update**
64. **The Pavilion at Lockwood Farm**
65. **The Connecticut Botanical Society**
66. **The Connecticut Department of Energy and Environmental Protection Division of Forestry (CT DEEP Division of Forestry)**
67. **The Connecticut Department of Energy and Environmental Protection Wildlife Division (CT DEEP Division of Wildlife)**
68. **Connecticut Professional Timber Producers Association**
69. **The Sleeping Giant Park Association**

- 70. United States Department of Labor (US OSHA)**
- 71. Connecticut Department of Labor CONN-OSHA (CONN OSHA)**
- 72. United States Department of Agriculture Animal and Plant Health Inspection Service Plant Protection and Quarantine (USDA APHIS/PPQ)**
- 73. South Central Connecticut Regional Water Authority**
- 74. Connecticut Forest & Parks Association**
- 75. The Federated Garden Clubs of Connecticut, Inc.**
- 76. University of Connecticut Extension Master Gardener Program (UConn Extension Master Gardener Program)**
- 77. Connecticut Environmental Council (CTEC)**
- 78. Hamden Land Conservation Trust**
- 79. Connecticut Department of Agriculture**
- 80. United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS)**
- 81. Tree-Savers**
- 82. United States Department of Agriculture, Farm Service Agency (USDA FSA)**
- 83. Connecticut Invasive Plant Working Group (CIPWG)**
- 84. Lyman Hall High School Agricultural Science and Technology Program**
- 85. Connecticut Farm Bureau Association (CFBA)**

\*Other plots here at the farm provide food for the Connecticut Food Bank.





## FIELD PLOT ABSTRACTS

### **1. Chinese Chestnut Trees**

Dr. Sandra L. Anagnostakis

These Chinese chestnut trees, planted by Donald Jones in 1941, were selected by chestnut grower W.C. Deming of Litchfield and grafted by the Hartford Park Department. The second tree from the gate is a graft of the cultivar Bartlett that was developed by the Bartlett Tree Co. in Stamford. All have been used by The Experiment Station and the American Chestnut Foundation in crosses with American chestnut trees to produce blight-resistant forest and orchard trees.

### **2. Sheet Composting with Oak and Maple Leaves**

Dr. Abigail Maynard and Dr. David Hill *Assisted by* Mr. Collin McCarthy

Many homeowners have a predominance of oak trees in their backyards. Oak leaves are known to be more resistant to decomposition than maple leaves. This experiment is investigating whether this difference in the rate of decomposition leads to decreased yields in soils amended with oak leaves compared to maple leaves and unamended controls. Undecomposed oak and maple leaves were layered about 6 inches thick in the falls of 1995-2015 and incorporated into the soil by rototilling. Yields from plots amended with oak leaves were compared to plots amended with maple leaves and the unamended controls. In 2015, the greatest bean yields were from plots amended with maple leaves (23.4 lbs./10 ft. row) followed by plots amended with oak leaves (22.0 lbs./10 ft. row) and the unamended control plots (19.8 lbs./10 ft. row). Lettuce yields from the plots amended with maple leaves averaged 1.8 lbs./head compared to 1.6 lbs./head from plots amended with oak leaves and 1.5 lbs./head from the unamended control.

### **3. Curiosity Garden**

Dr. Abigail Maynard and Dr. David Hill *Assisted by* Mr. Collin McCarthy

This demonstration plot contains a potpourri of vegetables grown to pique the interest of home gardeners and growers of specialty crops. Included are two varieties of globe artichokes, grown specifically for annual culture from seed. Four new cultivars of miniature pak choi are being evaluated to add to our knowledge from previous Chinese vegetable trials. Also being grown are kalettes which was developed through traditional breeding methods by crossing kale and Brussels sprouts. Grown and harvested similarly to Brussels sprouts, the florets are open rosettes resembling flowers, grown on stalks of tall, upright plants. Kale is being grown for comparison. Included also are two cultivars of beets (one red, one yellow), two cultivars of kohlrabi (one white, one purple), swiss chard (multicolored), and two heirloom varieties of tomatoes.

### **4. Nut Orchard**

Dr. Sandra L. Anagnostakis *Assisted by* Ms. Pamela Sletten

This orchard of nut trees was begun by Richard Jaynes in the spring of 1981. There are several named cultivars of chestnut and other nut trees included. Trees that fail to survive or produce well are replaced with new nut cultivars that we want to test for their production potential in Connecticut. All of the recently planted trees (in tree shelters) are butternuts (*Juglans cinerea*), seedlings from trees that may have some resistance to the butternut canker fungi that have nearly killed the large, grafted butternut trees in this plot.

### **5. The Effect of Chloride Nutrition on Fusarium Head Blight of Spring Barley**

Dr. Wade Elmer *Assisted by* Mr. Peter Thiel

Fusarium head blight is caused by the pathogenic fungus, *Fusarium graminearum*. The fungus can be found on corn, wheat, and barley. The disease can cause grain spoilage and introduce mycotoxins. Since chloride nutrition promotes disease resistance, these plots were designed to investigate the effect of KCl or NaCl at two rates on growth and disease severity. Half of the field was inoculated with *F. graminearum* and the other half was not inoculated. Disease and yield will be monitored.

### **6. Greenhouse Production of Figs in Self-Watering Planters**

Dr. Charles R. Vossbrinck *Assisted by* Mr. Richard Cecarelli and Mr. Mario DiNatale

Figs are a semi-tropical fruit, and will not withstand the winters in Connecticut, but will often come back from the roots. Three methods commonly used by the home gardener for overwintering figs are: wrapping the tree, leaning the tree over in a trench and burying it, and growing the trees in pots and storing them in the garage. We are developing methods for growing figs in 7- and 15-gallon pots with winter storage in a garage or other protected area. Six varieties are being tested for production, fig quality, and disease resistance. We are developing common practices that the home gardener can follow for successful production of figs on a small scale in pots. In addition we are testing the same 6 varieties of figs, grown and overwintered in the greenhouse in 20 gallon, self-watering (sub-irrigation) pots.



### **7. Use of Copper Oxide Nanoparticles on Fusarium Crown Rot of Asparagus**

Dr. Wade Elmer *Assisted by* Mr. Peter Thiel

Copper oxides that are manufactured at the nanoscale (<0.000,001 mm), are called nanoparticles (NP). Greenhouse trials have shown that asparagus transplants inoculated with *Fusarium* pathogens had 60% less *Fusarium* crown and root rot disease when treated with NP of CuO. These plots were designed to compare NP of CuO, to the larger equivalent form of CuO, the CuSO<sub>4</sub> salt, and to an untreated control. Yield and disease will be monitored to assess the treatment effect.

### **8. Commercial Chestnut Cultivars**

Dr. Sandra L. Anagnostakis *Assisted by* Ms. Pamela Sletten

These grafted trees are commercial cultivars of orchard chestnut trees. The largest trees are cultivar 'Colossal' (Japanese x European) which is the most frequently planted commercial cultivar in the U.S., with large acreages in Michigan and on the west coast. 'Eaton', in front, is a Chinese x (Japanese x American) cultivar released by CAES. The other trees are cultivar 'Bouche de Betizac', planted last year. We are evaluating the potential of these commercial chestnut cultivars for nut production here in Connecticut.

### **9. Remote Access Weather Station**

Dr. Francis J. Ferrandino *Assisted by* Ms. Joan Bravo

Remote-access weather stations are deployed at the three Connecticut Agricultural Experiment Station experimental farms located in Hamden CT, Windsor CT, and Griswold CT. One additional unit is located at Gouveia Vineyards in Wallingford CT, where a wine making trial for Saint Croix grapes is underway. Cumulative precipitation, growing degree days (GDD), frost events, and disease-risk assessments are recorded and/or calculated from the data collected.

### **10. Technical Demonstration Tent**

See program pages 9-11 for a schedule of Technical Demonstrations.

### **11. Commercial Chestnut Seedlings**

Dr. Sandra L. Anagnostakis *Assisted by* Ms. Pamela Sletten

These seedling trees are open pollinated (mostly Chinese) Dunstan chestnuts. They are not a cultivar (clones from a single tree), but a variety (a type) and are widely available for sale in garden centers. We will compare their growth and nut production with the grafted cultivars in plot #8.

### **12. Control of Blight on American Chestnuts**

Dr. Sandra L. Anagnostakis *Assisted by* Ms. Pamela Sletten

These American chestnut trees were planted in 1976 when they were 3 years old. Chestnut blight cankers were treated for 4 years, from 1978 to 1981, with our biological control using hypovirulent strains of the blight fungus. The control is working well to keep the trees alive and fruiting. Some of the trees are growing better than others. We do not know which trees were from seed collected in Wisconsin and which were from Michigan. It is possible that the difference in their ability to thrive in the presence of blight and hypovirulence indicates genetic differences in resistance. The grafted tree in the center of the east row is from an "American" chestnut in Scientist's Cliffs, MD, and the original tree resisted blight for many years (it may be a European hybrid). It definitely has some resistance, and is the best looking tree in the plot. Two grafted trees at the southeast corner are (*Chinese x American*) x *American* named cultivar 'Clapper' and have intermediate resistance to blight.

