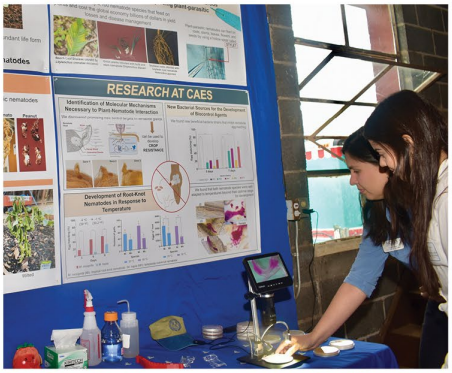
115th Plant Science Day 2025

Lockwood Farm
890 Evergreen Avenue, Hamden, CT 06518
Wednesday, August 6, 2025

CAES
The Connecticut Agricultural Experiment Station
Putting Science to Work for Society
150th ANNIVERSARY
1875 – 2025

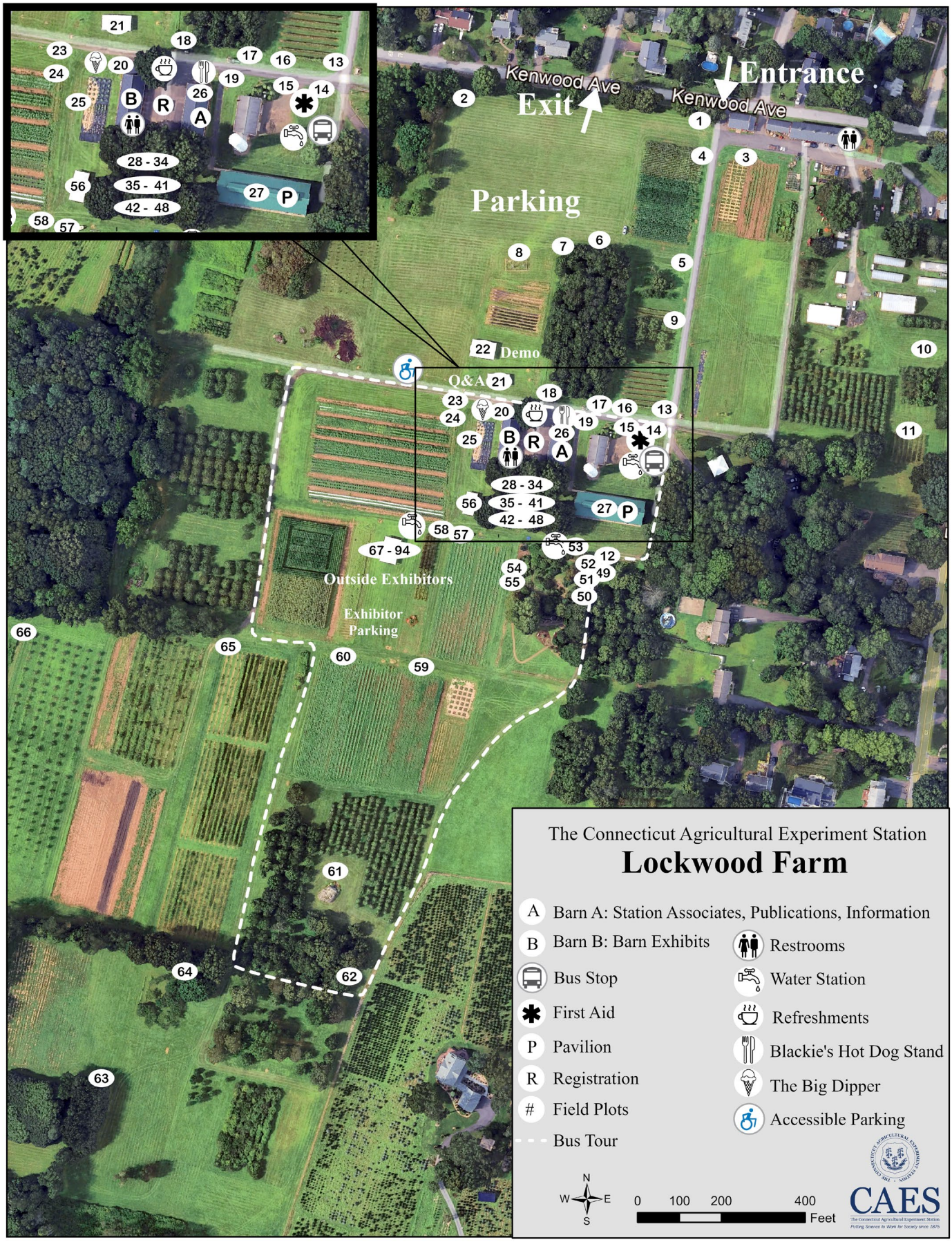
Health

Food Safety



Agriculture

Environment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CAES

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 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 Planning Committee

Michael Ammirata
Terri Arsenault
Joseph Barsky
Meghan Cahill
John Donovan
Vickie Bomba-Lewandoski
Richard Cecarelli
Jeremiah Foley
Andrea Gloria-Soria
Regan Huntley
Lisa Kaczenski
Michael Last
Joseph Liquori
Justin Lizon
Robert Marra
Goudarz Molaei
Craig Musante
John Ranciato
Natalie Rivera
Kitty Prapayotin-Riveros
Neil Schultes
Blaire Steven
Summer Weidman
Jason White
Quan Zeng
Nubia Zuverza-Mena

Program booklet created, compiled, and edited by
Vickie Bomba-Lewandoski, Natalie Rivera, and Summer Weidman

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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.

2025 CONNECTICUT CENTURY FARM AWARD

The Century Farm Award is selected by the Connecticut Agricultural Information Council and goes to a deserving farm that has been in operation for more than 100 years. The award is presented at the CAES Plant Science Day in August and recognized at Ag Day at the Capitol.

The 2025 winner of the Century Farm Award is:

Rosedale Farms and Vineyards
Simsbury, CT

Proclamation from Governor Ned Lamont:

In 1920, Morris and Minnie Epstein who had immigrated from Eastern Europe a few years earlier, moved from New York City where Morris was a painter to Simsbury, CT to try his hand at farming. They bought a 40 acre dairy/tobacco farm. Having no farming experience it was a "leap of faith". They decided to call the farm Rosedale after their youngest daughter Rose.
In 1927, Morris fell from a silo and died. At the age of 16, Louis took over the farm. Louis had an older sister, Ida and younger sister, Rose that helped out but it was on his shoulders to continue to make the farm viable.

He started a milk route in Hartford and that is where he met Edith, his future wife. It was shortly after that he decided to grow sweet corn and other vegetables as the sandy soil was conducive for growing crops. The cows were eventually sold although there were still some chickens for fresh eggs for family and friends. Louise and Edith married in 1946 and had two children: Sandra in 1947 and Marshall in 1952.

Over the years, additional farmland was purchased and in total there is 110 acres, 60 which is farmed and five acres of vineyard. Marshall decided he wanted to continue his family's legacy – went to college for business, married Lynn in 1973 and took over the farm in 1983. Even back in the 80's he and Lynn knew that to succeed they would have to increase exposure and engage in agritourism.

Fast forward – three daughters and four grandchildren later, a thriving vineyard, as well as farming a wide variety of crops, a bakery on site, a CSA program, a corn maze and sunflower stroll, hosting "Chef to Farm" dinners and several food festivals with MAX Hospitality along with wedding and corporate events, Rosedale is continuing to evolve. In addition, our older grandson, Kyle McCullough graduated from UCONN this May and is a full-time employee and an intricate part of the business as we continue looking for ways to grow, by increasing our footprint and to succeed for his generation and future generations.

CAES 150TH ANNIVERSARY 1875-2025

Proclamation from Governor Ned Lamont:

The Connecticut Agricultural Experiment Station (CAES) is honored to announce its 150th anniversary. The federal Hatch Act of 1887 authorized the establishment of Agricultural Experiment Stations on the campuses of the land grant colleges/universities of agriculture in each state of our union. However, the Connecticut Agricultural Experiment Station had actually formed 12 years earlier, in 1875 (150 years ago!), and as such, is the first and oldest Agricultural Experiment Station in the country. The founder of CAES and of the AES system in the United States was Professor Samuel Johnson. Johnson was a Yale University Analytical Chemist with a keen interest in agriculture; he spent time in Europe in the mid-1800s and witnessed the Agricultural Experiment Station system that existed there. He thought that the concept of technically trained scientists working directly with farmers to help solve their problems was something that needed to exist in the United States. As such, in early 1875 he petitioned that CT State Legislature to establish the CAES; the statute was passed in the summer of 1875 and with a two-year budget of $2400, the CAES was established. Importantly, that statute specified that the CAES was to remain independent, and as such, we are still an independent state agency; the only AES in the country that is not part of a university. After 2 years on the campus of Wesleyan University, followed by about 5 years in the Sheffield School of Science at Yale University, we moved to our current location in New Haven in 1882. The AES system now employs over 13,000 scientists, not only in the US but also in Puerto Rico, Guam, the Virgin Islands, the Federated States of Micronesia, and the Northern Mariana Islands. The central mission of the Agricultural Experiment Stations is to “conduct original research, investigation, and experiments which contributing to the establishment and maintenance of the agricultural industry in the United States.” Dr. Jason C. White, current and 10th Director of the CAES states that “we live this mission through our motto, ‘'Putting Science to Work for Society.”

On this important anniversary, Governor Ned Lamont states “For a century and a half, the Connecticut Agricultural Experiment Station has provided research and discoveries that are fueling our state's agricultural industry, which generates billions for our economy, employs thousands, and is responsible for producing the food that keeps Connecticut running. We are committed to supporting Connecticut farmers and the agricultural products they grow, and one of the many ways we do that is through the work of the Agricultural Experiment Station. Connecticut is the home of the very first Agricultural Experiment Station in the country, and I wish this office many more years of success to come.”

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.

LOST AND FOUND

Plant Science Day LOST and FOUND is located at the Registration Booth (between Barn A and Barn B). After Plant Science Day, all lost and found items will be located in the Business Office, Slate Building, voice: 203-974-8500, which is the official lost and found for CAES.

ANSWERS TO YOUR QUESTIONS (Plot 21)

Staff members in the "questions and answers" tent are prepared to give information on the identification of insects, plant disorders, soils, and their management, and other problems of growers and gardeners.

KIDS' CORNER (Plot 23)

Come to the Kids' Corner 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 visitors can explore, where they can ask questions, learn about the featured topic, and receive a special stamp for their passport. Once the passport is complete, they can go to the Self-Guided Activity Plot (plot 22) to collect a CAES patch.

SELF-GUIDED ACTIVITY FOR ALL CHILDREN, INCLUDING GIRL SCOUTS (Plot 23)

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. Additionally, Girl Scouts can use the activity to complete steps toward 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., to obtain your Pesticide Credit Passport, which you must have validated after you have attended or visited each of the required talks, demonstrations, and barn exhibits. Sign out begins at 3:30 p.m. at the Registration Desk (R), where you will redeem your Passport for your Pesticide Credit Form.

Connecticut Pesticide Credits Offered: **ALL CATEGORIES and PRIVATE APPLICATOR (PA) CATEGORY / 3.75 TOTAL CREDIT HOURS.**

Stay in Touch with CAES

Keep current with the Connecticut Agricultural Experiment Station by following us on social media.

Tag us or use the hashtag #CT_CAES to share your posts with us.

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Coast & Country Podcast

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

portal.ct.gov/caes

NO PETS, PLEASE. SERVICE DOGS ONLY.

Under the Americans with Disabilities Act (ADA), "a service animal is defined as a dog that has been individually trained to do work or perform tasks for an individual with a disability."

Also, under the ADA, "emotional support animals, comfort animals, and therapy dogs are not service animals under Title II and Title III of the ADA."

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
150th ANNIVERSARY
1875 – 2025

115th 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 – Vickie M. Bomba-Lewandoski, Information Officer

10:00 a.m. – 10:15 a.m. **PAVILION**
MORNING GREETING AND OPENING REMARKS
Jason C. White, Ph.D., Director
The Connecticut Agricultural Experiment Station

10:15 a.m. - 10:45 a.m. **PAVILION**
Sara Nason, Ph.D., Assistant Agricultural Scientist II, Department of Environmental Science and Forestry
Per- and Polyfluoroalkyl Substances (PFAS) – an Emerging Issue in Connecticut and Beyond
Per- and poly fluoroalkyl substances (PFAS) are a large group of highly toxic chemicals that have become common environmental contaminants. This talk will highlight a new CAES program providing free analysis of PFAS in soil for CT farms, as well as research on PFAS occurrence in various environments and PFAS remediation techniques. PFAS research at CAES began in 2019, when we also participated in the Governor's Interagency PFAS Taskforce. Over the past six years, research and regulatory work on PFAS have supported each other at CAES, resulting in strong analytical capabilities that we are using to confront a variety of PFAS issues.