### **13. New Hybrid Chestnut Orchard**

Dr. Sandra L. Anagnostakis *Assisted by* Ms. Pamela Sletten

These trees are from some of our hand-pollinated crosses done in previous years, and were planted as seedlings. All are hybrids of American chestnut trees and blight-resistant Chinese, Japanese, or hybrid trees. They will be grown to evaluate their blight resistance in the presence of the biological control that we assume will move over from the adjoining plot. The trees that look most like American chestnut trees and have good blight resistance will be used in future crosses for timber trees. Others will be developed as orchard trees for Connecticut growers. The paper bags on the trees cover hand-pollinated flowers from this year's crosses.

### **14. Use of Nanoparticles of Metal Oxides to Suppress Soil-Borne Diseases of Eggplants and Watermelons**

Dr. Wade Elmer and Dr. Jason White *Assisted by* Mr. Peter Thiel

When metallic oxides of copper (Cu), manganese (Mn), and Zinc (Zn) are manufactured at the nanoscale (<0.000,001 mm), they are called nanoparticles (NP). These particles have unique chemical and physical properties not observed in equivalent bulk materials. We have observed that applying NP to plant leaves produces more yield. These plots will compare NP with other forms of copper for their ability to suppress root diseases of eggplants and watermelon.

### **15. Comparison of Graft Union Height on Chardonnay Grapevines**

Dr. Francis J. Ferrandino *Assisted by* Ms. Joan Bravo and Ms. Catherine Walters

The coldest layer of air during a radiation freeze (clear sky) is immediately above the soil or snow level. By elevating the graft union, the labor and expense of burying the graft union might be avoided. Chardonnay vines, Dijon clone 95 on C3309 rootstock, were transplanted to the vineyard in spring, 2007. Half are of standard grafting height and half have the graft union 26 inches above ground. Over the past 3 years yields have remained the same in spite of the height of the graft union.

### **16. Powdery Mildew on Chardonnay Wine Grapes**

Dr. Francis J. Ferrandino *Assisted by* Ms. Joan Bravo and Ms. Catherine Walters

Wine grapes and wineries are a relatively new industry in Connecticut. In the past 20 years, acreage planted to wine grapes has gone from 160 A to 620 A and the number of wineries has gone from 15 to 42, producing about 550,000 gallons of wine valued at between 12-14 million dollars per year. In our climate, powdery mildew has the greatest impact on wine-grape yield of all pathogens and pests. This plot is planted with Chardonnay vines, which are prized for the quality of the wine they produce, but are very susceptible to powdery mildew. Over the next few years the relation between the onset of powdery mildew and climate will be closely followed in order to attune disease-risk models to our local weather conditions.

### **17. Table Grape Demonstration Plot**

Dr. Francis J. Ferrandino *Assisted by* Ms. Joan Bravo and Ms. Catherine Walters

The row to the south and the two rows to the north of the hybrid winegrape trials consist of the seedless table grapes Canadice and Vanessa (red), Himrod (green), and Jupiter (black). The vines were planted in 2006 and bore their first (small) crop in 2008, with full crops since. Each row is trained to a different training system: Vertical Shoot Positioning, Hudson River Umbrella, and Smart-Dyson.

### **18. Seedlings of Old Surviving American Chestnuts**

Dr. Sandra L. Anagnostakis *Assisted by* Ms. Pamela Sletten

In the southern U.S., large surviving American chestnut trees have been found scattered through the range. When we checked the blight fungi in the cankers on these old trees, we found several new kinds of hypovirulence viruses. We believe that these trees have a little more resistance than surrounding trees, which all died of blight, and that allowed viruses from other fungi in the area to infect the blight fungus. The American Chestnut Cooperators Foundation ([www.ppws.vt.edu/griffin/accf.html](http://www.ppws.vt.edu/griffin/accf.html)) has been collecting cuttings from these survivors and grafting them together in orchards where they can cross with each other. This will allow any resistance genes present in individuals to be joined together in the resulting seedlings. The ACCF sent us this collection of seedlings that we have inter-planted with seedlings from crosses of American trees here at Lockwood Farm. We will compare their winter hardiness and blight resistance with that of the European chestnut trees from Turkey and the old American chestnut trees north of them.

### **19. Wild Chestnuts from Turkey**

Dr. Sandra L. Anagnostakis *Assisted by* Ms. Pamela Sletten

These seedling trees are from six wild populations along the Black Sea in Turkey. Those from the eastern border are near the population in the Caucasus Mountains where European chestnuts (*Castanea sativa*) survived the ice ages, and are genetically quite diverse. Those from the western border are much less diverse. We are growing these here to compare their winter hardiness (not very!) and resistance to chestnut blight disease (also not very!) with that of American chestnut trees and with the seedlings from "old survivors" planted next to them.

### **20. Questions and Answers Tent**

Mr. Robert Durgy, Ms. Rose Hiskes, Dr. Yonghao Li, Ms. Lindsay Patrick, Ms. Diane Riddle, and Dr. Gale E. Ridge

This is a great opportunity to ask the experts about growing plants, testing soil, and identifying plants, plant diseases, and insects. Bring samples of soil, symptomatic plants, and insects for testing and identification. Visit the displays and pick up fact sheets about current insect and disease problems.

### **21. Hamden Police Department**

The Hamden Police Department's goal is to enforce the law in a fair and impartial manner, recognizing both the statutory and judicial limitations of police authority and the constitutional rights of all persons. <http://www.hamden.com/content/219/228/default.aspx>

### **22. Composting Leaves Using the Static Pile Method**

Dr. Abigail Maynard and Dr. David Hill *Assisted by* Mr. Collin McCarthy

Since the 1991 ban on disposing leaves in landfills, large-scale leaf composting has spread throughout Connecticut. Some 84 municipalities are currently composting their leaves. In static pile composting, leaves are piled and the internal temperature of the pile is monitored. As the leaves decompose, the temperature in the center of the pile reaches a temperature of about 140°F. When the temperature decreases, the pile is turned and fresh material is introduced to the center of the pile. Turning also aerates the pile. Leaf

compost is seen here in various stages of decomposition. The finished compost is used in experiments here at Lockwood Farm and at the Valley Laboratory in Windsor.

### **23. Verizon Wireless**

Learn about the cellular transmission tower.

### **24. The Farmer's Cow**

Kathy Smith

The Farmer's Cow is an innovative, premium milk brand produced and marketed by Connecticut family-owned dairy farms. The Farmer's Cow was formed in response to consumers' interest in purchasing fresh, naturally produced, local products. Collectively, The Farmer's Cow member farms milk 2,300 cows and manage over 6,000 acres of Connecticut farmland. The Farmer's Cow milk is currently available in over 100 grocery stores throughout the state. A complete listing of retailers is shown at [www.thefarmerscow.com](http://www.thefarmerscow.com). The Farmer's Cow is sold in half gallon cartons in whole, 2 percent, 1 percent, and skim varieties. Chocolate milk and single-serve packaging are under development. The owners of The Farmer's Cow are active members in The Connecticut Farmland Trust and The Working Lands Alliance who are working to protect and preserve Connecticut farmland. They were also the founding members of "Very Alive," a non-profit organization dedicated to the promotion of Connecticut Agriculture. Connecticut farms contribute \$2 billion annually to the local economy. 51 percent of Connecticut farmland is in dairy or dairy support. In 2003, there were 191 dairy farms remaining in Connecticut. The Farmer's Cow owners are: Paul and Diane Miller, Fairvue Farms, Woodstock; Bill, Tom and Greg Peracchio, Hytone Farm, Coventry; Ned and Renee Ellis, Mapleleaf Farm, Hebron; Jim and Don Smith, and Nate Cushman, Cushman Farms, Franklin; Peter Orr and Family, Fort Hill Farms, Thompson; Robin and Lincoln Chesmer, Graywall Farms, Lebanon. Further information can be found at [www.thefarmerscow.com](http://www.thefarmerscow.com), [www.ctfarmland.org](http://www.ctfarmland.org), and [www.workinglandsalliance.org](http://www.workinglandsalliance.org).

### **25. Kid's Korner**

Ms. Kathryn Soleski, Ms. Lisa Kaczinski Corsaro, and Ms. Tracy Zarrillo

Come to the Kids' Korner to pick up your child's passport and a gift. The passport is a special activity for young children to help them enjoy and explore Plant Science Day. There are six different stations located throughout Lockwood Farm that they can visit, where they can ask questions, learn about the topic featured at the station, and then receive a special stamp for their passport. Once the passport is complete, they can go to the Girl Scouts' (plot 26) to collect a CAES patch.

### **26. Self-Guided Activity for All Children, Including Girl Scouts**

Ms. Terri Arsenault

Children can come to this plot to complete an age appropriate, self-guided activity, to earn a patch of their choosing among several options. Children are directed to a few of the many exhibits where age appropriate activities and speakers are available just for them. In addition, Girl Scouts will have the option to earn the Naturalist Legacy badge appropriate for their level of scouting. On October 1, 2007, Girl Scouts of Connecticut became the largest organization of women and girls in Connecticut, serving over 47,300 girls. The mission of Girl Scouts is to build girls of courage, confidence, and character, who make the world a better place through a diverse range of fun, and horizon-stretching experiences. We encourage everyone to use this opportunity to learn something new about the natural world, and use your new knowledge to make the world a better place.

### **27. Experiment Station Associates**

Ms. Anne Rowlands

Information is available on this organization formed to help promote scientific advances at The Connecticut Agricultural Experiment Station. Visit their webpage at: <http://www.ct.gov/caes/ESA> or <http://www.agstationfriends.org>.

### **28. Fiddlehead Trials**

Dr. Abigail Maynard and Dr. David Hill *Assisted by* Mr. Collin McCarthy

Fiddleheads are the furled fronds of a young fern, harvested in spring for use as a vegetable. Ultimately, each fiddlehead would unroll into a mature frond. The most popular fiddlehead is that of the ostrich fern (*Metteuccia struthiopteris*), often called the fiddlehead fern. The ferns are available commercially either canned or frozen, but since the early 1980's, farmers' markets and supermarket chains have sold fresh ferns in season. Its flavor is similar to asparagus with a pleasantly crunchy, tender-firm texture. In this trial, we are determining the number of fiddleheads that can be harvested from each clump to optimize both the yield of fiddleheads and growth and health of the fern plant. This experiment is also duplicated at our Valley Laboratory in Windsor.

### **29. Removing and Destroying Methyl Bromide in Fumigation Chamber Vent Streams**

Dr. Joseph J. Pignatello and Dr. Hsin-Se Hsieh

Methyl bromide is a gas used to kill pests in soil and various commodities, such as produce and lumber. It is listed as an ozone depleting substance under the Montreal Protocol, but its use as a quarantine and pre-shipment (QPS) fumigant in international trade is currently exempted for lack of suitable alternatives. QPS fumigation is typically carried out within a cargo container or chamber, and

afterward the fumes are simply vented with forced air into the surrounding atmosphere. We have researched different ways to trap and/or destroy methyl bromide in the vent stream, where levels as high as 40,000 parts per million by volume can be reached. One way, to be featured in this exhibit, is entrapment by activated carbon, concurrent with, or followed by, chemical treatment to convert it to methanol and bromide ions that can be harmlessly discharged. Another way is to pass the vent stream through a “catalytic converter”—a heated catalyst bed that combusts methyl bromide to gases that are either harmless (carbon dioxide) or can be easily trapped and destroyed in a second converter (hydrogen bromide, bromine).

### **30. Hands-On Chemistry**

Dr. Christina Robb, Ms. Kitty Prapayotin-Riveros, Dr. Walter Krol, Ms. Terri Arsenault, Mr. Michael Cavadini, and Dr. Jason C. White

This display will include a number of “hands-on” experiments that will allow you to get up close and personal with chemistry in action. You will not only get to “play” with our chemists but also CAES staff members will explain the mechanisms and principles behind the chemistry.

### **31. Nanomaterials in Agriculture: Trophic Transfer and Co-Contaminant Interactions**

Dr. Roberto De la Torre-Roche, Dr. Sanghamitra Majumdar, Dr. Luca Pagano (University of Parma, Italy), Mr. Joseph Hawthorne, Mr. Craig Musante, and Dr. Jason C. White

Nanomaterials (NMs) have at least one dimension less than 100 nanometers (one billionth of a meter) and this small size results in unique and useful properties. For example, at that size range, materials that are normally good insulators actually become conductive (silicon) and other elements that are generally stable actually become chemically reactive (gold). Current nanomaterial use is ubiquitous; over 1600-NM containing products are commercially available in areas such as electronics, health-care, cosmetics, pharmaceuticals, agriculture, and food processing/packaging. One area of research being funded by a USDA Food Safety grant is seeking to characterize the potential trophic transfer of engineered nanomaterials within food chains. The NMs are added to soil, followed by the subsequent planting of crops (e.g. lettuce, zucchini, and tomatoes). After growth, the plant tissues are analyzed for NM content, as well as for molecular and physiological effects. Some leaves are used as food for herbivores such as crickets. Similarly, after cricket exposure, some insects are analyzed for NM content but others are used as food for secondary consumers (e.g. wolf spiders, mantis or lizards). Results indicate that particle size specific accumulation and trophic transfer occurs for some but not all nanomaterials. A second series of investigations is addressing how NM co-exposure might impact the accumulation and toxicity of secondary contaminants within food crops, including pesticides such as DDE, chlordane, and imidicloprid, as well as pharmaceutical compounds such as carbamazepine.

### **32. Integrating Forest and Roadside Management Objectives to Create Storm Resilient Forest**

Dr. Jeffrey S. Ward *Assisted by* Mr. Joseph P. Barsky and Ms. Amanda Massa

Abstract: Residents throughout the region have been affected by recent storms that negatively impacted both utility and transportation infrastructures through prolonged outages and impassable roads. Hanging, fallen, and/or broken trees have contributed to many outages. We have begun a collaborative project of managing roadside forests to increase utility reliability while maintaining their aesthetic appeal by integrating silvicultural and arboricultural practices. Collaborators on this project include: Audubon Connecticut, University of Connecticut, Connecticut Light and Power, Connecticut Department of Energy and Environmental Protection, and several forest landowners.

### **33. The Public Health and Entomology Tent**

#### **a. The “Deer” Tick *Ixodes Scapularis***

Dr. Kirby C. Stafford III *Assisted by* Ms. Heidi Stuber, Ms. Megan Carroll, and Ms. Erika Rayack

The blacklegged tick or “deer” tick *Ixodes scapularis* transmits the agents of Lyme disease, babesiosis, anaplasmosis, and a new relapsing fever *Borrelia* in Connecticut. Observe live and preserved ticks under the microscope. The latest information on natural and biological control are available.

#### **b. Mosquito Surveillance for West Nile and Eastern Equine Encephalitis**

Dr. Philip Armstrong, Dr. Theodore Andreadis, and Mr. John Shepard *Assisted by*: Ms. Angela Bransfield, Mr. Michael Misencik, Mr. Michael Thomas, Ms. Stephanie Canales, Mr. Daniel Cole, Mr. Alexander Diaz, Mr. Max Engel, Mr. Ryan Gregory, Mr. Michael Olson, Ms. Cora Ottaviana, Mr. James Maccone, and Ms. Sofia Moscovitz

Mosquito-borne viral diseases constitute an annual threat to human health in Connecticut. A comprehensive surveillance program, complemented by science-based controls and timely public outreach, are the most effective ways of protecting the public and reducing the risk of human disease. Experiment Station scientists and technicians monitor mosquitoes, eastern equine encephalitis (EEE), and West Nile virus activity at 91 locations throughout Connecticut from June-October. This information is used to assess environmental risk of human infection and guide mosquito control and other disease prevention efforts as needed. To date, the program has collected and tested over 3 million mosquitoes representing 52 different species since 1997. A total of 1,738 West Nile virus isolations have been recovered from 21 different mosquito species and a total of 399 isolations of EEE virus isolations have come from 19 species of mosquitoes. West Nile virus has been detected every year since its introduction into Connecticut in 1999. Virus activity peaks from

July-September and is most frequently detected in densely-populated areas of lower Fairfield and New Haven Counties, and the Hartford metropolitan area. Seasonal transmission of EEE virus occurs sporadically and the focal areas are located near forested swamps in southeastern Connecticut. Further information on weekly test results and annual summaries for previous years can be found on the CAES web site ([www.ct.gov/caes/mosquitotesting](http://www.ct.gov/caes/mosquitotesting)).

### **c. Tick Testing Program for Lyme and Allied Diseases**

Dr. Goudarz Molaei *Assisted by* Mr. Tommy Ferri, Ms. Magali Bazzano, Mr. Charles Sisson, and Mr. Jianxun Shen  
Department of Environmental Sciences & Center for Vector Biology & Zoonotic Diseases

Tick-associated illnesses including Lyme disease (LD) constitute a major threat to human health in Connecticut. In 2014, 96% of confirmed LD cases in the US were reported from 14 states including Connecticut with the 5<sup>th</sup> highest number of confirmed cases of LD ( $n=1719$ ) and 6<sup>th</sup> highest incidence (confirmed cases per 100,000 persons) rate of 47.8. The blacklegged tick, *Ixodes scapularis*, is the most important species in transmitting *Borrelia burgdorferi*, *Anaplasma phagocytophilum* and *Babesia microti*, the causative agents of LD, babesiosis, and anaplasmosis, respectively. The Tick Testing Program at the Connecticut Agricultural Experiment Station was established in 1990 following an earlier outbreak of an unknown illness and hospitalization of a large number of children in Lyme, Connecticut with arthritic and other symptoms. Each year, an average of 3,000 ticks are submitted for testing. Tick testing results in 2015 indicate that greater than 40% of ticks in Connecticut are infected with at least one pathogen capable of causing debilitating human illness. Of the 2406 ticks tested in 2015, nearly 33%, 11% and 5% were positive for the causative agents of LD, babesiosis, and anaplasmosis, respectively.

### **34. Bacteria Busters-CAES Research Fights Bacterial Plant Disease**

Dr. Lindsay R. Triplett and Dr. Teja S. Shidore *Assisted by* Mr. Derek LeJeune

Bacterial plant diseases are among the hardest to control. This exhibit highlights three different control methods that CAES researchers are studying to fight bacterial disease: Antibiotics, nanomaterials, and plant resistance genes. Hands-on displays will demonstrate how the different control methods work.