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.)
Jatinder S Aulakh, Ph.D., Associate Agricultural Scientist, Valley Laboratory
Invasive Plant Management Options for Homeowners
Many homeowners in Connecticut are confronted with non-native invasive plants ranging from simple herbaceous annuals (garlic mustard and Japanese stiltgrass, etc.) to tough perennial herbs (Lesser celandine, mugwort, and swallowworts, etc.), shrubs (Autumn olive and Japanese barberry, etc.), trees (Callery pear and tree-of-heaven, etc.), and woody vines (Mile-a-minute, Oriental bittersweet, and porcelain berry, etc.). The presence of invasive plants such as kudzu, Japanese knotweed, and running bamboo (yet not considered invasive in CT) is not only a serious management challenge but also significantly depreciates the real estate value. Invasive plants are difficult to manage and often appear irresponsive to different control methods. This technical demonstration will discuss chemical and non-chemical control options and application methods for managing the most common homestead invasive plants.

10:40 a.m. – 11:00 a.m. **TECHNICAL DEMONSTRATION TENT**
(20-minute demonstration, repeated twice during the day, 10:40 a.m. & 3:15 p.m.)
Joseph Liquori, Agricultural Research Technician I, Department of Plant Pathology and Ecology
DIY Propagation Station: Cut, Dip, and Stick!
Propagation can be defined as the breeding of plants, which encompasses germination from seed, cloning from cutting, air layering, etc. In this technical demonstration, Joe will be showing you how to build a DIY propagation box for sticking cuttings year-round. Cuttings allow you to have an exact clone of the plant it was taken from. It is also the backbone of many nursery operations. Therefore, if you have a specimen you would like to share with others, or a shrub/tree which is on its way out and want to have a new plant of the same stock, you will be able to do that via this method! Join Joe as he explains the basics of cutting propagation and demonstrates his DIY setup aimed towards homeowners.

10:45 a.m. - 11:00 a.m. **PAVILION**
CENTURY FARM AWARD
Rosedale Farms and Vineyards, Simsbury, CT

11:00 a.m. – 11:10 a.m. **PAVILION**
EXPERIMENT STATION ASSOCIATES
Cheryl Cappiali, President

11:10 a.m. – 12:00 noon **PAVILION**
THE SAMUEL W. JOHNSON MEMORIAL LECTURE
Scott Chaskey
Poet, Farmer, and Educator
Peconic Land Trust at Quail Hill Farm, Amagansett, NY
Cultivation and Kinship in the Web of Life

12:00 p.m.-1:15 p.m. **LUNCH on your own**

1:15 p.m.-1:45 p.m. **PAVILION**
Quan Zeng, Ph.D., Agricultural Scientist, Department of Plant Pathology and Ecology
Managing Apple Diseases in a Sustainable Manner: From Biological Controls to Disease Resistance in the Hosts
Apples are an essential fruit crop but are susceptible to various diseases and pests. Sustainable management of apple diseases takes a holistic approach, incorporating host disease resistance, chemical, cultural, and biological controls. Research has been conducted to improve the efficiency of existing control tools and develop new tools for controlling apple diseases. For instance, disease prediction models that consider environmental conditions that may influence disease infection help growers better time their pesticide sprays to be most efficient in targeting the pathogens during key infection events. Researchers discovered a group of novel yeast-based biological controls that can induce plant defense responses once applied to apple flowers, thereby reducing the susceptibility of the hosts and suppressing disease infection. Finally, a new disease-resistant apple cultivar has been identified, which can recognize the two key virulence proteins secreted by the pathogen and trigger a "self-killing" response in the plant tissue in contact with the pathogen, saving the rest of the plants from getting infected by the pathogen. The developed "2+2" program using two formulations of biopesticides has been successfully tested and adopted by organic apple growers in the Northeast for controlling apple diseases.

1:45 p.m.-2:15 p.m. **PAVILION**
Kelsey E. Fisher, Ph.D., Assistant Agricultural Scientist II, Department of Entomology
Managing Milkweed Habitat to Support Monarch Butterfly Success
Over the last three decades, the overwintering populations of monarch butterflies (*Danaus plexippus*) have significantly declined. In December 2024, the United States Fish and Wildlife Service proposed that monarchs be listed as threatened and be provided federal protection under the Endangered Species Act. A significant driver is the decline of their obligate host plant, milkweed (*Asclepias* sp.), which monarchs rely on for a majority of their lifecycle. While conservation and milkweed restoration efforts are underway, it is imperative that these practices are designed to maximize monarch survival, longevity, and realized fecundity. Integrating aspects of lepidopteran behavior that enhance oviposition rates and larval survival into conservation plans could increase the overall impact of the efforts. Here, we will report on work that is being conducted by the Fisher Lab to provide recommendations for habitat management that will enhance monarch success in CT.

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.*)
Jatinder S Aulakh, Ph.D., Associate Agricultural Scientist, Valley Laboratory
Invasive Plant Management Options for Homeowners
Many homeowners in Connecticut are confronted with non-native invasive plants ranging from simple herbaceous annuals (garlic mustard and Japanese stiltgrass, etc.) to tough perennial herbs (Lesser celandine, mugwort, and swallowworts, etc.), shrubs (Autumn olive and Japanese barberry, etc.), trees (Callery pear and tree-of-heaven, etc.), and woody vines (Mile-a-minute, Oriental bittersweet, and porcelain berry, etc.). The presence of invasive plants such as kudzu, Japanese knotweed, and running bamboo (yet not considered invasive in CT) is not only a serious management challenge but also significantly depreciates the real estate value. Invasive plants are difficult to manage and often appear

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3:15 p.m.-3:35 p.m. **TECHNICAL DEMONSTRATION TENT**
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Joseph Liquori, Agricultural Research Technician I, Department of Plant Pathology and Ecology
DIY Propagation Station: Cut, Dip, and Stick!
Propagation can be defined as the breeding of plants, which encompasses germination from seed, cloning from cutting, air layering, etc. In this technical demonstration, Joe will be showing you how to build a DIY propagation box for sticking cuttings year-round. Cuttings allow you to have an exact clone of the plant it was taken from. It is also the backbone of many nursery operations. Therefore, if you have a specimen you would like to share with others, or a shrub/tree which is on its way out and want to have a new plant of the same stock, you will be able to do that via this method! Join Joe as he explains the basics of cutting propagation and demonstrates his DIY setup aimed towards homeowners.

3:35 p.m. **TECHNICAL DEMONSTRATION TENT**
Adjourn Technical Demonstrations

2:30 p.m.-3:30 p.m. **SIGN-OUT (For those requesting pesticide credits) (R)**
Attendees can pick up their Pesticide Credit forms at the registration table (R).

BUS STOP ( )

10:00 a.m.-11:00 a.m. & 1:00 p.m.-3:30 p.m. (tours run every half hour during these hours)

Take a number and have a seat under the willow and wait for the next bus tour

10:00 a.m. - 11:00 a.m. **MEET AT THE BUS STOP ( )**
A 30-minute bus tour of Lockwood Farm narrated by a CAES Staff member. Tours run every half hour.

1:00 p.m. - 3:30 p.m. **MEET AT THE BUS STOP ( )**
A 30-minute bus tour of Lockwood Farm narrated by a CAES Staff member. Tours run every half hour.

LOCKWOOD FARM WALKING TOUR
(Meet at the Registration Desk, R) AT 10:50 A.M.

11:00 a.m.–12:00 p.m.

11:00 a.m. - 12:00 p.m. **LOCKWOOD FARM WALKING TOUR:** A one-hour guided tour of selected "off the beaten path" field plots. Learn about persimmons, beach plums, pawpaws…and more!
Robert E. Marra, Ph.D., Associate Agricultural Scientist, Department of Plant Pathology and Ecology
Meet at the Registration Desk (R) at 10:50 a.m.

ALL ABOUT APPLES WALKING TOUR
(Meet at the Registration Desk, R) AT 11:50 A.M.

12:00 p.m.-12:45 p.m.

12:00 p.m. - 12:45 p.m. **All ABOUT APPLES WALKING TOUR:** A 45-minute guided walking tour all about apples. Apples are the second most consumed fruits in the United States. Do you know how apples are propagated, grown, and protected from pests and diseases? On this walk, you will learn all you need to know about apples, their diseases and pests, and ongoing research conducted at CAES for sustainable disease management of apple.
Quan Zeng, Ph.D., Agricultural Scientist, Department of Plant Pathology and Ecology
Meet at the Registration Desk (R) at 11:50 a.m.

BARN EXHIBITS (BARN B)

The Connecticut Agricultural Experiment Station 150th Anniversary Year- History and Achievements
Investigators: Katherine Dugas and Gale E. Ridge, Ph.D.
Abstract: 2025 marks the 150th anniversary of the founding of the Connecticut Agricultural Experiment Station. This exhibit showcases a dynamic timeline of the pivotal events that have shaped this unique institution for the past century and a half. The top half of the timeline summarizes milestones, major publications, scientific discoveries and breakthroughs accomplished by CAES scientists from 1875 to 2014. The bottom half of the timeline provides a more in-depth summary of accomplishments in the last ten years. Artifacts, a short video, and extra information on historical photographs will also be on display.

Sprayable Eugenol-Infused Nano-Bioemulsion Film for Protecting Tomatoes After Harvest
Department: Analytical Chemistry
Investigators: Raja Muthuramalingam, Ph.D., Carlos Tamez, Ph.D., Anuja Bharadwaj, Ph.D., Nubia Zuverza-Mena Ph.D., Washington Da Silva, Ph.D., Christian O. Dimkpa, Ph.D., Jason C. White, Ph.D.
Abstract: Fungal diseases can cause significant spoilage in fruits and vegetables after harvest, leading to major food losses around the world. One serious culprit in post-harvest food spoilage is *Fusarium*, a fungus that causes soft rot in tomato and many other crops. To help tackle this challenge, we developed a natural, sprayable coating that protects tomato fruits and keeps them fresher for longer. Our innovation is a special "nano-bioemulsion" made from eugenol, a natural compound found in cloves, combined with other safe, biodegradable ingredients. When sprayed onto tomato fruits, this fine coating forms a thin, invisible film that sticks well to the fruit surface, preventing fungal infections, and helping preserve the fruit's nutrition and quality. In our tests, tomato fruits treated with the spray stayed healthier, had fewer fungal lesions, and lost less weight over a 30-day period, compared to untreated fruits. Notably, the treated tomatoes also contained more lycopene, compared to untreated fruits. Lycopene is a nutrient that gives tomato fruits their red color and health benefits. Unlike traditional chemical sprays, our nano-bioemulsion is made from natural materials and offers a safer, more sustainable option for protecting fresh produce. As a next step, we are expanding this technology for use in combating fungi that produce harmful toxins (called mycotoxins) in fruits and vegetables. We aim to not only protect crops from rot but also block the production of these dangerous compounds, thereby helping improve food safety from farm to fork. This new approach could help farmers, fresh produce marketers, and consumers by reducing food waste, promoting safer food, and extending the shelf life of fresh produce.