### **35. Sudden Vegetation Dieback of Connecticut Salt Marshes**

Dr. Wade Elmer *Assisted by* Mr. Peter Thiel

Salt marshes are the most productive ecosystems in Connecticut. Around 2000, large irregular, barren areas appeared along the intertidal creeks from New Haven to New London. This phenomenon was Sudden Vegetation Dieback (SVD) and affects mostly smooth cord grass (*Spartina alterniflora*). A key feature of SVD is that the plants do not grow back the next year. We are studying the role of newly discovered pathogenic fungal species and the role of herbivorous nocturnal marsh crabs on recovery from SVD.

### **36. Invasive Insects in the Northeast**

Dr. Chris T. Maier *Assisted by* Ms. Tracy Zarrillo and Ms. Morgan Lowry

Invasive insects pose a significant threat to the economy and the biodiversity of our region. Annually, state and federal workers conduct surveys to detect new non-native insects and to determine the distributional range of established ones. Early detection, in particular, greatly decreases the cost of coping with invasive insects. The cost of foreign insects can be reduced even further by conducting research on their behavior and ecology to develop effective strategies to slow their spread or to eradicate them. During the last few years, we have examined the distribution and biology of the brown marmorated stink bug, the lily leaf beetle, the Eurasian spruce needleminer, the barberry fly, and several non-native bees. Currently, we are evaluating the impact of the lily leaf beetle upon native plants in the lily family.

### **37. *Stachybotrys* Species Found in Indoor Environments**

Dr. De-Wei Li

*Stachybotrys chartarum* (aka black mold) is a common mold in indoor environments. It gained unusual notoriety among indoor molds due to its potential health effects, especially for the mycotoxins it can produce. However, six additional species of *Stachybotrys*, *S. chlorohalonata*, *S. elegans*, *S. microspora*, *S. nephrospora*, *S. yunnanensis*, and *S. (Memnoniella) echinata* have been isolated from indoor environments. Among the indoor *Stachybotrys* species, *S. chartarum* is the predominant one, but *S. chlorohalonata* and *S. echinata* are also rather common.

### **38. Native Woody Shrubs**

Dr. Jeffrey S. Ward *Assisted by* Mr. Joseph P. Barsky

Native woody shrubs offer an alternative to exotics commonly used in landscaping. This collection of shrubs was assembled in 1962 and in 1976 it was arranged in its present form with a dry site on the gravel mound and moist site in the shallow, plastic-lined depression. Many of these shrubs flower in the spring; their flowers can be seen in the photographs. Others, such as sweet pepperbush, spirea, and buttonbush, flower in summer. Witch-hazel flower in early autumn. Birds are frequent visitors to the garden and quickly eat the mature fruit. These shrubs survive with minimal maintenance. Occasional mowing, annual removal of dead stems, and replenishment of mulch are performed. These shrubs have never been fertilized, watered, or treated for disease.

### **39. Bird and Butterfly Garden**

Ms. Jane Canepa-Morrison and Mr. Jeffrey Fengler

The Bird and Butterfly Garden creates several favorable habitats for our native birds, butterflies, and pollinating insects and helps us determine which plants may work best in southern Connecticut gardens. At this time of year, the garden is at its peak performance with plants thriving in the garden and meadow. Plant labels are placed near the plants in the garden to provide the botanical and common name. Throughout the day, we update our list of birds, butterflies, and moths spotted in the garden. The Bird & Butterfly Garden at Lockwood Farm is listed in the 'Nature Conservancy Open Days Directory for New England'. Do you have a butterfly garden or would like to start one? Experiment Station staff members can provide you support by answering your questions and suggesting ways for you to enjoy a butterfly garden small or large on your patio or in your yard.

### **40. Environmentally-Friendly Control of Powdery Mildew on Vegetable Plants**

Dr. Francis J. Ferrandino *Assisted by* Ms. Joan Bravo

Many vegetable plants commonly grown in Connecticut gardens are subject to powdery mildew. This disease is caused by a fungus that grows on the surface of plant tissue giving the foliage a white powdery appearance. The result is relatively unsightly and the fungus weakens infected plants by feeding on the sugar the plant produces and by blocking sunlight, which limits the ability of the plant to produce more sugar. This plot is planted with a number of common vegetables (tomato, pepper, eggplant, pumpkin, and muskmelon) which are susceptible to powdery mildew. Environmentally-friendly foliar sprays, including milk (20% in water), Potassium bicarbonate (1% in water) and light horticultural oil (1% in water), will be compared to chemical fungicides in their ability to control the disease.

### **41. Pollinator Habitat on Connecticut Vegetable Farms**

Dr. Kimberly Stoner *Assisted by* Ms. Tracy Zarrillo, Ms. Morgan Lowry, and Mr. Ben Gluck

Growers of fruiting vegetables, such as pumpkins, squash, cucumbers, tomatoes, and peppers, benefit from having pollinators visiting their crops. Pumpkins and squash and some varieties of cucumbers require pollination to set fruit, while tomatoes and peppers produce larger fruit and greater yield as a result of insect pollination. Many plants that farmers grow for other reasons also benefit pollinators, including herbs, cut flowers, and many cover crops. This display presents information from a survey of 10 Connecticut vegetable farms about bee visitation to these alternative floral resources. This project was funded by the Connecticut office of the Natural Resources Conservation Service as a Conservation Innovation Grant.

### **42. Invasive Aquatic Plant Program**

Mr. Gregory Bugbee and Dr. Mark June-Wells *Assisted by* Mr. Michael Cavadini, Ms. Jennifer Fanzutti, Ms. Jordan Gibbons, and Mr. Brian Hart

Connecticut lakes and ponds face an imminent threat from non-native invasive plants. Recently introduced plants such as Eurasian milfoil, variable milfoil and fanwort are of great concern. Their dense stands often reach the surface and interfere with recreational uses. Invasive species drastically alter native ecosystems leading to the decline in native plants, fish and other beneficial organisms. Researchers, in the Department of Environmental Sciences, are documenting our states invasive aquatic plant problem and studying management options. We are continuing a statewide inventory of freshwater aquatic vegetation. From 2004 - 2010, the invasive and native plants in 170 lakes and ponds were surveyed and mapped. We documented over 100 plant species with 13 of them being invasive. Approximately two-thirds of the water bodies contained one or more invasive species. In 2010, we resurveyed several lakes we originally surveyed in 2004 and observed dramatic increases in the area of invasive species. Requests for station assistance in managing unwanted aquatic vegetation are common. A search is underway to discover novel ways to control invasive aquatic plants. These include reduced risk herbicides and biological agents such as the Eurasian water milfoil weevil and grass carp. At this plot you will see our aquatic plant surveillance and control boat and underwater video equipment. Samples of the most common invasive aquatic plants will be on display and an identification guide will be available. A researcher will be available to discuss our program answer questions about lakes and ponds.

### **43. Chestnut Species and Hybrids**

Dr. Sandra L. Anagnostakis *Assisted by* Ms. Pamela Sletten

These trees are part of the large collection of species and hybrids of chestnut maintained by The Experiment Station. Great differences can be seen in chestnut blight resistance, Asian chestnut gall wasp resistance, form, and nut production. Hypovirulent strains of the blight fungus help protect the trees from lethal cankers (see CONTROL OF BLIGHT ON AMERICAN CHESTNUTS plot #12). Plants of all seven species of chestnut are growing here. One seedling from the Caucasus Mountains of Russia (a true European chestnut), planted in 1994, has not survived well through our Connecticut winters. Commercial European chestnut trees from Northern Turkey have also done poorly. Two trees of the chinquapin native to Florida are planted across the road from an Allegheny chinquapin from Pennsylvania. The original tree (the "ortet") of the cultivar 'Lockwood' is at the southwest corner of the plot.

#### **44. Healthy Plants—Healthy Business: Support of the Green Industry by Inspection**

Dr. Victoria L. Smith *Assisted by* Ms. Tia Blevins and Mr. Jeffrey Fengler

We work to assure the quality of the agricultural products leaving the state and to maintain the health of forests and Connecticut's agricultural industry. In 2015, the Office of the State Entomologist completed registration and inspections for 275 nursery growers and dealers of plants and plant products. Over 500 certificates of export were issued for plant commodities moving out of state or out of country. Nearly 400 beekeepers registered 7,100 hives, and over 1,000 of these were inspected for diseases of honeybees. In addition, surveys were conducted for a variety of exotic pests and diseases, and health of our forests was assessed by aerial survey. Our goal is to safeguard agriculture and forests of Connecticut through surveys to detect infestations, through monitoring of the health and vitality of the forests, and through inspection and registration of commodities and producers to assure their fine quality.

#### **45. The Cooperative Agricultural Pest Survey (CAPS) Program and Farm Bill Surveys**

Ms. Katherine Dugas *Assisted by* Mr. Zachary Brown

The Cooperative Agricultural Pest Survey (CAPS) Program conducts science-based national and state surveys targeted at specific exotic plant pests, diseases, and weeds identified as threats to U.S. agriculture and/or the environment. These activities are accomplished primarily under USDA funding that is provided through cooperative agreements with state departments of agriculture, universities, and other entities. Surveys conducted through the CAPS Program represent a second line of defense against the entry of harmful plant pests and weeds. This year in Connecticut, CAPS pest surveys are being conducted in nurseries and Christmas tree farms. Additionally, CAES is conducting pest surveys with funding from the Farm Bill in orchards and berry farms.