The Invasive Tiger Mosquito *Aedes albopictus* Increases Dog Heartworm Risk in Connecticut
Department: Entomology
Investigators: Andrea Gloria-Soria, Ph.D. and Meredith Bagger, MPH.
Abstract: Filarial nematodes are parasitic roundworms transmitted by mosquitoes that can cause morbidity and mortality for their human and animal hosts. Transmission to vertebrate hosts occurs through the bite of infected arthropods, such as mosquitoes. In the United States *Dirofilaria immitis* is the filarial species that causes most disease. *D. immitis* infection is known as dirofilariasis or heartworm. Heartworm affects mainly dogs and cats, and symptoms include pulmonary artery blockage, cough, exhaustion, and weight loss. In response to increasing heartworm cases in Connecticut and the recent invasion and establishment of two mosquito species in the state: the tiger mosquito *Aedes albopictus* and the rock pool mosquito *Ochlerotatus japonicus*; we used molecular-based surveillance methods to identify filarial species infecting field-caught mosquitoes from southern Connecticut between 2020 and 2021. Our work found that *Ae. albopictus* had the highest infection prevalence for heartworm in both years, suggesting that this mosquito is contributing to the increase of heartworm cases in the state. This highly invasive mosquito is expected to increase its northern range as winters become warmer. Following this expansion, we expect to see an increase in cases of heartworm in the northern regions of Connecticut. Along with *D. immitis*, the avian parasite *Aproctella* sp. and the hoofed mammal parasite *Setaria* sp. were also identified but at lower frequencies. These two parasite species were identified in Connecticut for first time but are poorly understood. Persistent mosquito infection with filarial parasites, particularly in invasive species, poses a risk to veterinary and public health. Future research should expand upon this study by continuing to monitor filaria infection prevalence and diversity in Connecticut, examining infection prevalence in northern counties, and dissecting the role of *Ae. albopictus* on *D. immitis* transmission in the state.

Using Organic and Inorganic Amendments to Improve Soil Properties
Department: Environmental Science and Forestry
Investigators: Itamar Shabtai, Ph.D. and Alice Zhou, Ph.D.
Abstract: Agricultural soils with higher soil organic carbon content show improvements in most soil physical, chemical, and biological properties and soil functions. The properties are often aggregated into scores that reflect a soil 'health'. In fact, the three metrics that are most responsive to soil health improvement practices are soil organic carbon, carbon mineralization potential, and aggregate stability, of which the latter two are directly influenced by soil organic carbon content. Thus, while soil organic carbon does not equate to soil health, it is a strong indicator and vital component of high functioning, healthy soils. However, the amount of soil organic carbon depends on the net difference between carbon input and outputs, and an increase in inputs tends to result in a proportionate increase in outputs. Increasing soil organic carbon is therefore a challenge that requires an understanding of the

mechanisms involved. Our work focuses on understanding how natural and exogenous amendments (inputs) can be used to change soil properties in beneficial ways by studying the mechanisms involved. For example, we found that amending soil with large amounts of organic amendment, farmyard compost, improved the water holding properties of soil used to grow kale under drought conditions. This was due to a change in the physical structure of the soil aggregates. Ongoing work is done in greenhouse and field experiments to test an inorganic amendment known as basalt rock powder. When this rock powder is broken down in the soil, it counters acidity, releases trace nutrients such as silicon, and can sequester carbon from the atmosphere in inorganic forms which are more stable than organic carbon. Potentially, this type of amendment can improve both soil and crop health.

Integrated Strategies for Managing Apple Disease: From Antibiotics to Genetic Resistance

Department: Plant Pathology and Ecology

Investigators: James Standish, Jewell Jung, Naziya Nabi, Himanshi Jayasinghe, Veedaa Soltaniband, Quan Zeng, Ph.D.

Abstract: Plant diseases affect the world's agriculture and have profound economic and ecological impacts. Apple is one of the most exported fruits and in turn is one of the most economically important fruit crops in the world and is vulnerable to a range of devastating diseases that can lead to significant yield and economic losses. Traditionally, chemical treatments such as antibiotics have been the primary method for defense against plant pathogens. Antibiotics and their extensive use is increasingly linked to the development of antibiotic-resistant pathogens. Given this, sustainable alternatives that replace this long-standing practice must be explored and understood. One such practice is the use of biocontrol agents which offer a promising strategy by using naturally occurring microorganisms to suppress disease. Alternatively, creating a naturally resistant plant, either through genetic modification or traditional breeding techniques, can create a completely resistant host plant without the need for added treatments. This can help to reduce the economic burden farmers face annually. By integrating biocontrol measures in conjunction with innovative genetic approaches, we can reduce the reliance on antibiotics and establish a resilient framework for managing apple disease. This will ultimately ensure the sustainability and productivity of apple orchards worldwide.

Deer Repellents: DIY Options

Department: Valley Laboratory

Investigator: Richard S. Cowles, Ph.D., *assisted by* Ethan Paine

Abstract: Conventional deer repellents usually rely on toxic (thiram), malodorous (predator urine, blood, or putrescent eggs), or short-lasting (mint oils and soaps) taste and/or odor cues. None of these products provide several months of protection, as would be convenient for ornamental landscape plants subject to deer browse during the winter. Recent introduction of Trico® products, based upon sprayable emulsified body fat of sheep was demonstrated by others to provide winter-long protection of evergreen shrubs from deer browsing. Two repellents suitable for do-it-yourself treatments were tested. During a summer trial using forage soybeans, a spray made from emulsified lanolin (sheep wool grease) was at least as effective as Trico. During a winter experiment, potted yew shrubs were perfectly protected for five months from damage when treated with Trico, the lanolin-based repellent, and milkfat. It appears that repellents based on emulsified animal fats are extraordinarily effective, long-lasting, and are practically undetectable to the human nose. These materials (especially whole milk) can conveniently be used by homeowners on their own property to protect their ornamental shrubs at low cost.

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: http://portal.ct.gov/caes

EMAIL US AT: CAES@CT.GOV

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; New Haven, CT 06511, phone 203-974-8447, fax 203-974-8502, e-mail Vickie.Bomba-Lewandoski@ct.gov, or on the web at https://portal.ct.gov/CAES/ABOUT-CAES/Speakers/Available-Speakers

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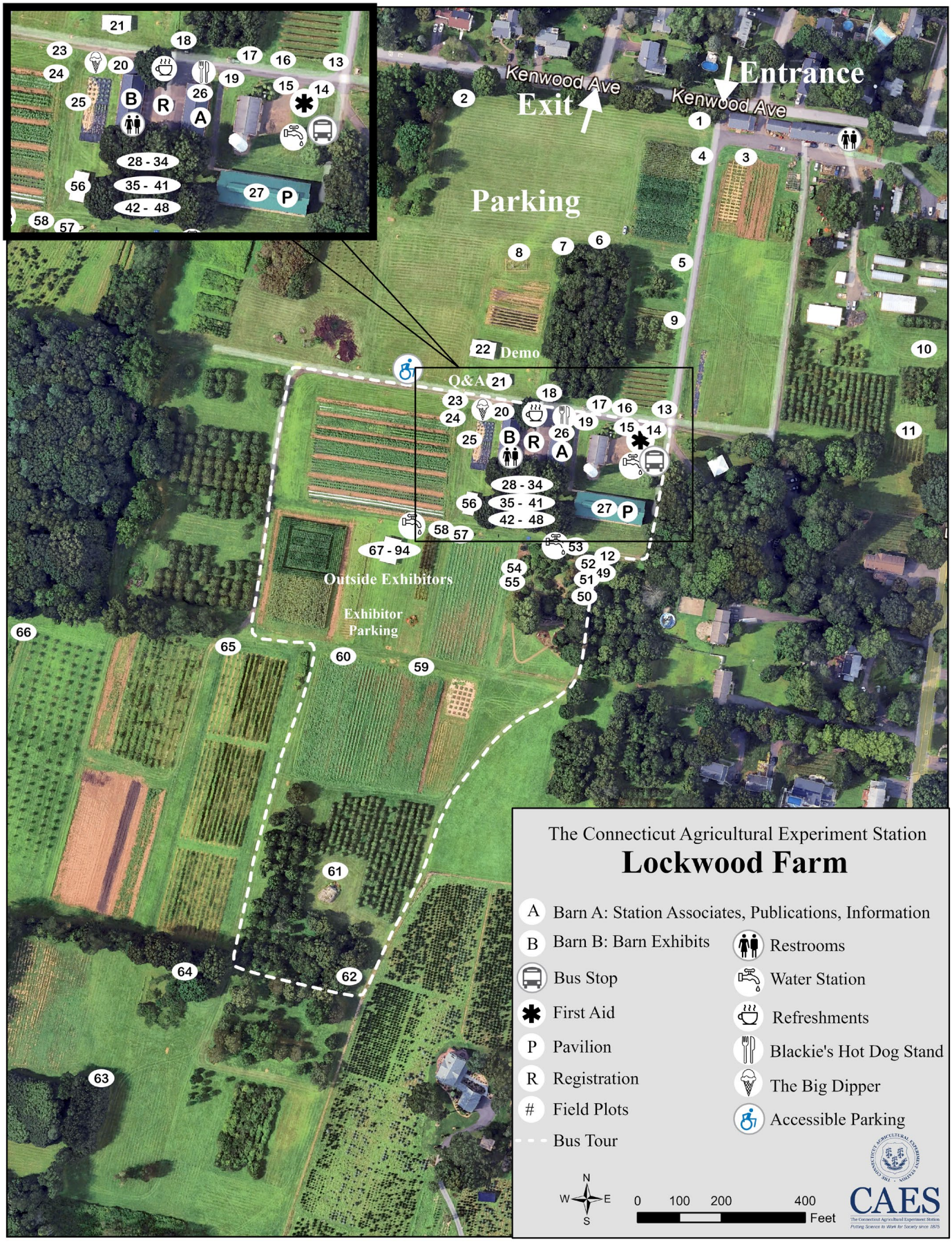
CAES
The Connecticut Agricultural Experiment Station
Putting Science to Work for Society
150th ANNIVERSARY
1875 – 2025


Kenwood Ave
Exit
Entrance
Kenwood Ave
Parking
Demo
Q&A
Outside Exhibitors
Exhibitor Parking
The Connecticut Agricultural Experiment Station
Lockwood Farm
A Barn A: Station Associates, Publications, Information
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Bus Stop
First Aid
P Pavilion
R Registration
Field Plots
Bus Tour
Restrooms
Water Station
Refreshments
Blackie's Hot Dog Stand
The Big Dipper
Accessible Parking
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0 100 200 400
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CAES

FIELD PLOT LISTING

Outside Exhibitors (Plots 14, 15, 19, 20, 67-94) 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 Richard Cecarelli, Agricultural Research Technician II, Rollin Hannan, and Farmer, Joseph Toth, as well as Seasonal Resource Assistants Henry Burns, Miles Houston, and Rosa Maya. Other plots here at the farm provide food for the Connecticut Food Bank.

1. Chinese Chestnut Trees
2. Nut Orchard
3. Strawberry Disease Resistance Trial
4. Monitoring for Sweet Corn Insect Pest Resistance
5. Commercial Chestnut Cultivars
6. 50 Years of Chestnut Blight Biocontrol Field Trials at CAES
7. New Hybrid Chestnut Orchard
8. Remote Access Weather Station
9. Commercial Chestnut Seedlings
10. Advancing Aquatic Plant Research Through Mesocosm Infrastructure
11. Chardonnay Wine Grapes
12. The Long Lost Chestnut Bee, *Andrena rehni*, Rediscovered in Connecticut at Lockwood Farm
13. Table Grapes
14. Hamden Police Department
15. Hamden Fire Department
16. Crown Castle Cellular Tower
17. Seedlings of Old Surviving American Chestnuts
18. Wild Chestnuts from Turkey
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20. The Big Dipper
21. Questions and Answers Tent
22. Technical Demonstration Tent
23. Kid's Corner and Girl Scout Badges
24. Farm Equipment Used at Lockwood Farm
25. Baby Pools: Low-Cost Containers for Vegetable Production in Urban Agriculture
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28. Hands-On Chemistry
29. "Green" Solution Against Root-Knot Nematodes
30. Utilizing Nanoparticles to Enhance Crop Growth and Stress Resistance
31. Improving Soybean Seed Nutrition: Optimizing Nanoparticle Delivery with Vacuum Infiltration
32. Effect of Polyvinyl Chloride Microplastics on the Translocation of Different Environmental Pollutants in *Lactuca sativa* (lettuce) and *Triticum aestivum* (spring wheat)
33. Could Crop Chemistry Be Impacted by Soot from Wood Burn? A Prospective Metabolomics of Soot-Exposed Tomato Plants Tissues
34. Nanoscale CuS Foliar Application Enhances Fusarium Suppression in Tomatoes
35. Per- and Polyfluoroalkyl Substances (PFAS) – Environmental Assessment and Remediation Methods
36. Irrigation With Recycled Wastewater – Risks and Benefits
37. Precision Foliar Delivery of Copper-Alginate Hydrogels Nanoparticles to Enhance Tomato Productivity and Stress Adaptation
38. Phosphorus Transport and Plant Response in Soil System with the Application of Phosphate Rock Coated with Nano Sulphur-Biopolymer
39. Nano-Enabled Agriculture - Tiny Solutions to a Toxic Problem - Cellulose Microfibers and Nano Zerovalent Iron to Make Food Free of Lead and Arsenic