#### **46. Kabocha Squash Trials**

Dr. Abigail Maynard and Dr. David Hill *Assisted by* Mr. Collin McCarthy

Kabocha is a generic term for squash in Japan, but in North America, kabocha is a specific type of winter squash. It has a hard, dull, bumpy dark green shell marked with pale, celery green striations. Round with a flattened top, it ranges from one to eight pounds, but generally averages two to three pounds. It has a brilliant yellow-orange flesh with a naturally sweet flavor and texture similar to pumpkin and sweet potato. When kabocha is harvested, it is immature with dry, bland-tasting, pale yellow flesh. In order to enhance sweetness and maturity with a bright orange color, it must be ripened to full maturity. It reaches the peak of ripeness about 6-12 weeks after it is harvested. Two cultivars of kabocha were included in our winter squash trials in 1997-1998 but there are now over 20 cultivars on the market including both regular and new smaller (1 lb.) personal-sized types. This 3-year trial, which is also repeated at the Valley Laboratory in Windsor, is evaluating the yield and quality of ten cultivars of kabocha squash. Included in the trials are 7 short-vined and 3 long-vined varieties as well as 3 personal-sized varieties. Last year, Thunder (13.5 lbs./plant) and Eclipse (13.4 lbs./plant) averaged the greatest yields.

#### **47. Okra Trials**

Dr. Abigail Maynard and Dr. David Hill *Assisted by* Mr. Collin McCarthy

Okra is grown for its long pointed seed pods, which are used in gumbos and soups. It is best picked when the pods are young and immature or about 2-4 inches long. It is considered a delicacy in the southern United States particularly when breaded with corn meal and deep fried. It is in the same family as cotton, hollyhocks, and hibiscus which make it a nice ornamental plant as well. Okra plants are extremely drought resistant which make a popular vegetable in countries with difficult growing conditions. It grows best in hot weather with warm soils so that yields are usually increased when grown with black plastic mulch in the Northeast. In this trial, we are growing 10 cultivars of okra to determine which performs best in Connecticut's climate and soils. In addition, we are growing the crop with and without black plastic mulch to determine whether the expected increased yields utilizing the black plastic mulch is enough to offset the added expense of the plastic. Last year, North and South averaged the highest yields (98 pods/plant). Yields from the black plastic amended plots averaged 92% greater when compared to plots with no plastic. This 3-year trial is also repeated at our Valley Laboratory in Windsor.

#### **48. Brussel Sprouts Trials**

Dr. Abigail Maynard and Dr. David Hill *Assisted by* Mr. Collin McCarthy

Brussels sprouts are related to other better-known vegetables in the mustard family including broccoli, cabbage, and cauliflower. Typically, it is grown as an annual and the axillary buds, which resemble miniature cabbages, are harvested either by hand with several harvests of 5-15 sprouts, or by cutting the entire stalk at once for processing. Each stalk can produce 2-3 lbs. per stalk. Brussels sprouts grow best in temperatures ranges of 45-75°F with the highest yields at 60-65°F. Quality does not decrease from freezing, and, in fact, sprouts are considered to be sweetest after a frost. Sprouts that develop in hot weather often do not form compact heads and can be bitter. In this trial, we are growing 10 cultivars of Brussels sprouts to determine which performs best in Connecticut's climate and soils. In addition, we are growing the crop with and without black plastic mulch. Black plastic mulch controls weeds. However, as Brussels sprouts are cool loving plants and black plastic raises the soil temperature, it is important to determine the effect of plasticulture on the yield and quality of marketable sprouts in Connecticut. This 3-year trial is also repeated at our Valley Laboratory in Windsor.



#### **49. Sweet Potato Trials**

Dr. Abigail Maynard and Dr. David Hill *Assisted by* Mr. Collin McCarthy

A 1998 Connecticut Department of Agriculture survey showed that sweet potato is one of the most popular specialty vegetables. In the South, the sweet potato is also called yam, but both are identical species. In the United States, North Carolina and Louisiana are the leading producers where they are grown in hilled soil. Since they have a long growing season and thrive in warm soil, they have always been grown in the Northeast with black plastic mulch. However, black plastic mulch and hilling the soil increases both the labor and the cost per acre of producing the crop. In this trial, we are determining whether black plastic mulch and hilled soil are necessary for optimum production of sweet potatoes in Connecticut. We have 4 treatments: black plastic/flat soil, black plastic/hilled soil, no mulch/flat soil, and no mulch/hilled soil. In this way, we will determine the cultural method for growing sweet potatoes which is most productive and economically the most feasible.

#### **50. Hybrid and Vinifera Winegrape Cultivar Trial**

Dr. Francis J. Ferrandino *Assisted by* Ms. Joan Bravo

This vineyard was planted in late spring, 2008. Some of the new cultivars are selections from breeding programs at Cornell University and the University of Minnesota and have not yet been released, while others are newly available cultivars from cool and cold climate areas of Europe. The new cultivars are being compared to established cultivars. Another, smaller, cultivar evaluation plot has been established at the Windsor station.

#### **51. Pinot Gris Cultural Trials**

Dr. Francis J. Ferrandino *Assisted by* Ms. Joan Bravo

A planting of 288 Pinot Gris vines was established in 2004. Half of the vines are on 101-14 rootstock, and the other half are on C3309. Vines on C3309 have had greater winter mortality and increased incidence of crown gall. Horticultural oil was applied at bloom in 2006-2008. Application of oil reduced photosynthesis and fruit set, resulting in less compact clusters that may be more resistant to late-season fruit rot diseases. This summer the half acre plot is being used to measure detailed wind statistics in the vineyard.

#### **52. The Rock**

This rock is (technically) a Glacial Boulder composed of diabase. It was moved by flowing ice from its place of origin, and is therefore also known as a Glacial Erratic. The boulder probably fell onto the top of the glacier oozing its way down past the Sleeping Giant's head during the waning stage of the last continental glaciation. It was deposited here, near the toe of the waning glacier, onto "till", an unsorted mass of sandy or silty material mixed with rounded pebbles and boulders that had been pushed in front of, or under, the glacier, and deposited as the ice melted. Most of the boulders around the area, such as those in the nearby stone walls, are rounded and their surfaces have been ground smooth by abrasion beneath the glacier. Diabase has a fine crystalline texture, having been pushed up as magma close to the surface where it cooled quickly. The "trap rock" of this region is either diabase, or its compositional equivalent basalt that was extruded onto the surface as lava flows that form topographic "trappa" or "trappe" (steps or stairs).

#### **53. Rocky Hill American Chestnut Trees**

Dr. Sandra L. Anagnostakis *Assisted by* Ms. Pamela Sletten

Seed collected from selected American chestnut trees in a woodlot in Rocky Hill, CT in 1985 grew into the trees planted here. They are used as female parents in our crosses and are being treated with hypovirulence (see CONTROL OF BLIGHT ON AMERICAN CHESTNUTS plot #12) to keep them alive.

#### **54. Asian Chestnut Gall Wasp on Chestnut**

Dr. Sandra L. Anagnostakis *Assisted by* Ms. Pamela Sletten

Many of the chestnut trees here at Lockwood Farm are heavily infested with Asian chestnut gall wasp (*Dryocosmus kuriphyllis*). The insect was first detected in CT in 2011, but has done serious damage to commercial orchards in the mid-west and in Italy. We have been making crosses of susceptible trees with chinquapins which seem to have good resistance to this insect, and some are planted here. There are more wasp galls on some of these trees than on others, and we will continue to evaluate the effect of these galls on the growth and nut production of the trees.

#### **55. Beach Plum Trials**

Dr. Abigail Maynard and Dr. David Hill *Assisted by* Mr. Collin McCarthy

Beach plum (*Prunus maritima* Marsh.) is a fruiting shrub native to the coastal dunes of the Northeastern United States. Beach plum jam has become a premium product especially in the Cape Cod region. Currently, consumer demand for beach plums is greater than the supply. Commercial production is the only way to meet the demand for beach plums and its relatively low growth habit makes it ideal for a pick-your-own operation. In its native seaside habitat, beach plums grow very slowly and bear fruit sporadically. Growth in more fertile soil should be more vigorous and crop size will be improved. In spring 2003, 210 beach plum seedlings were planted at Lockwood Farm and 96 at the Valley Laboratory. These seedlings were raised at Cornell University from seeds collected from 35

sites from Maine to Delaware. The trees are evaluated annually and select elite individuals will be propagated as possible cultivars in the future.

### 56. Pawpaw Trials

Dr. Abigail Maynard and Dr. David Hill *Assisted by* Mr. Collin McCarthy

Pawpaws are shrubby trees that are native to the temperate woodlands of the eastern United States. The American Indian is credited with spreading pawpaws across the eastern U.S. to eastern Kansas and Texas, and from the Great Lakes almost to the Gulf. They are woodland understory plants that need shade to protect the seedlings but once established prefer full sun. They produce maroon, upside-down flowers which are self-incompatible, requiring cross pollination from another unrelated pawpaw tree. They are not pollinated by bees but by flies and beetles. The pawpaw is the largest edible fruit native to America. Individual fruits weigh 5 to 16 ounces and are 3 to 6 inches in length. The tasty fruit has a smooth, custard texture. In this trial, 4 cultivars of pawpaws were planted in 2002. Since 2013, annual yields were recorded from each tree. Thus far, the cultivars Rebecca's Gold and Overleese have averaged the greatest yields (43 and 39 fruit/tree, respectively) with Sunflower producing the largest fruit (6.9 oz/fruit).