40. Remediation of Trichloroethylene Contaminated Groundwater Using Colloidal Activated Carbon and Bacterial Biodegradation
41. Analytical Testing of Adult-Use and Medical Marijuana Products in Connecticut
42. Effects of Tire Wear Particles on Soil Physical Properties
43. A Scytalidium-Like Indoor Fungus Revealing Polyphyletic Relationships in Scytalidium
44. A World of Viruses
45. Exploring Microbial Responses to Marsh Restoration for Wetland Health
46. Chemical Senses of Invasive Species
47. Mycorrhizal Inoculation in Urban Trees
48. Developing and Testing Disease Resistant Apples
49. Chestnut Species and Hybrids
50. Supporting Connecticut's Green Industry and Honey Bees Through Inspection and Surveys
51. Collaborations in Biological Control of Hemlock Woolly Adelgid (HWA)
52. Spotted Lanternfly in Connecticut
53. Bird and Butterfly Garden
54. Mowing for Monarchs
55. Busy Bumblebees
56. The Public Health and Entomology Tent
    a. Statewide Monitoring Program for Mosquito-Borne Viral Diseases in Connecticut
    b. Monitoring Native and Invasive Ticks and Tick-Borne Pathogens to Better Guide Public Health Action in Connecticut
    c. Statewide Tick Surveillance in Connecticut: Monitoring Emerging Threats
    d. Integrated Tick Management in Connecticut: Targeting Hosts, Habitat, and Human Risk
57. Office of Aquatic Invasive Species (OAIS)
58. Assessing Pollinator Response to Ecotype Native Plants
59. Challenges for Hemp Growers
60. The Effects of Management Practices on Cut-and-Come-Again Greens Production
61. The Rock
62. Asian Chestnut Gall Wasp on Chestnut
63. Hybrid Elm Trees
64. Rocky Hill American Chestnut Trees
65. Grapes
66. Mowing for Monarchs
67. Cheshire Pollinator Pathway and Hamden Land Conservation Trust
68. Connecticut Botanical Society
69. Connecticut Christmas Tree Growers Association
70. Connecticut College Arboretum
71. Connecticut Department of Agriculture
72. Connecticut Department of Energy and Environmental Protection - Wildlife Division
73. Connecticut Department of Energy and Environmental Protection- Pesticide Management Program
74. Connecticut Forest and Park Association (CFPA)
75. Connecticut Land Conservation Council
76. Connecticut Professional Timber Producers Association
77. Connecticut Tree Protective Association, Inc.
78. CT Council on Soil and Water Conservation
79. Connecticut Farmland Trust
80. D.E.E.P. Forestry Division, Private and Municipal Lands Program
81. Levo International, Inc.
82. Mill River Watershed Association
83. Northeast Organic Farming Association of CT (CT NOFA)
84. Six Lakes Park Coalition
85. Sleeping Giant Park Association
86. The American Chestnut Foundation - CT Chapter
87. U.S. Department of Labor - Occupational Safety and Health Administration (OSHA)
88. U.S. Department of Labor, Wage and Hour Division

89. UCONN 4-H
90. UCONN IPM Program
91. U.S. Department of Agriculture - Forest Service Northern Research Station
92. USDA APHIS PPQ
93. U.S. Department of Agriculture - Farm Service Agency
94. Wild Ones Connecticut Mountain Laurel Chapter

FIELD PLOT ABSTRACTS

1. Chinese Chestnut Trees

Sandra Anagnostakis, Ph.D. (Emeritus)

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. Nut Orchard

Sandra Anagnostakis, Ph.D. (Emeritus) *assisted by* Pamela Sletten (Retired)

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 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.

3. Strawberry Disease Resistance Trial

Nate Westrick, Ph.D. *assisted by* Rebecca Syme

Strawberries are a critical crop in Connecticut, and we grow a wide range of strawberry varieties to fulfill the needs of consumers. These varieties are bred for a number of traits, including flavor, cold hardiness, and aesthetics, but are often not evaluated for resistance to the wide range of diseases capable of infecting this crop. In 2023, a fungal disease known as Anthracnose Crown Rot (ACR) was detected in the state and caused severe wilting and death in many different varieties of strawberries. Given the historical absence of this disease in the state, nothing is known about the resistance of our northern varieties to this pathogen. To address this, a field study containing 20 different strawberry varieties has been planted both here and in Windsor, CT. Plants have been purposefully inoculated with the fungal pathogen and will be evaluated through the field season for their susceptibility to ACR.

4. Monitoring for Sweet Corn Insect Pest Resistance

Kelsey E. Fisher, Ph.D.

In the early 1900s, the European corn borer (ECB) was introduced to North America near Boston, MA, with the importation of broomcorn from Italy and Hungary. By 1942, ECB was distributed throughout the major corn-growing regions and was the most economically impactful corn-insect pest through the 20th century. Many management strategies were attempted, but few were successful until 1996 with the commercialization of genetically modified corn encoded with *Bacillus thuringiensis* (Bt corn). Bt corn expresses insecticidal crystalline proteins in plant tissues and ingestion by larvae results in death. Bt corn is highly effective and accounts for 85% of the corn planted in the United States, which reduces our reliance on pesticides. Over 20 years, no cases of ECB resistance to targeted toxins were identified; however, in 2018, evidence of resistance was reported in Nova Scotia and continues to persist. This monitoring plot will enable early detection of potential Bt resistance in Connecticut.

5. Commercial Chestnut Cultivars

Sandra Anagnostakis, Ph.D. (Emeritus) *assisted by* Pamela Sletten (Retired)

These trees are potential commercial cultivars of orchard chestnut trees. The largest tree (grafted) is 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. The other trees are seedlings from a cross of ‘Colossal’ x ‘Lockwood’ made here in 2014. We are evaluating the potential of these trees for nut production here in Connecticut.

6. 50 Years of Chestnut Blight Biocontrol Field Trials at CAES

Susanna E. Keriö, D.Sc., Nathaniel Westrick, Ph.D., and Sandra L. Anagnostakis, Ph.D.

This chestnut plot planted in 1976 with 71 American chestnut trees showcases an example of chestnut blight biocontrol. Chestnut blight is a disease caused by the invasive fungal pathogen *Cryphonectria parasitica*. Biocontrol of chestnut blight is possible with hypovirulent strains of *C. parasitica* carrying hypoviruses. Hypovirus infection slows down pathogen growth, allowing the tree to produce callus to contain cankers. In 1978-1981, CAES research staff treated every canker that could be reached from the ground with a mixture of eight hypovirulent strains. The hypoviruses in these strains were from Italy, France, and Michigan. In 2013, half of the trees were alive, and hypovirulent strains were retrieved from 14 out of 15 trees that were examined. Today, the largest specimen of American chestnut found in Connecticut grows in this plot. The trees are a source of American chestnut germplasm for breeding and demonstrate how biocontrol can support conservation of American chestnut.

7. New Hybrid Chestnut Orchard

Sandra Anagnostakis, Ph.D. (Emeritus) *assisted by* Pamela Sletten (Retired)

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 are being 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.

8. Remote Access Weather Station

Remote-access weather stations are deployed at the three Connecticut Agricultural Experiment Station farms located in Hamden, Windsor, 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.

9. Commercial Chestnut Seedlings

Sandra Anagnostakis, Ph.D. (Emeritus) *assisted by* Pamela Sletten (Retired)

These seedling trees are open pollinated (Chinese) Dunstan chestnuts (a trademarked name). They are not a cultivar (clones from a single tree), but a variety (a type) and are widely available for sale in garden centers.

10. Advancing Aquatic Plant Research Through Mesocosm Infrastructure

Jeremiah R. Foley Ph.D. a*ssisted by* Madeline Watts and Olajumoke Omosowone

To meet the increasing demand for controlled, replicable experiments on invasive and native aquatic vegetation, the Connecticut Agricultural Experiment Station's Office of Aquatic Invasive Species has established a state-of-the-art mesocosm facility. This "tank farm" consists of 30 fiberglass tanks arranged into two independently circulating systems ("trees") of 15 tanks each. The design enables factorial experiments with high replication under both standardized and manipulated environmental conditions, supporting research on plant growth, herbivory, water quality dynamics, and biological control efficacy. Each closed-loop system integrates filtration, aeration, and temperature control, allowing precise manipulation of factors such as nutrient availability, salinity, and water movement. This facility marks a major advancement in CAES's ability to evaluate management strategies for aquatic invaders like *Hydrilla verticillata* and serves as a scalable platform for interdisciplinary research. The mesocosm system reinforces CAES's leadership in applied aquatic plant science and supports its mission to protect Connecticut's freshwater ecosystems through evidence-based management.

11. Chardonnay Wine Grapes

Washington da Silva, Ph.D. and Richard Cecarelli

Chardonnay Wine Grapes - Chardonnay vines are prized for the quality of the wine they produce but are very susceptible to powdery mildew. This plot was first planted to study the relationship between the onset of powdery mildew and climate in order to attune disease-risk models to our local weather conditions.

12. The Long Lost Chestnut Bee, *Andrena rehni*, Rediscovered in Connecticut at Lockwood Farm

Tracy A. Zarrillo *assisted by* Connor Grace, David Mantack, Kate Perzanowski, and Kristina Libby

When the American Chestnut vanished from the landscape, many insects that depended upon that tree species for survival also vanished. We may never know how many insect species went extinct from the loss of this keystone species in the environment, however we do know that some insect species managed to dodge the bullet, including a very tiny mining bee called *Andrena rehni*. The chestnut bee, *Andrena rehni*, is a pollen specialist of Castanea, meaning it only uses the pollen from chestnut or chinquapin to feed its young. A thriving population of this bee species was recently discovered in New England in the chestnut orchards at Lockwood Farm in Hamden, Connecticut in 2019, with subsequent detections in New York, Massachusetts, Pennsylvania and Maryland. In June 2024, *Andrena rehni* was found visiting the chestnut trees near parking lot of the Sleeping Giant State Park. CAES is investigating the current distribution of this bee species and the mystery of its survival.

13. Table Grapes

Washington da Silva, Ph.D. and Richard Cecarelli

Table Grape vine rows are 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.

14. 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.hamdenpd.com.

15. Hamden Fire Department
The Department of Fire and Emergency Services looks forward to providing continued quality care and service to the citizens of Hamden. Pride, tradition, and professionalism equal our commitment to you and your families.
https://www.hamden.com/154/Fire-Department

16. Crown Castle Cellular Tower
Learn about the cellular transmission tower.

17. Seedlings of Old Surviving American Chestnuts
Sandra Anagnostakis, Ph.D. (Emeritus) *assisted by* Pamela Sletten (Retired)
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 (https://accf-online.org/) 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.

18. Wild Chestnuts from Turkey
Sandra Anagnostakis, Ph.D. (Emeritus) *assisted by* Pamela Sletten (Retired)
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.

19. Blackie's Hot Dog Stand
We've been a popular family-owned spot since 1928, and we've been serving our signature hot dogs and burgers fresh daily since then. Our hot dogs are a custom recipe made exclusively for Blackie's by Martin Rosol's of New Britain, CT. Our famous homemade Hot Pepper Relish has delighted travelers and families, and many have tried to copy the secret family recipe – but there's nothing like it anywhere! We're proud of our deep traditions and intent on keeping it going for another 80 years! https://blackieshotdogs.com/

20. The Big Dipper
Harry Rowe
Our home-style ice cream is freshly made on the premises in small batches to ensure the finest product. In our search to bring you premium, gourmet ice cream we use the world's highest quality vanilla from the island of Madagascar and the best cocoa made from Holland. We combine farm fresh dairy cream from one of the leading dairies on the east coast with choice chocolates, nuts, berries, and the purest of flavors and extracts. With over 25 years and two generations of making ice cream, we strive to make your experience one that you will come back to for years to come. https://bigdipper.com/, harry@bigdipper.com, (203) 758-3200, 75 Waterbury Rd, Prospect, CT.

21. Questions and Answers Tent
Katherine Dugas, Rose Hiskes, Yonghao Li, Ph.D., Felicia Millett, Diane Riddle, and Gale E. Ridge, Ph.D.
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.