### 57. Japanese Plum Variety Trials

Dr. Abigail Maynard and Dr. David Hill *Assisted by* Mr. Collin McCarthy

As wholesale marketing of major tree fruits becomes unprofitable, many Connecticut growers are turning to retail sales of their fruit. For a retail operation to be successful there must be a diversity of products. Thus, many growers are interested in adding minor specialty fruits to their operations. Consequently, we have expanded our New Crops Program to include fruits. This trial, also repeated at the Valley Laboratory in Windsor, includes 12 cultivar/rootstock combinations of Japanese plum. Many trees were severely damaged by black knot disease and were removed from the orchard. However, the cultivar Obilinaja (planted in the first row) has been relatively free of the disease.

### 58. Hybrid Elm Trees

Dr. Sandra L. Anagnostakis *Assisted by* Ms. Pamela Sletten

The late Eugene Smalley spent his whole career at the University of Wisconsin breeding elm trees for resistance to Dutch Elm Disease and for the tall, vase-shaped form of American elm trees (*Ulmus americana*). The problem with this kind of breeding is that American elms have four sets of chromosomes, and all the other species of elm have two sets. They bloom at different times, but stored pollen can be used to make crosses. In 1992, Dr. Smalley sent us trees of Chinese elm (*Ulmus parvifolia*) and some of his successful crosses. Mortality has been high, but some of the trees still survive. A few of them look like good replacements for American elms as street trees.

### 59. Management of Boxwood Blight, A New Disease of Boxwood and Pachysandra

Dr. James A. LaMondia and Dr. Katja Maurer, *Assisted by* Ms. Michelle Salvat and Mr. Nathaniel Child

Boxwood blight, caused by the pathogenic fungus *Calonectria pseudonaviculata*, is a recent, introduced disease in Connecticut. The impact of the disease has been great; boxwood plant losses have been estimated at over \$5 million in Connecticut since 2011. We conducted experiments to identify fungicides with activity and have determined the effects of these plant protection chemicals on conidial germination, leaf infection, and ability to suppress or kill different life stages of the pathogen. These fungicides are being applied alone and in combination at different time intervals to boxwood plants in pots in the greenhouse and at the CAES Valley Laboratory container nursery area to evaluate protective and curative disease control. Research results are being used to develop effective fungicide management programs with different and complementary combinations of active ingredients to prevent and manage disease while evaluating the potential for and reducing the development of fungicide resistance.

### 60. Know Your Weeds-Identification and Control

Dr. Jatinder S. Aulakh

The simplest definition of a weed is "A plant growing where it is not wanted". Weeds have been categorized in several different ways depending on their life cycle (annuals, biennials, and perennials), morphology (grasses, broadleaves, and sedges), and habitat (aquatics and terrestrials), etc. Correct identification and knowledge of weed biology and ecology are the keys to effectively manage weeds. The weed management plot will provide information on identification of non-native invasive plants and key weed species in ornamental plants, home-lawns, and chemical and non-chemical measures for their control. Live specimens of weeds and non-native invasive plants will be displayed and supplementary literature will be available.

### 61. Hops – A New Crop for Connecticut

Dr. Katja Maurer and Dr. James A. LaMondia *Assisted by* Mr. Nathaniel Child and Ms. Michelle Salvat

Growing hops has just started in CT and it seems to be a promising crop for the future. The recent interest in hop cultivation is based on the increasing popularity of microbrew culture, local brewpubs and the growing demand for regional products. To evaluate the feasibility of producing hops in CT, we established two hop yards with several cultivars using high and low trellis systems to evaluate yield, growing characteristics, and susceptibility to diseases and pests at the Lockwood Farm, Hamden and at the Valley Laboratory, Windsor. Our research, which involved five hop varieties, identified two, Cascade and Summit, to be well suited for CT. The high

trellis system resulted in better yields for all varieties except Summit. The most common diseases and pests are downy mildew, which is the most dreaded disease in New England, aphids, and spider mites. A novel pest, the potato leafhopper, appeared unexpectedly last year and caused severe damage. However, diseases and pests can be controlled by intensive scouting and management. Therefore, we are establishing a region-specific integrated pest management program. Our research has demonstrated the general feasibility of hop production in CT.

## **62. Biological Control of Hemlock Woolly Adelgid and Mile-a-Minute Weed in Connecticut**

Dr. Carole Cheah, *Assisted by* Mr. Emmett Varricchio

Hemlock woolly adelgid, *Adelges tsugae* (HWA) has been a serious forest, nursery and landscape exotic pest since its first detection in Connecticut in 1985. The Station, with the support of the USDA Forest Service, discovered, reared and released >176,000 of the tiny Japanese ladybeetle, *Sasajiscymnus tsugae*, for biological control of HWA between 1995 and 2007. From 2005-2009, there was widespread recovery of forest hemlocks in beetle release sites, and these are currently being reassessed. However, recent warm winters have also promoted the expansion of another serious exotic pest, the elongate hemlock scale, (EHS), concurrently damaging hemlocks. Unpredictable and severe winters, 2014-2016, have also severely reduced HWA populations in Connecticut, giving hemlocks a reprieve statewide from adelgid attack. Similarly, mile-a-minute weed, *Persicaria perfoliata* (MAM), an exotic invasive species, initially reported in Connecticut in 2000, has now spread to 43 towns. In 2009, a tiny weevil, *Rhinoconomus latipes*, herbivorous only on MAM and imported from China, was first released in Connecticut in collaboration with the University of Connecticut, as part of the federal biological control program for MAM. As of 2015, >45,000 weevils have been released in the most heavily infested 21 towns to control MAM and weevils have survived winters, adapted and spread in many areas. More releases will be occurring in 2016. Updates on the current pest status of these invasive species with information on the biological control programs are presented.

## **63. Emerald Ash Borer Research Update**

Dr. Claire E. Rutledge *Assisted by* Ms. Ionela M. Scott and Ms. Shelby Farnham

The emerald ash borer (EAB) is an invasive beetle from Asia that attacks and kills native ash trees. Since its first detection in Michigan in 2002 the beetle has spread across eastern North America. The station detected EAB in 2012 in Prospect Connecticut. Find out about the current distribution, and impact of EAB, and also about efforts that are underway to help manage this harmful pest. Highlighted will be EAB detection by citizen-scientists, the Wasp-Watchers who use a native wasp to detect and monitor EAB levels, and biological control of EAB in Connecticut.

## **64. The Pavilion at Lockwood Farm**

See program pages 9-11 for a schedule of short talks under the pavilion.

The pavilion at Lockwood Farm was commissioned by the Experiment Station's Board of Control with funds provided by the William R. Lockwood Trust. Completed in May of 2016, it was designed and built by Steven Strong of Strong Timber Frames, East Hampton, CT. All wood products used in construction of the pavilion are Connecticut grown. The posts, beams and walls are eastern white pine, grown and harvested from Babcock Pond Wildlife Management Area in Westchester, CT. The pegs and splines are white oak, harvested from the Strong 50-acre farm in East Hampton, CT. The pavilion is constructed using traditional timber framing post and beam techniques with large heart sawn timbers. The pavilion design features a large cupola with window and louver units that were constructed from the edges of the timbers. It functions to allow natural light and ventilation which provide an open feel in the interior of the building.

## **65. The Connecticut Botanical Society**

Truda Steinnagel

We are a group of amateur and professional botanists who share an interest in the plants and habitats of Connecticut and the surrounding region since it was founded in 1903. Our goals are to increase knowledge of the state's flora, to accumulate a permanent botanical record, and to promote conservation and public awareness of the state's rich natural heritage. Our social media connections are: [www.ct-botanical-society.org/index.html](http://www.ct-botanical-society.org/index.html), [www.facebook.com/pages/CT-Botanical-Society/486881834720804](https://www.facebook.com/pages/CT-Botanical-Society/486881834720804), and [www.facebook.com/CTNotableTrees](https://www.facebook.com/CTNotableTrees).

## **66. The Connecticut Department of Energy and Environmental Protection Division of Forestry (CT DEEP Division of Forestry)**

Chris Donnelly, Larry Rousseau, Dick Raymond, Jen Hockla, and Hannah Reichle

The CT Department of Energy and Environmental Protection Division of Forestry performs a range of services for the citizens of Connecticut. Our state is about 60 percent forested, making it both one of the most forested and densely populated states in the country. Among its responsibilities, DEEP Forestry manages nearly 162,000 acres of state-owned forestlands, for the health of the forest and for the benefit of those who live in state. We also work with private forestland owners and municipalities, providing assistance with proper forest management, forest health, wildland fire control, the certification of forestry professionals and general technical support. Of the 1.86 million total acres of forest in Connecticut, private landowners own 1.54 million acres. Recent storms and the outbreak of the emerald ash borer have pointed out, again, how important our trees and forests are. At Plant Science Day, the

DEEP Forestry program will have representatives of the Private and Municipal Lands program, which focuses its efforts on outreach to the public regarding private forestlands and municipal tree programs, and from the Forest Practices group, which focuses on the certification of forestry professionals and the standards regarding the work performed on forestlands throughout the state. Questions regarding forests, trees, and forest and tree professionals are all fair game for this group. [www.ct.gov/deep/forestry](http://www.ct.gov/deep/forestry)

#### **67. The Connecticut Department of Energy and Environmental Protection Wildlife Division (CT DEEP Division of Wildlife)**

Kelly Cannon and Brendan Zielinski

The CT DEEP Wildlife Division is responsible for managing the state's wildlife through a program of regulation, research, management, and public education. The Outreach Program within the Division will be displaying information on the 150<sup>th</sup> Anniversary of the CT Bureau of Natural Resources and hands-on materials to learn more about Connecticut's common wildlife.