22. Technical Demonstration Tent
See page 11 of the program for a schedule of Technical Demonstrations.

23. Kids's Corner and Girl Scout Badges
Andrea Gloria-Soria , Ph.D. and Terri Arsenault *assisted by* Dario Balcazar, Ph.D.
Bring your children to the Kids' Corner to make fun crafts and learn interesting facts about insects, plants, and more! Don't miss out on the opportunity to make your own pipe cleaner insects and plants, do some coloring, play with bubbles, and grab a cold treat! Children can come to this plot to collect 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 (Bugs, Flowers or Trees). Once the activity is complete, return to this location to collect your patch or badge!

24. Farm Equipment Used at Lockwood Farm

Lockwood Farm is a 75-acre working research farm. Here are some examples of the tractors and other equipment used for plowing, cultivating, tilling, and mowing the farm to assist the scientists in their research.

25. Baby Pools: Low-Cost Containers for Vegetable Production in Urban Agriculture

Leigh Whittinghill, Ph.D. *assisted by* Katherine Bruno, Lauren Crawford, and Riley Eagleson

The use of inexpensive containers, such as small plastic pools, could help expand production in urban areas. An experiment was conducted from 2022 to 2024 to 1) compare cucumber production in pools to traditional nursery pots, 2) find the optimal growing media/compost mixture, and 3) optimize the drainage strategy (drainage hole and pine bark placement) for growing cucumbers in pools. We found production to be heavily affected by compost that was not fully matured at the start of the experiment, and therefore not providing the expected nutrients and by fungal disease. We are repeating the experiment using a compost that has been fully matured and a fungal disease resistant cucumber variety. We will be monitoring soil moisture and temperature, plant growth and development, and harvests quantity and quality. We expect the harvests this year to be high, as it was in the first year of the original experiment, but with better performance in pools and pots containing higher compost levels.

26. Experiment Station Associates

Cheryl Cappiali, ESA President

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.

27. The Pavilion at Lockwood Farm

See page 11 of the program for a schedule of short talks held in 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's 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 provides an open feel in the interior of the building.

28. Hands-On Chemistry

Meghan Cahill

Join us at our Hands-On Chemistry station for a fun and interactive experience where you can become a chemist for the day! This booth offers hands-on experiments that allow visitors of all ages to explore the exciting world of chemistry. Whether you're mixing colorful reactions, watching chemical processes unfold right before your eyes, or learning about the science behind everyday substances, there's something for everyone. Come curious, leave amazed. Let's make science fun!

29. "Green" Solution Against Root-Knot Nematodes

Milica Pavlicevic, Ph.D. and Raquel Rocha, Ph.D. *assisted by* Regan Huntley, Krishna Ravali, Nubia Zuverza Mena, Ph.D., Christian Dimkpa, Ph.D. and Jason C. White, Ph.D.

Root-knot nematodes (*Meloidogyne* spp.) are microscopic worms that infect the roots of many plant species, causing so-called root-knot disease. The presence of root-knot nematodes in roots can be visualized by the formation of large galls (or "knots"), that subsequently steal the transport of water and nutrients from the plants to the worm. Consequently, plants become shorter, produce less fruit, and suffer a range of physiological consequences, such as decreases in photosynthesis, energy production, antioxidants, and mineral contents. A solution to the root-knot nematode problem involves application of copper-based (Cu) nanoparticles produced from hemp waste. Application of "green" Cu nanoparticles decreased the number of galls by 39% and number of eggs per root mass was 74% lower compared to non-treated plants. Taken together, "green" Cu nanoparticles produced from hemp waste present an eco-friendly, efficient management strategy against root-knot nematodes.

30. Utilizing Nanoparticles to Enhance Crop Growth and Stress Resistance

Zeyu Cai, Ph.D., Christian Dimkpa, Ph.D., Jason C. White, Ph.D., and Yi Wang, Ph.D.

Nanomaterials offer enhanced chemical reactivity, efficient nutrient release, and strong biological compatibility compared to larger materials. Their use in sustainable agriculture as fertilizer alternatives shows great promise. We evaluated the effects of zinc oxide nanoparticles (nZnO) on tomato growth. nZnO increased tomato growth and fruit yield by 20–30%. Lycopene, a key antioxidant in tomatoes, was also elevated with nZnO treatment, along with essential nutrients like amino acids, zinc, and iron. Using a simulated human digestion model, we found that nZnO did not negatively affect digestion and actually improved nutrient absorption in the intestines. These findings suggest that nZnO can enhance both crop quality and nutritional value without compromising food safety. As green synthesis methods improve and interdisciplinary research continues, nanoparticles are poised to play a key role in precision agriculture and sustainable food production.

31. Improving Soybean Seed Nutrition: Optimizing Nanoparticle Delivery with Vacuum Infiltration

Chaoyi Deng, Ph.D., Wade H. Elmer, Ph.D., and Jason C. White, Ph.D.

Agrochemical delivery is inefficient, and novel methods are needed to improve crop yields while reducing environmental impact. This study developed a vacuum infiltration seed priming strategy to incorporate important nutrients such as nanoscale silica into soybeans. While effective in early trials, optimal conditions for nutrient delivery remain unclear. Using fluorescent silica nanoparticles and confocal microscopy, we evaluated variables including surface charge, concentration, infiltration time, ionic strength, pH, and seed presoaking. Greater infiltration was observed with negatively charged nanoparticles, higher concentrations, shorter times, and potassium-based salts. Elemental analysis supported fluorescence data, showing co-delivery of beneficial nutrients like potassium and magnesium. These results demonstrate a new strategy for biofortifying soybeans with nanoscale nutrients, with potential for broader agrochemical applications and sustainable agriculture.

32. Effect of Polyvinyl Chloride Microplastics on the Translocation of Different Environmental Pollutants in *Lactuca sativa* (lettuce) and *Triticum aestivum* (spring wheat)

Mandeep Kaur, Ph.D., Nubia Zuverza-Mena, Ph.D., Milton Das, Ph.D., Gaddi Eshun, Ph.D., Glen DeLoid, Ph.D., Satwik Majumder, Ph.D., Omowunmi Sadik, Ph.D., Philip Demokritou Ph.D. and Jason White, Ph.D.

The present study investigates the effect of polyvinyl chloride microplastics (PVC-MP- 5 mg/L and 10 mg/kg) on the translocation and bioaccumulation of EPs (As, Cr, Pb, and boscalid at concentrations of 0.5 mg/L and 1 mg/kg each, and perfluoro-octane-sulfonic acid (PFOS) at 5 μg/L and 50 μg/kg) in lettuce and wheat growing in hydroponic and soil environment, respectively. The co-occurrence of EPs with PVC-MPs resulted in significant decrease in the biomass and chlorophyll content of lettuce. Lettuce exposed to aged PVC-MPs+EPs (PVC-A+EPs) resulted in significant increase in the translocation of heavy metals at least 3.5-fold, PFOS 4.35-fold and boscalid translocation by 97% as compared to the control. Wheat plants treated with unaged PVC-MP showed a 14 % increase in the shoot biomass whereas PVC-A showed 25.07% increase in grain weight as compared to the control. This type of work can add more information regarding the effect of ageing and co-contaminant behavior of MPs on plants.

33. Could Crop Chemistry Be Impacted by Soot from Wood Burn? A Prospective Metabolomics of Soot-Exposed Tomato Plants Tissues

Nassifatou Koko Tittikpina, Ph.D. and Sara Nason, Ph.D.

Previous studies conducted in vineyards exposed to wildfire-induced particulates showed differences in the chemistry of the produced wine, compared to wine from unexposed plants. We hypothesize that when exposed to particulates from soot produced by burning firewood, plants would synthesize de novo compounds, or at least their chemical fingerprint would be affected. To test the hypothesis, we grew tomato plants and exposed them to 100 g/L and 500 g/L concentration of soot solutions by foliar exposure over 1-, 2- and 3-months period. To investigate the chemical profile of the exposed plants, High Resolution Mass Spectrometry was used to analyze extracts from the exposed plants and the IROA Truquant kit. Using Truquant software, the data will be normalized and ion loss corrected. Further comparison of chemical fingerprints and identification will be achieved by annotation using molecular networking through computational mass spectrometry platforms.

34. Nanoscale CuS Foliar Application Enhances Fusarium Suppression in Tomatoes

Luyao Qing, Ph.D., Chaoyi Deng, Ph.D., Zeyu Cai, Ph.D., Hina Asrar, Ph.D., Sudhir Sharrma, Ph.D., and Yi Wang, Ph.D.

Copper sulfide (CuS) nanoparticles (NPs) show strong potential for enhancing tomato resistance to fungal pathogens, though their efficacy depends on nanomaterial properties. In this study, in-house synthesized CuS NPs, bulk CuS, and copper sulfate ($CuSO_4$) were foliar-applied to infected tomato plants. Compared to the diseased control, all Cu treatments—except bulk CuS—significantly increased shoot biomass. Only CuS1 significantly improved chlorophyll content. Cu-based treatments also boosted antioxidant enzyme activity, reducing oxidative stress. These results suggest that Cu-based materials, especially CuS NPs, can enhance disease resistance and support sustainable agriculture.

35. Per- and Polyfluoroalkyl Substances (PFAS) – Environmental Assessment and Remediation Methods

Sara Nason, Ph.D., Jasmine Jones, Priyankar Chand, Ph.D., Jingyi Zhou, Ph.D., Raees Ahmad, Ph.D, Nubia Zuverza-Mena, Ph.D., Christian Dimkpa Ph.D., and Jason White, Ph.D.

Per- and poly fluoroalkyl substances (PFAS) are a large group of highly toxic chemicals that have become common environmental contaminants. We will share results from CAES research on PFAS in maple syrup production and phytoremediation of PFAS, as well as provide information about the CAES program providing free analysis of PFAS in soil from Connecticut farms.

36. Irrigation With Recycled Wastewater – Risks and Benefits

Sara Nason, Ph.D., Nubia Zuverza-Mena, Ph.D., Jingyi Zhou, Ph.D., Raees Ahmad, Ph.D., and Priyankar Chand, Ph.D.

Recycling municipal wastewater for use in crop irrigation is a key strategy for reducing freshwater needs. Additionally, recycled wastewater can supply nutrients that enhance crop growth and reduce fertilizer needs. However, there are many chemical contaminants in wastewater, and understanding their movement in agricultural systems is important for reducing risk from consumption of irrigated crops.

37. Precision Foliar Delivery of Copper-Alginate Hydrogels Nanoparticles to Enhance Tomato Productivity and Stress Adaptation

Hina Ashraf, Ph.D., Chaoyi Deng, Ph.D., Christian O. Dimkpa, Ph.D., and Jason C. White, Ph.D. *assisted by* Catherine A. Jalomo, Ph.D., and D. Howard Fairbrother, Ph.D., of the University of Illinois Urbana-Champaign

"Food systems globally face substantial pressure from climate change and an increasing population. To meet the rising food demand, particularly as the global population is projected to reach nearly 10 billion by 2050, nano-enabled strategies are essential. The potential of hydrogel nanoparticles (HNPs) lies in their ability to tune copper delivery in tomato (*Solanum lycopersicum* L.), a globally important vegetable crop due to its consumption. Hydrogels remain underexplored as controlled-release nanomaterials capable of delivering various types of cargo, ranging from metal ions to small molecules. Hydrogels are biocompatible, and their internal carboxylic acids coordinate agriculturally valuable micronutrients like Cu2+, Zn2+, and Ca2+. The effects of HNPs on plant health and production were assessed. Greenhouse experiments provided measurements of biomass, chlorophyll content, and disease progression (AUDPC) during the growing period under healthy, diseased, and drought conditions.

38. Phosphorus Transport and Plant Response in Soil System with the Application of Phosphate Rock Coated with Nano Sulphur-Biopolymer

Paul Aikpokpodion, Ph.D. and Christian Dimkpa, Ph.D.

Phosphate fertilizers have been implicated in surface and groundwater contamination due to high P solubility in commercial fertilizers. On the other hand, the utilization of phosphate rocks as P fertilizer in their pristine state is rare due to their insolubility in water. The study aimed to increase P solubility in phosphate rock by coating it with selected organic acids and nano-sulfur and chitosan to improve its nutrient use efficiency and value addition. The coated phosphate rock materials were applied alongside with commercial phosphate fertilizer in a plant-soil system. Coatings increased P solubility, minimized P loss in soil and increased plant yield.

39. Nano-Enabled Agriculture - Tiny Solutions to a Toxic Problem - Cellulose Microfibers and Nano Zerovalent Iron to Make Food Free of Lead and Arsenic

Sudhir Sharma, Ph.D., Christian Dimkpa, Ph.D., Adeyemi Adeleye, Ph.D., Benjamin Hsiao, Ph.D., Howard Fairbrother, Ph.D., and Jason White, Ph.D.

Toxic metals like Lead (Pb) and Arsenic (As) in soils can reduce crop yield and harm the people who eat contaminated crops. Current ways to clean contaminated soils are often ineffective or too expensive. Our study looks at two affordable and eco-friendly materials- cellulose microfibers (CMF) and nano zerovalent iron (nZVI)- to assess if they can help reduce the amount of lead and arsenic that plants absorb.

We are growing lettuce and wheat in soil spiked with lead or arsenic in a greenhouse. By adding different amounts of CMF or nZVI to the soil, we want to determine how well these materials can trap the metals and keep them from entering the plants. We expect CMF to make lead (Pb) stick to the soil organic matter, while nZVI will likely change arsenic into less harmful forms, from a more accessible form, arsenate, to a less accessible form of arsenite. The results of our exhaustive study will help develop cost-effective ways to make food safer by reducing toxic elements in crops.

40. Remediation of Trichloroethylene Contaminated Groundwater Using Colloidal Activated Carbon and Bacterial Biodegradation

Rishikesh Bajagain, Ph.D. and Joseph J. Pignatello, Ph.D.

Trichloroethylene (TCE), a degreaser and dry-cleaning fluid, is a persistent groundwater contaminant in military zones and industrial sites, posing serious environmental and health risks. Our study, funded by the Department of Defense, examines a commercial remediation method combining colloidal activated carbon (CAC) and a bacterial culture meant to be injected underground water as a suspension. “Colloidal” refers to particles small enough (0.1- 2 micrometers) to stay suspended. CAC enhances TCE adsorption and thereby affects biodegradation, but it is not clear whether CAC is actually beneficial. Our results indicate that TCE adsorption onto CAC is rapid, reaching equilibrium within 1 hour, with adsorption significantly

faster than desorption. We also investigate competitive sorption of TCE with cis-dichloroethylene (cis-DCE), a TCE degradation byproduct, to assess its impact on CAC performance. Using advanced analytics, we study sorption/desorption rates under controlled conditions.

41. Analytical Testing of Adult-Use and Medical Marijuana Products in Connecticut

Anuja Bharadwaj Ph.D., Michael Ammirata, Terri Arsenault, Christian Dimkpa, Ph.D., and Jason C. White, Ph.D.

Following the legalization of adult-use marijuana in CT, a regulatory testing program was created to assess cannabinoid content and product safety. CAES, in collaboration with the Dept. of Consumer Protection (Drug Control Division), ensures that medical & adult-use cannabis products meet label claims and regulatory standards. The Analytical Chemistry Department at CAES has developed and implemented validated testing methods based on High-Performance Liquid Chromatography with UV detection (HPLC-UV) & Gas Chromatography Mass Spectrometry (GCMS), both accredited by the American Association for Laboratory Accreditation (A2LA). The lab quantifies cannabinoids-THC (delta-9-tetrahydrocannabinol), CBD (cannabidiol), THCA & CBDA, and screens for potential contaminants such as pesticides, mycotoxins, and toxic elements when required. This comprehensive analytical framework helps safeguard public health and consumer safety by ensuring cannabis products are safe and free from harmful substances.

42. Effects of Tire Wear Particles on Soil Physical Properties

Yingxue Yu, Ph.D. and Sonam Sah

Tire wear particles (TWPs), generated from vehicle traffic, are a major source of microplastic pollution in terrestrial systems. Soil physical properties, such as water retention, hydraulic conductivity, and aggregate stability, are vital for ecosystem function, yet the influence of TWPs on these properties under realistic environmental conditions is poorly understood. This project aims to assess how TWPs affect soil bulk density, hydraulic conductivity, water retention, and aggregate stability at field-relevant concentrations.

43. A Scytalidium-Like Indoor Fungus Revealing Polyphyletic Relationships in Scytalidium

DeWei Li, Ph.D., Ethan Paine, and Neil P. Schultes, Ph.D.

A Scytalidium-like fungus was isolated from a dust sample collected indoors in the USA. ITS, LSU, Tub, EF1a, and RPB of this fungus were sequenced. Phylogenetic analyses indicated that the Scytalidium-like fungus is closely related to Scytalidium flavobrunneum, yet neither fungus is phylogenetically related to the generic type species, *S. lignicola*. Further analyses showed that members of Scytalidium are polyphyletic belonging to eight orders: Amphisphaeriales, Coryneliales, Helotiales, Hypocreales, Mycosphaerellales, Pleosporales, Sordariales, Xylariales; seven subclasses: Coryneliomycetidae, Dothideomycetidae, Hypocreomycetidae, Leotiomycetidae, Pleosporomycetidae, Sordariomycetidae, Xylariomycetidae. Scytalidium s.s. belongs to Helotiales. The indoor fungus has dimorphic anamorphs and belongs to Monochaetia using five loci, Amphisphaeriales. Species of Scytalidium belonging to other orders are combined in their respective genera based on phylogenetic analyses using ITS and LSU.

44. A World of Viruses

Godfrey Indinda Nattoh, Ph.D., Jonathan Karisa, Ph.D., and Rebecca Johnson, Ph.D. *assisted by* Duncan Cozens

Viruses are parasitic microorganisms that replicate within infected cells. Composed of genetic material bundled in a protein shell, viruses are relatively simple. Yet, despite their simplicity, viruses play a significant role in shaping the world we live from global economics to human health. They infect all living organisms from bacteria in deep-water vents to plants and animals. This exhibit will explore the fascinating world of viruses from their diversity and size to their medical and agricultural importance. Bring the kids and join us in constructing our own virus models.

45. Exploring Microbial Responses to Marsh Restoration for Wetland Health

Jing Yuan, Ph.D. *assisted by* Jacquelyn LaReau and Blaire Steven Ph.D.

Connecticut coastal wetlands face pressure from multiple human activities, including “salt marsh squeeze”, which results from the combined effects of sea level rise and coastal development. As rising sea levels submerge lower marsh areas and development restricts plant migration, critical bird habitats are lost. Sediment addition is being used to raise marsh elevation and create nesting sites for the birds that depend on these systems. However, the impact of this practice on sediment microbial communities, sediment chemistry, and other wetland ecosystem services is not fully understood. Researchers at the Connecticut Agricultural Experiment Station (CAES) are studying these effects to prevent unintended consequences such as altered carbon cycling, pollutant release, or the introduction of pathogens—ultimately safeguarding the entire wetland ecosystem, from birds to bacteria.

46. Chemical Senses of Invasive Species

Qi Xue, Ph.D. and Hany Dweck, Ph.D.

Insects are among the most successful animals on Earth, due in part to their dependence on highly developed chemical senses, primarily olfaction (sense of smell) and gustation (sense of taste), to navigate their environments, locate resources,

and interact with other organisms. By understanding how insect chemosensory systems function and evolve, we can develop innovative tools to combat pest populations while minimizing harm to beneficial insects and ecosystems. The chemical senses of insect pests, while vital to their success, also represent a critical vulnerability that can be leveraged to protect agricultural and natural resources effectively.

47. Mycorrhizal Inoculation in Urban Trees

Susanna E. Keriö, D.Sc. *assisted by* Julia Celio and Remick McIntyre

Tree planting is critical for urban tree canopy maintenance, but various abiotic and biotic stress factors affect the survival of newly planted trees. Soil conditions are estimated to explain 80% of urban tree health issues. Therefore, approaches that improve root health may improve tree health. One approach to improve tree health is to inoculate them with mycorrhizal fungi. Benefits of mycorrhizae for trees are widely accepted, but it is unclear how useful and how effective mycorrhizal inoculation is for trees growing in field conditions. We present results from a project that quantified the impact of mycorrhizal inoculation on urban tree health in eight towns and on eight tree species in Connecticut. The exhibit will provide information on site factors that affect both tree health and the success of mycorrhizal inoculation, and how the interaction of site conditions and tree species affect mycorrhizal inoculation.

48. Developing and Testing Disease Resistant Apples

Quan Zeng, Ph.D., Naziya Nabi, and Joseph Liquori

Apples are an essential fruit crop, but are also susceptible to many diseases and pests. Due to the extensive use of pesticides, apples are constantly on the "Dirty Dozen" list of produce with the most pesticides detected. In collaboration with researchers from Cornell University, we developed and tested apple cultivars that are naturally resistant to plant diseases. The apple cultivars displayed can detect the pathogen presence, triggering the plant's immune response to induce its cell death, restricting pathogen spread. Crosses of the disease-resistant apples are made to determine the disease-resistant allele on their chromosomes. The goal is to breed the resistance into apples with good horticulture traits to produce disease-resistant, good-tasting apples.

49. Chestnut Species and Hybrids

Sandra Anagnostakis, Ph.D. (Emeritus) *assisted by* Pamela Sletten (Retired)

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). 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 northern Florida are planted across the road from an Allegheny chinquapin from Ohio. The original tree (the “ortet”) of the cultivar ‘Lockwood’ is at the southwest corner of the plot.

50. Supporting Connecticut’s Green Industry and Honey Bees Through Inspection and Surveys

Jacob Ricker *assisted by* Tia Blevins, Jeffrey Fengler, Raffaela Nastri, Paula Wolf, and Dylan Alderucci

This office works towards safeguarding plant health by reducing the spread of pests and diseases for plant products that are sold in CT. In 2024, our office conducted 182 nursery inspections for our 200 registered nursery growers that sell plants in the state. Our state apiary inspector oversees the health of honey bees for over 800 licensed beekeepers and 8,849 hives. We issued 165 interstate certificates for exports to 11 states, and 414 international certificates for 32 countries. We also conduct forestry surveys across the state for spongy moth, elm zig-zag sawfly, and other forest pests. Working with growers, we survey for exotic insects and diseases not known in our state with programs supported by the Cooperative Agricultural Pest Survey and Plant Protection Act. This past year we focused on box tree moth, old world bollworm, oak ambrosia beetle, and pests of fruit trees. With these efforts, our long-term purpose is to continually reduce negative impacts to agriculture in CT.

51. Collaborations in Biological Control of Hemlock Woolly Adelgid (HWA)

Carole Cheah, Ph.D.

Hemlock woolly adelgid (HWA), a devastating non-native pest of Eastern and Carolina hemlocks, continues to threaten Connecticut’s hemlocks in urban and forest landscapes. Connecticut has a collaborative, no-chemical strategy to manage HWA outbreaks using *Sasajiscymnus tsugae*, a tiny native ladybeetle predator of HWA from Japan. Identified by Japanese and Connecticut scientists, it is the first HWA biological control agent released in North America and available commercially. Over 300,000 *S. tsugae* have been released in Connecticut since 1995 in multiple state lands, town open space, land trust preserves, private forests, bird sanctuaries, water company lands etc. Homeowners have also released *S. tsugae* to reduce HWA impacts. The Upper and Lower Farmington River and Salmon Brook is a case study for this important strategy. Miles of riparian hemlock forests along the Nation’s first Partnership Wild and Scenic River are now being protected without chemicals using *S. tsugae*.

52. Spotted Lanternfly in Connecticut

Claire E. Rutledge, Ph. D.

Spotted lanternfly is a large, striking, Asian planthopper that was first found in Connecticut in 2020. It is of primary economic concern as a pest of grapes, but it is also a nuisance pest for homeowners. It sucks the sap from plants creating copious amounts of sticky honeydew. In this display we will share information about the spread, biology and management of spotted lanternfly.

53. Bird & Butterfly Garden

The Bird & 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.

54. Mowing for Monarchs

Kelsey E. Fisher, Ph.D. *assisted by* Riley Eagleson, Hannah Flis, Annette Flotten, Erik Galvin, Sarah Gray, Remick McIntyre, Emma Somol, and Mikayla Spero

In December 2024, monarchs were proposed to be listed as threatened under the Endangered Species Act. A significant driver is the decline of their obligate host plant, milkweed, which monarchs rely on for most of their lifecycle. While milkweed restoration efforts are underway, these practices must be designed to maximize monarch survival, longevity, and realized fecundity. Integrating aspects of behavior that enhance oviposition rates and larval survival into conservation plans could increase the overall impact of the efforts. Habitat quality has the potential to impact monarch butterfly success. Monarchs seem to favor young, succulent, and lush milkweed for oviposition, and larvae have higher survival rates, larger larval and pupal masses, and develop faster when fed young vegetation than older leaves. Here, we are conducting a study to see if mowing milkweed in June, July, or August to provide young vegetation later in the growing season impacts monarch utilization and success.