[www.ct.gov/deep/wildlife](http://www.ct.gov/deep/wildlife)

#### **68. Connecticut Professional Timber Producers Association**

Brennan Sheahan

The mission of the Association is to enhance the image and understanding of the forest products profession in Connecticut through public outreach programs, education and a commitment to professionalism amongst its members. The Association strives to enhance the image of the industry by:

- Communicating information to members.
- [Instituting ethical guidelines](#) and demanding a high degree of professional ethics among its members.
- Establishing forest practice standards for the timber harvesting and forest products profession.
- Promoting safety within the profession.
- Promoting Best Management Practices for the timber harvesting profession.
- Promoting education in the fields of forestry, timber harvesting, & forest products both within and outside the Association.
- Promoting superior utilization of forest products.
- Promoting the use of Connecticut wood products.
- Publishing a Connecticut Forest Profession Directory and a periodic newsletter.

Our website can be found at [www.timproct.org](http://www.timproct.org)

#### **69. The Sleeping Giant Park Association**

Julie Hulten

The Sleeping Giant Park Association is an all-volunteer 'friends group' dedicated to the care and upkeep of the Giant and the Sleeping Giant State Park since 1924. We field groups that engage in trail maintenance, environmental stewardship projects, and care-taking of a small garden designed to attract birds and butterflies. To encourage exploration of the Giant we offer 15+ guided and/or themed hikes throughout the year and promote hiking through our Giant Master's program (hike all 32 miles for a badge and certificate). We welcome all who hold the Giant dear. [www.sgpa.org](http://www.sgpa.org)

#### **70. United States Department of Labor (OSHA)**

Leona May and Tandy Mazo

Our agency's purpose is to assure safe and healthy working conditions for working men and women. Our Federal website is: [www.osha.gov](http://www.osha.gov). Our local offices are located in Hartford and Bridgeport, CT. To contact your local office call: Hartford 860-240-315 or Bridgeport 203-579-5581. Our exhibit will have literature available on topics including, but not limited to: chemical safety, tree trimming, chain saws, wood chippers, heat stress, teen worker safety, and construction.

#### **71. Connecticut Department of Labor CONN-OSHA (CONN OSHA)**

Catherine Zinsser

The Connecticut Department of Labor's Division of Occupational Safety and Health is referred to as CONN-OSHA administers Connecticut's Public Employer Only State Plan and enforces occupational safety and health standards as they apply to all municipal and state employees. In addition to having enforcement responsibilities in the public sector, CONN-OSHA provides on-site consultations to both public and private sector employers. The mission of the Connecticut Consultation Program is to provide timely, courteous, and professional service to Connecticut employers to help them recognize and control workplace hazards and prevent work-related injuries, illnesses, and fatalities. Our consultants also provide assistance in developing and implementing effective safety and health programs. These consultations are provided at the request of the employer and are free of charge. CONN-OSHA offers comprehensive training and education programs covering all aspects of occupational safety and health. Provided at no charge, these programs are designed to be utilized in conjunction with both consultation and enforcement activities.

<http://www.ctdol.state.ct.us/osha/osha.htm>

**72. United States Department of Agriculture Animal and Plant Health Inspection Service Plant Protection and Quarantine (USDA APHIS/PPQ)**

Eric Chamberlain

The mission of Plant Protection and Quarantine: APHIS-PPQ safeguards U.S. agriculture and natural resources from the entry, establishment, or spread of animal and plant pests and noxious weeds. Fulfillment of its safeguarding role ensures an abundant, high-quality, and varied food supply, strengthens the marketability of U.S. agriculture in domestic and international commerce, and contributes to the preservation of the global environment. 203-741-5643. <http://www.aphis.usda.gov>

**73. South Central Connecticut Regional Water Authority**

Lisa DeFrancesco

The importance of forest management practices in maintaining healthy land around our reservoirs and the impact on water quality. 203-777-1142. <http://www.rwater.com>

**74. Connecticut Forest & Parks Association**

Liz Fossett

The Connecticut Forest & Park Association (CFPA) is a 501c3 nonprofit organization dedicated to connecting people to the land in order to protect forests, parks, walking trails, and open spaces in Connecticut for future generations. With a staff of experienced conservation professionals and a Board of Directors who strongly support CFPA's mission and values, CFPA delivers programs on Blue-Blazed Hiking Trails, Environmental Education, Land Conservation, and Public Policy. Our headquarters is located at the James L. Goodwin Forest & Park Center in the Rockfall section of Middlefield.

[www.ctwoodlands.org](http://www.ctwoodlands.org)

**75. The Federated Garden Clubs of Connecticut, Inc.**

Arlene Field

The Federated Garden Clubs of Connecticut, Inc. is an educational, charitable non-profit organization comprised of 6,557 individual members, 125 clubs and 15 affiliate organizations. It is one of thirteen charter members of the National Council of State Garden Clubs, Inc., now known as National Garden Clubs, Inc. Our mission is to coordinate, stimulate and encourage higher standards in all aspects of Garden Club work and to protect and conserve natural resources, preserve our heritage and promote civic beauty. Our focus under our current President, Jane Waugh, is the planting of native oak trees in public locations across our state. It's our state tree and the best tree for supporting local wildlife. The Federation offers educational programs to our members and the community at large through our national curriculum across four schools: Flower Show School, Landscape Design Study School, Garden Study School and Environmental Studies School. Additionally, we have resources to address Garden Therapy, Historic/Memorial and Public Gardens, Horticulture, Legislative/Government Action, Public Relations, Scholarships and Youth Activities. The Federation sponsors The Connecticut State Flower Show held each February at the Convention Center in Hartford. Visit our website at [www.ctgardenclubs.org](http://www.ctgardenclubs.org).

**76. University of Connecticut Extension Master Gardener Program (UConn Extension Master Gardener Program)**

Jude Hsiang

The UConn Extension Master Gardener Program is an Educational Outreach Program of the University of Connecticut Extension System. Following their special training course, Master Gardeners commit time as volunteers to provide horticultural-related information to the community. Master Gardeners in New Haven County collaborate with parks departments, land trusts, community groups, and educational institutions at all levels to increase environmental awareness through hands-on programs. The University of Connecticut is an Equal Opportunity Employer and Program Provider. New Haven County Extension Center, 305 Skiff Street, North Haven, CT 06473, 203 407-3161. <http://mastergardener.uconn.edu/>

**77. Connecticut Environmental Council (CTEC)**

Erica Fearn

Today we will be talking about pollinators. Sound bee management is essential to keep bees healthy and able to battle pathogens and other stresses. We will also focus on using pesticides correctly. Connecticut Environmental Council (CTEC) unites individuals, businesses and industry associations that engage in the responsible use of pesticides and fertilizers to beautify, protect and provide healthy spaces and places. CTEC works to improve the quality of life for Connecticut families through leadership, stewardship, sustainability and compliance. CTEC is dedicated to clarifying facts and myths on fertilizer, pesticide and water use in our state. Active in government regulation, CTEC works with policy makers and regulators to be able to provide the best service and products to Connecticut residents. CTEC offers professional development and education opportunities to member businesses. Making Connecticut's spaces and places beautiful, safe, and pest-free. [www.ctenvironmentalfacts.org](http://www.ctenvironmentalfacts.org)

### **78. Hamden Land Conservation Trust**

Gail Cameron

The Hamden Land Conservation Trust is a group of Hamden residents who care about open space and work to protect it in our town. We also work to educate the public about ways to promote environmental practices in their own properties. We protect diverse natural environments including forests, woodlands, wetlands, tidal marsh, and more. The many areas that are not too fragile or unsafe for public access are available for walking, bird watching and simply relaxing. Maintaining the diversity of Hamden's habitat areas is at the heart of what we do. Our goal is to preserve what we can of Hamden's last remaining open space parcels, to protect our forests, farmland and other natural features for the benefit of today's families and future generations. The mission of the Hamden Land Conservation Trust is to protect and preserve open space in Hamden through purchase or easements, and to educate the public about conservation issues. [www.hlct.org](http://www.hlct.org)

### **79. Connecticut Department of Agriculture**

Rebecca Eddy

The Connecticut Department of Agriculture's mission is to foster a healthy economic, environmental and social climate for agriculture by developing, promoting and regulating agricultural businesses; protecting agricultural and aquacultural resources; enforcing laws pertaining to domestic animals; and promoting an understanding among the state's citizens of the diversity of Connecticut agriculture, its cultural heritage and its contribution to the state's economy. [www.CTGrown.gov](http://www.CTGrown.gov)

### **80. United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS)**

Lisa Krall

The Natural Resources Conservation Service (NRCS) is an agency of the United States Department of Agriculture with offices at six locations in Connecticut. For over 75 years, we have worked cooperatively with landowners, conservation districts, federal, state, and local governments, and citizens from urban and rural communities to restore, enhance, and protect natural resources. NRCS conservation specialists promote land stewardship by providing technical and financial assistance to agricultural and forest landowners and producers to address water quality and quantity; restore and protect habitat; improve air quality and energy conservation, and protect farmland from development. NRCS also provides soils and other natural resource information and analysis to help land owners and managers make informed decisions. For more information visit us at: <http://www.ct.nrcs.usda.gov>. 860-871-4051.

### **81. Tree-Savers**

Jayne Boniewicz and Fred Lishman

Hemlock Woolly Adelgid (HWA) is a relentless invasive pest that decimates hemlock trees and is damaging entire ecosystems across the Eastern United States. Chemical pesticides, the conventional approach to controlling this invasive pest, have failed to stop the devastation. Fortunately, nature has the answer for saving Hemlocks from death by HWA – the *Sasajiscymnus tsugae* (*S. tsugae*) beetle. This remarkable insect literally eats HWA for lunch (and breakfast and dinner!). Tree-Savers is here to balance the equation. We raise *S. tsugae* beetles in our specialized laboratory by the tens of thousands and send them into the fight to save hemlock trees from HWA. [www.tree-savers.com](http://www.tree-savers.com), 570-871-0088.

### **82. United States Department of Agriculture, Farm Service Agency (USDA FSA)**

Debbie Castle and Teresa Peavey

The Farm Service Agency equitably serves all farmers, ranchers, and agricultural partners through the delivery of effective, efficient agricultural programs for all Americans. We are a customer-driven agency with a diverse and multi-talented work force, dedicated to achieving an economically and environmentally sound future for American Agriculture. The goal of our agency is to create a market-oriented, economically and environmentally sound American agriculture by delivering an abundant, safe, and affordable food and fiber supply while sustaining quality agricultural communities. The foundation of FSA's mission and vision rests upon the USDA's long-standing core values of strong ethics, customer service, team work, inclusive decision-making, and fiscal responsibility. For more information visit us at <http://www.fsa.usda.gov>. 203-269-6665 x100.

### **83. Connecticut Invasive Plant Working Group**

Donna Ellis

The Connecticut Invasive Plant Working Group (CIPWG) is a statewide organization whose members gather and convey information on the presence, distribution, ecological impacts, and management of invasive plant species. We promote the use of native or other non-invasive ornamental alternatives throughout Connecticut and work cooperatively with researchers, conservation organizations, government agencies, the green industry, and the general public to identify and manage invasive species pro-actively and effectively. The CIPWG website, [www.cipwg.uconn.edu](http://www.cipwg.uconn.edu) provides timely information on non-native invasive plants and their alternatives, including a list of Connecticut invasive species, management information, invasive plant alerts, fact sheets, invasive plant legislation, photos, alternative replacements for invasives, and a calendar of events. For additional information, or to become a member of CIPWG and subscribe to the list serve, please contact Donna Ellis at 860-486-6448; email [donna.ellis@uconn.edu](mailto:donna.ellis@uconn.edu), [www.hort.uconn.edu/cipwg](http://www.hort.uconn.edu/cipwg)



**84. Lyman Hall High School Agricultural Science and Technology Program**

Emily Picard

The Agricultural Science and Technology Program at Lyman Hall High School is a hands-on program that supplements a regular high school academic curriculum for students interested in agriculture or agriculturally related fields. Specialty areas include: Agricultural Mechanics, Aquaculture, Food Science, Large Animal Technology, Plant Science, Small Animal Technology, and Wildlife Biology. Students learn through classroom and laboratory instruction while developing skills to apply this knowledge in real world settings. Agricultural Science provides career readiness and prepares students for post-secondary education. The three components to the Agricultural Science program include Instruction, Supervised Agricultural Experience (SAE), and the National FFA Organization. These components work together to provide optimal opportunities for all students and develop a well-rounded individual. Stop by our table to talk with some current students and teachers! We recruit from nine sending towns, including Hamden. [www.LHAgEd.org](http://www.LHAgEd.org).

**85. Connecticut Farm Bureau Association (CFBA)**

Joan Nichols

The mission of the Connecticut Farm Bureau is to elevate the stature of agriculture in our state. Through education, market promotion and legislative advocacy, we strive to increase farm income and to improve the quality of life not only for Connecticut farmers, but also for their consumers. [www.cfba.org](http://www.cfba.org), [info@cfba.org](mailto:info@cfba.org), 860-768-1100

\*Other plots here at the farm provide food for the Connecticut Food Bank.





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## History of The Connecticut Agricultural Experiment Station

The Connecticut Agricultural Experiment Station (CAES) is one of a national network of state agricultural experiment stations. Experiment Station scientists collaborate with researchers in other states and the federal government to solve local, regional, and national problems.

The CAES is the first state agricultural experiment station in the United States. It was founded by the efforts of Samuel W. Johnson, a professor of agricultural chemistry at Yale University. Johnson had seen an agricultural experiment station when he did his studies in Germany during the 1850s. He saw how the science of chemistry could be used to aid farmers and campaigned for 20 years until one was established by the Connecticut legislature in 1875. Initially opened as a chemistry laboratory at Wesleyan University in Middletown, the Station was moved to Yale in 1877, where its first bulletin reported on analysis of a fertilizer that had little agricultural value. In 1882, the Experiment Station moved to its present location on Huntington Street (previously named as Suburban Street) in New Haven. Besides Lockwood Farm, its outdoor laboratory in Hamden, the Experiment Station also has a research farm and laboratories in Griswold and Windsor.

Through the years, many important discoveries have been made by researchers at the CAES. For example, vitamin A was discovered as an outgrowth of studies of the chemical composition of foods. The first practical hybrid of corn was developed, and many experiments in increasing the yield of corn were conducted at Lockwood Farm by Donald F. Jones. This discovery led to the doubling of yields of corn crops throughout the nation and led to more abundant and lower cost of food for mankind. Also, at Lockwood Farm, experiments were conducted, which led to the development of organic fungicides, some of which are still in use to combat plant diseases. These fungicides replaced toxic heavy metals previously used to control plant pathogens. The first culture of the West Nile virus in North America was made at the main campus in New Haven.

Research at the Experiment Station covers plants and their pests, such as diseases and insects; the pests of man and animals such as mosquitoes and ticks; growth of the state's forests; methods of enhancing the growth of plants by protecting them from pests and increasing crop yields through cloning of genes; and studies of environmental contamination and ways to reduce application of pesticides or their impact on the environment. Research continues on crops for biodiesel fuel production and for nematode control. Staff at the Station also analyze fresh fruits and vegetables for excess pesticide residues, test fertilizers and animal feeds for compliance with label claims, and screen a wide variety of foods as a part of the federal and state's food and product safety monitoring programs.

Some current research includes:

- ❖ Release of a lady beetle to control the hemlock woolly adelgid, which can kill hemlocks throughout the state.
- ❖ Studies of the pathogen that causes Lyme disease and means of controlling the tick vector.
- ❖ Treatments to reduce the toxicity of organic contaminants in soil and water.
- ❖ Studies of natural changes in Connecticut's forests and control of exotic plant species.
- ❖ Ways to control insect pests of plants using non-chemical means.
- ❖ Surveys and studies of the eastern equine encephalitis virus, West Nile virus, and other encephalitis viruses in mosquitoes.
- ❖ Enhancing growth of crops through the use of compost as a substitute for fertilizer.
- ❖ Finding new crops for Connecticut farmers and developing the best growing practices for existing crops in Connecticut.
- ❖ Studies of invasive aquatic plants and methods of control.
- ❖ Deciphering the cause of Sudden Vegetation Dieback in Connecticut salt marshes.
- ❖ Surveys for the emerald ash borer and the release of parasitoids to help control this invasive insect.
- ❖ Studies of native pollinators and floral resources for wild bees.

The experiments at Lockwood Farm are only a portion of these conducted by Station scientists. Scientists also perform experiments in New Haven, Griswold, and Windsor and carry out other experiments in state forests and on private lands.

Revised: June 13, 2016







# CAES

The Connecticut Agricultural Experiment Station

*Putting Science to Work for Society since 1875*



*PLANT SCIENCE DAY* is held annually the first Wednesday in August at Lockwood Farm, 890 Evergreen Avenue, Mt. Carmel, Hamden.



*THE CONNECTICUT AGRICULTURAL EXPERIMENT STATION*, founded in 1875, is the first state agricultural experiment station in America. It is chartered by the General Assembly to make scientific inquiries and experiments regarding plants and their pests, insects, soil and water, and to perform analyses for State agencies.



## OFFICE AND MAIN LABORATORIES

123 Huntington Street; New Haven, CT 06511-2016, (203)-974-8500,  
toll-free, statewide, 1-(877)-855-2237

## VALLEY LABORATORY

153 Cook Hill Road; Windsor, CT 06095-0248, (860)-683-4977

## LOCKWOOD FARM

890 Evergreen Avenue; Hamden, CT 06518-2361, (203)-974-8618

## GRISWOLD RESEARCH CENTER

190 Sheldon Road; Griswold, CT 06351-3627, (860)-376-0365



**THE EXPERIMENT STATION'S WEB PAGE:** [WWW.CT.GOV/CAES](http://WWW.CT.GOV/CAES)

or just scan our QR code below with your smartphone.



Revised: Monday, July 11, 2016

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