55. Busy Bumblebees

Kelsey E. Fisher, Ph.D. and Caleb Bryan, Ph.D. *assisted by* Violet Bisset, Sierra Ciak, Abigail Gill, and Emma Somol

Pollinator populations have been declining for the past several decades. One of the causes we can control is the lack of available nesting, foraging, and overwintering habitat. Many CT residents are doing their part by establishing and maintaining small gardens with blooming flowers that provide nectar for pollinators across the state. This is a great first step! But, focusing solely on floral habitat restoration may not be enough, as nesting and overwintering habitat may be limited as well. Come learn about our current research projects that will help us understand habitat needs for all the life stages of some of our favorite charismatic pollinators: bumblebees. Our pollinator friends are looking forward to meeting you!

56. The Public Health and Entomology Tent

a. Statewide Monitoring Program for Mosquito-Borne Viral Diseases in Connecticut

Philip Armstrong, Ph.D., John Shepard, Andrea Gloria-Soria, Ph.D., Angela Bransfield, Michael Misencik, and Tanya Petruff

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 to protect the public and reduce the risk of human disease. The Connecticut Agricultural Experiment Station (CAES) maintains a network of 108 mosquito-trapping stations in 88 municipalities throughout the state. The surveillance program monitors the types, numbers and locations of mosquitoes and tests them for the presence of viruses that can cause illness including West Nile virus (WNV) and eastern equine encephalitis virus (EEEV). To date, more than 5.6 million mosquitoes representing 48 different species have been collected, identified, and tested since 1997. A total of 3,473 WNV isolations have been recovered from 27 different mosquito species and a total of 717 isolations of EEEV have come from 21 species of mosquitoes. WNV 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 EEEV 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: https://portal.ct.gov/caes/mosquito-testing/introductory/state-of-connecticut-mosquito-trapping-and-arbovirus-testing-program

b. Monitoring Native and Invasive Ticks and Tick-Borne Pathogens to Better Guide Public Health Action in Connecticut

Goudarz Molaei, Ph.D. *assisted by* Noelle Khalil

The convergence of important tick vectors, overlapping ranges of ticks and their associated pathogens, and the recognition of novel tick-borne pathogens pose an elevated risk for human infections and coinfections with tick-borne pathogens in Connecticut and throughout the Northeast and upper midwestern United States. Tick-borne diseases (TBDs) comprise more than 90% of nationally notifiable human vector-borne disease cases in the U.S. The reported TBD cases have increased from 50,863 in 2019 to 71,346 in 2022, for a total of 184,459, but the actual case number is substantially higher. The majority of TBD cases are associated with the blacklegged (deer) tick, which serves as a vector for several pathogens, including those responsible for Lyme disease (LD), Borrelia miyamotoi disease, anaplasmosis, ehrlichiosis, babesiosis, and Powassan virus (POWV) disease. Monitoring tick populations in Connecticut has historically been conducted by the CAES-Tick Testing Laboratory (CAES-TTL) within the framework of a passive tick and tick-borne disease surveillance program with the objectives to 1) screen ticks for pathogens, 2) monitor the distribution and spread of both native and invasive ticks, 3) develop mathematical and statistical models to better predict the presence, abundance, and range expansion of ticks and their associated pathogens, and 4) investigate the effects of environmental factors such as climate change on the spatiotemporal patterns of tick species. The CAES-TTL is currently receiving nearly 6,000 tick submissions per year and testing blacklegged ticks for disease agents. In 2024, the CAES-TTL received 4,233 ticks, of which 3,437 (81.2%) were blacklegged ticks, 560 (13.23%) were American dog ticks, 199 (4.7%) were lone star ticks, 26 (0.61%) were longhorned ticks, 4 (0.09%) were woodchuck ticks, 3 (0.07%) were Gulf Coast ticks, and 4 (0.1%) were other tick species. Of the 3,303 engorged nymphs and adult female blacklegged ticks that were tested, 27.4%, 4.9%, 10.5%, 2.1%, and 0.4% tested positive for the causative agents of LD, anaplasmosis, babesiosis, Borrelia miyamotoi disease, and POWV disease, respectively. In addition, up to 5.4% of these ticks tested positive for two or three pathogens simultaneously.

c. Statewide Tick Surveillance in Connecticut: Monitoring Emerging Threats

Megan Linske, Ph.D, and Doug Brackney, Ph.D. *assisted by* Jamie Cantoni and Duncan Cozens

Connecticut has seen a steady rise in the abundance and distribution of medically important tick species in recent years. In response, the **Active Tick Surveillance Program (ATSP)** was established in spring 2019 to monitor changes in tick populations and assess the associated risk of pathogen transmission across the state. The ATSP conducts routine collections of adult and nymphal ticks from 40 permanent monitoring sites during peak activity seasons, typically from late March through November. Collected ticks are identified and tested for a panel of pathogens of significant public health concern, including *Borrelia burgdorferi* (Lyme disease), *Babesia microti* (babesiosis), *Anaplasma phagocytophilum* (anaplasmosis), *Borrelia miyamotoi* (relapsing fever), *Borrelia mayonii* (a novel Lyme agent), and Powassan virus (Powassan encephalitis). Since its launch, the program has collected, identified, and tested nearly 16,000 ticks. As new species such as the lone star tick (*Amblyomma americanum*), the longhorned tick (*Haemaphysalis longicornis*), and the recently detected Gulf Coast tick (*Amblyomma maculatum*) continue to expand their range into Connecticut, surveillance efforts are increasingly focused on tracking their spread and understanding their potential impact on tick-borne disease dynamics in the state.

d. Integrated Tick Management in Connecticut: Targeting Hosts, Habitat, and Human Risk

Megan Linske, Ph.D and Scott Williams, Ph.D. *assisted by* Jessica Brown Ph.D., Heidi Stuber, Natalie Bailey, Carlin Eswarakumar, and Thomas Larkin-Wells

As tick populations and tick-borne diseases continue to rise in the Northeast, there is a growing need for science-based, scalable management strategies that reduce human risk while minimizing environmental impact. Our **Integrated Tick Management (ITM)** research program focuses on optimizing and adapting existing control strategies by targeting the ecological drivers of tick abundance—namely host species and habitat conditions. We apply a dual-scale approach to tick risk reduction. At the **small scale**, we assess risk in residential backyards to test within-season interventions tailored to specific landscapes. These include systemic small mammal treatments (e.g., oral acaricides), targeted pesticide applications, and analyses of habitat features that influence tick density and host activity. By working directly in peri-domestic environments, we aim to develop practical, evidence-based tools that homeowners can implement to reduce tick exposure on their own properties. At the **larger landscape scale**, we evaluate long-term strategies that consider broader habitat dynamics and the role of large-bodied hosts, particularly white-tailed deer. This includes testing the efficacy of systemic acaricides delivered via seasonal baiting to reduce tick loads on deer and mitigate reproduction of medically important tick species. Our goal is to develop an integrated, ecologically grounded framework that aligns short-term, site-specific risk reduction with long-term,

regional-scale management strategies. Through this work, we aim to support public health by delivering sustainable and adaptable tick control solutions rooted in host and habitat ecology.

57. Office of Aquatic Invasive Species (OAIS)

Gregory Bugbee, Jeremiah Foley, Ph.D., Summer Weidman, Riley Doherty, Madeline Watts *assisted by* Madison Manke, Olajumoke Omosowone, and Abraham Haxhi

Connecticut's ponds, lakes, and rivers are increasingly threatened by non-native, invasive aquatic plants such as hydrilla, Eurasian watermilfoil, variable-leaf watermilfoil, and fanwort. These species degrade native ecosystems, hinder recreational activities, lower property values, and can harbor harmful algae. Since 2002, researchers in the Department of Environmental Science and Forestry have conducted over 430 aquatic plant surveys across the state, identifying over 100 plant species - 14 of which are invasive. Surveys indicate that roughly 60% of Connecticut waterbodies contain at least one invasive aquatic plant. OAIS continues to explore innovative management strategies, including reduced-risk herbicides, biological controls, winter drawdowns, and the use of drone and satellite technologies. In 2016, OAIS discovered Northern hydrilla (*Hydrilla verticillata* subsp. *lithuanica*) in the Connecticut River, a subspecies of hydrilla native to Europe and Asia and not previously found in North America. By 2021, OAIS had completed a comprehensive invasive species survey of the river from the CT/MA border to Long Island Sound, revealing a widespread, well-established population of the invasive species. Northern hydrilla has continued to spread throughout the region, and by 2025 has been established in 10 new waterbodies in CT and MA. OAIS is actively collaborating with the U.S. Army Corps of Engineers to research and manage this subspecies, which is genetically and morphologically different from other hydrilla subspecies in the United States. At this plot, you'll see our research boats and the equipment we use to collect data - including an underwater camera system and our fixed-wing mapping drone. You will also have a chance to explore our new web application designed to help residents visualize, identify, and report aquatic invasive species. In addition, live specimens of invasive plants will be on display to hone your identification skills. A researcher will be present to discuss our work and answer questions about aquatic invasive species issues in Connecticut.

58. Assessing Pollinator Response to Ecotype Native Plants

Tracy Zarrillo *assisted by* David Mantack, Connor Grace, Kate Perzanowski, and Kristina Libby

State and federal agencies, land trusts, private landowners, farmers, and pollinator conservation groups are investing time and money creating pollinator habitat throughout Connecticut. In response to demand for locally adapted native plants, ecotypic flower seed is being developed. Ecotype seeds are seeds grown from a parent stock that have genetically evolved over time to be adapted to a particular ecoregion. Some of the native flower species being grown for ecotype seed are hosts of specialist bees. Specialist bees typically only use pollen from one plant genus or one plant family. Some species, such as the squash bee, are ubiquitous in the Connecticut landscape and consequently will show up wherever their host plant is grown. Here I am exploring how readily three specialist bee species, *Melissodes denticulata, Dufourea monardae*, and *Osmia distincta*, find their associated host plants, *Vernonia noveboracensis*, *Monarda fistulosa*, and *Penstemon digitalis*.

59. Challenges for Hemp Growers

Terri Arsenault, Richard Cecarelli, and Anuja Bharadwaj, Ph.D.

CAES began testing hemp in 2019 following the legalization of the growing of hemp with passage of the Agricultural Improvements Act in December of 2018. The bill allowed growing *Cannabis sativa* as long as it has <0.3% total delta-9 THC, which is federally legal and referred to as hemp (versus marijuana). While hemp cultivars are predominantly CBD, they will contain THC at a ratio of about 25:1, with the ratio dependent upon the genetics of the plant. This means that the maximum CBD is around 8%, depending on the measurement uncertainty of the testing. However, the advertised maximum CBD for many cultivars is around 12%, and there is a notable escalation in CBD content as plants mature. Gowers should be mindful of the rapid escalation in CBD\THC content as plants mature and may need to harvest prior to full maturity to prevent crop embargoes. Also, while marijuana is legal under CT state law, hemp is federally legal and has separate growing and harvesting requirements.

60. The Effects of Management Practices on Cut-and-Come-Again Greens Production

Leigh Whittinghill *assisted by* Katherine Bruno, Lauren Crawford, and Riley Eagleson

Cut-and-come-again is a practice in which greens are harvested by removing the outer leaves, leaving the growing center of the plant intact to grow and be harvested again. Experimentation at CAES has been focused on determining what management practices increase yields and crop quality at later harvests. In this plot, kale is being grown some of which was planted in the spring and has been harvested weekly since May, and some of which was planted in July. Some of the kale receive only an initial fertilizer application, or that plus a side dressing of nitrogen, while others are receiving fertilizer at every harvest. We are also harvesting some of the kale by removing only half of the leaves that are ready, and some by removing all but four of the leaves. There are also plots that are only harvested once that act as controls. We are monitoring yield quantity and quality, leaf nutrient content, and nutrient leaching to determine the optimal cut-and-come-again management practices.

61. 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).

62. Asian Chestnut Gall Wasp on Chestnut

Sandra Anagnostakis, Ph.D. (Emeritus) *assisted by* Pamela Sletten (Retired)

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 species of 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.

63. Hybrid Elm Trees

Sandra Anagnostakis, Ph.D. (Emeritus) *assisted by* Pamela Sletten (Retired)

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.

64. Rocky Hill American Chestnut Trees

Sandra Anagnostakis, Ph.D. (Emeritus) *assisted by* Pamela Sletten (Retired)

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) to keep them alive.

65. Grapes

Washington da Silva, Ph.D. and Richard Cecarelli

Wine Grapes – these vines are reminiscent of the first grapevines planted at Lockwood farm in 1978 by CAES scientists when the grape research program was established at CAES. Over decades, many studies were conducted on grape disease susceptibility and winter hardiness, which helped to propel the wine and grape industry in Connecticut by providing important information on the varieties best adapted to the local climate.

66. Mowing for Monarchs

Kelsey E. Fisher, Ph.D *assisted by* Riley Eagleson, Hannah Flis, Annette Flotten, Erik Galvin, Sarah Gray, Remick McIntyre, Emma Somol, and Mikayla Spero

In December 2024, monarchs were proposed to be listed as threatened under the Endangered Species Act. A significant driver is the decline of their obligate host plant, milkweed, which monarchs rely on for most of their lifecycle. While milkweed restoration efforts are underway, these practices must be designed to maximize monarch survival, longevity, and realized fecundity. Integrating aspects of behavior that enhance oviposition rates and larval survival into conservation plans could increase the overall impact of the efforts. Habitat quality has the potential to impact monarch butterfly success. Monarchs seem to favor young, succulent, and lush milkweed for oviposition, and larvae have higher survival rates, larger larval and pupal masses, and develop faster when fed young vegetation than older leaves. Here, we are conducting a study to see if mowing milkweed in June, July, or August to provide young vegetation later in the growing season impacts monarch utilization and success.

67. Cheshire Pollinator Pathway and Hamden Land Conservation Trust

Joy VanderLek

Cheshire Pollinator Pathway is partnering with Hamden Land Trusts Pollinator Pathway to help promote native plants in the local landscape, raising awareness for all sizes and types of property-whether you have a yard, a patio or a planting pot. Everyone can help pollinators. https://www.cheshirepollinatorpathway.org/
Joyvlek@gmail.com , cheshirepollinatorpathway@gmail.com, (203) 623-4027

68. Connecticut Botanical Society
Edmund (Ed) Smith
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, we strive 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.
We have goals to:
1) Build awareness of the botanical resources in other CT groups' beloved places, and in the neighborhoods of our members.
2) To have a site where people feel comfortable posting photos of plants and asking for help with ID, to encourage hands-on botany.
3) From a practical standpoint, a place to post weather updates and supplemental directions for the nearly weekly CBS field trips, and lectures and indoor programs as well.
4) A place to share informal photos of botanists exploring together, to increase membership and build our sense of camaraderie.
5) A place to resolve serious identification challenges or post photos of new varieties – for scientific feedback from the experts among us.
connecticutbotanicalsociety@gmail.com

69. Connecticut Christmas Tree Growers Association
Lisa Angevine-Bergs
The Connecticut Christmas Tree Growers Association is a non-profit membership organization established in 1960. CCTGA is dedicated to the development of the Christmas tree industry in the state of Connecticut. Representing over 200 members, CCTGA focuses on the production and marketing of top-quality Christmas trees as well as providing consumers with information about local tree farms, where to purchase CT Grown Christmas trees, and how to care for them.
https://ctchristmastree.org/, executivedirector.cctga@gmail.com, (860) 601-5906

70. Connecticut College Arboretum
Scott D'Agostino
The Arboretum, established in 1931, is a signature feature of Connecticut College. Today it encompasses 750 acres, including the landscaped grounds of the College campus as well as the surrounding plant collections, natural areas and managed landscapes. The Arboretum offers visitors a chance to explore a diverse collection of native plants and natural habitats or simply wander and enjoy the beauty of this precious natural resource. Taking a self-guided tour (offered May-October) is an excellent way for first-time visitors to experience many interesting features in the Native Plant Collection.
Approximately 2,500 trees, shrubs and vines native to eastern North America and hardy in southeastern Connecticut are labeled with scientific names and accession numbers. The various species take turns displaying their beauty throughout the seasons: shadbush and willows in April; dogwood and azaleas in May; mountain laurel and magnolias in June; giant rhododendron, sourwood and sweet pepperbush in July; Franklin tree in September; brilliant autumn foliage in October; evergreens and conifers year-round. Spring blooming wildflowers and late summer blooming perennials add color and pollinator habitat across the landscape. The Arboretum is open to the public, free of charge, every day of the year from sunrise to sunset. For more information, please feel free to contact sdagostin@conncoll.edu or (860) 439-2144.
Visit our website at https://www.conncoll.edu/the-arboretum/.

71. Connecticut Department of Agriculture
Rebecca Eddy
The Connecticut Department of Agriculture 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. For more information, visit www.CTGrown.gov, or contact rebecca.eddy@ct.gov, (860) 713-2500

72. Connecticut Department of Energy and Environmental Protection - Wildlife Division
Paul Benjunas
The DEEP Wildlife Division is part of the Connecticut Department of Energy and Environmental Protection (DEEP) and is responsible for advancing the conservation, use, and appreciation of Connecticut's wildlife resources. This display will

highlight some of the Division's ongoing research with an emphasis on black bears and the Connecticut Wildlife Action Plan. https://portal.ct.gov/DEEP/Wildlife/Wildlife-in-Connecticut, paul.benjunas@ct.gov, (860) 416-8563

73. Connecticut Department of Energy and Environmental Protection- Pesticide Management Program
Zachary Donais
The Connecticut Department of Energy & Environmental Protection (DEEP) Pesticide Management Program's main goal is to prevent adverse human health or environmental effects from the misuse of pesticides. We work with all people, products, permits, and businesses that are related to pesticides and arboriculture and make sure that they are properly certified and knowledgeable in the work they are doing. We would be happy to answer any questions about pesticides or help anyone looking to get certified! https://portal.ct.gov/deep-pmp, zachary.donais@ct.gov, (860) 424-3326

74. Connecticut Forest and Park Association (CFPA)
Elizabeth Merow
The Connecticut Forest & Park Association (CFPA) connects people to Connecticut's forests, parks, and Blue-Blazed Hiking Trails, and ensures these special places are protected and well-managed for future generations. CFPA inspires active, lifelong engagement with Connecticut's abundant forests, parks, and trails by building a vibrant and diverse conservation community, including individuals and families, educators, community leaders, and volunteers. Through its forest education programs, CFPA offers engaging, hands-on learning opportunities for school children and adult learners alike, fostering a deeper understanding of and connection to the natural world. CFPA is a nonprofit organization that relies on members and supporters to carry out its mission. www.ctwoodlands.org, emerow@ctwoodlands.org, (860) 346-8733

75. Connecticut Land Conservation Council
Aaron Lefland
The Connecticut Land Conservation Council is the only statewide service provider and voice for all Connecticut land trusts. CLCC is a leader in advocacy and policy, education and training, and technical assistance to empower Connecticut's 120+ land trusts and ensure the long-term viability of land conservation efforts in the state. Since its formation in 2006, CLCC has grown into one of the most effective land trust service associations in the country, offering a wide range of programming and services – from traditional capacity building, training and education to new and creative opportunities for land trusts to better connect to one another and their communities for greater conservation, economic, and social impact. https://ctconservation.org/, info@ctconservation.org, (860) 852-5512

76. Connecticut Professional Timber Producers Association
Kit Serafini
The Connecticut Professional Timber Producers Association is a non-profit organization representing the forest products industry of CT. Our membership works 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. www.timproct.org, info@timproct.org, (860) 948-0432

77. Connecticut Tree Protective Association, Inc.
Cathy Dvorsky
The Connecticut Tree Protective Association is a non-profit organization that supports arboriculture in the State of Connecticut. This association was established to accomplish the following goals: a.) promote the protection and care of trees in the State of Connecticut, b.) to advocate for beneficial legislation as it relates to trees, c.) to sponsor meetings devoted to the presentation and exchange of scientific data and general information in the field of arboriculture, d.) to foster research in the field of arboriculture, e.) to encourage a greater interest in planting trees and how to plant, and nurture them properly and f.) to promote good fellowship and ethical practices in the arboricultural profession. www.ctpa.org, cathy@ctpa.org, (203) 484-2512

78. CT Council on Soil and Water Conservation
Lilian Ruiz
The Connecticut Council on Soil and Water Conservation is set up by State Statute to assist the Commissioner of the Department of Energy and Environmental Protection (DEEP) with the coordination of soil and water conservation, protection, and management across the state. The Council brings together local, state, and federal agencies involved in such matters with its membership including the 5 Conservation Districts, DEEP, Dept of Agriculture, UConn Extension, USDA Natural Resource Conservation Service, USDA Farm Service Agency, CT Agricultural Experiment Station, and the CT Resource Conservation and Development Council. There is a similar coordinating body in every state, creating a national network of state soil and water conservation agencies providing for technical transfer of scientific knowledge and best practices across the nation. www.ctcouncilonsoilandwater.org, ctcouncilswc@gmail.com.

79. Connecticut Farmland Trust
Elisabeth Moore
CT Farmland Trust is the only statewide nonprofit in the state dedicated to the protection of agricultural land. Since its founding in 2002, CFT has protected 75 farms and assisted its partners in conserving an additional 1,100 acres. CFT works with farm owners to permanently protect their land, often in partnership with the CT Department of Agriculture, USDA-NRCS, municipalities and local land trusts. www.ctfarmland.org, Emoore@ctfarmland.org, (860) 247-0202

80. D.E.E.P. Forestry Division, Private and Municipal Lands Program
David Irvin, Central District Service Forester
DEEP Forestry performs a wide range of public services regarding the State of Connecticut's urban and rural forests. This includes forests on both public and private land. The Private and Municipal Lands component of DEEP Forestry will be out in force at Plant Science Day, as we have found it to be an excellent venue at which to make contact with our constituents, be that public officials, private forestland owners or just people in general interested in trees and in the welfare of the trees and forests in the state. https://portal.ct.gov/deep, david.irvin@ct.gov, (860) 462-8961

81. Levo International, Inc.
Nathaniel Heiden
Levo International is a non-profit 501(c)3 organization dedicated to eliminating food insecurity through innovation and partnership. Levo's main focus has been delivering assistance to food insecure neighborhoods in Connecticut and in Haiti. Hydroponics is the growth of plants without soil in a water-based system. Simplified forms of hydroponics are the main mechanisms Levo uses to increase food access. Levo's research program has therefore focused on reducing the inputs required for hydroponic farming to increase its accessibility and impact. With the support of the Connecticut Agricultural Experiment Station, the Northeast SARE, and the CT Department of Agriculture, Levo has ongoing research efforts exploring the development and deployment of effective organic fertilizers and improved mineral fertilizer usage in hydroponics. https://levointernational.org/, nheiden@levointernational.org, (203) 981-6363

82. Mill River Watershed Association
Ron Walters
The Mill River Watershed Association is a community-based membership organization focused on promoting effective stewardship of the Watershed. Broad-based and collaborative, the MRWA pursues conservation and restoration; Informed Community Involvement in Policy Development: relevant research, education for all interested parties, and the formation of partnerships to guide public policy managing the Watershed; Wise Utilization of the Watershed's Resources: MRWA facilitates appropriate, sustainable uses of the Watershed in ways that respect and nurture the integrity and well-being of the Mill River. https://millriverofsouthcentralct.org/, rjwalters3144@gmail.com

83. Northeast Organic Farming Association of CT (CT NOFA)
Kimberly Stoner
CT NOFA Educators of Organics, The Northeast Organic Farming Association of CT's mission is to ensure the growth and viability of organic agriculture, organic food, and organic land care. We envision a healthy, organic Connecticut founded on ecologically, socially, and economically just principles. In addition to our food-based initiatives, we also run the NOFA Organic Land Care program to train the next generation of organic landscapers, land managers, and conservationists. www.ctnofa.org, kim@ctnofa.org, (203) 408-6819

84. Six Lakes Park Coalition
Justin Farmer
The Six Lakes Park Coalition is a growing alliance of concerned neighbors and supporting organizations seeking to restore and conserve for public use the 102 acres of forest and wetlands in Southern Hamden commonly known as Olin Powder Farm. SLPC seeks both to ensure thorough remediation of site contaminants and to align the property's eventual use with the needs and interests of the Newhall neighborhood and the wider Hamden community. http://sixlakespark.org/, JustinFarmerDirect@gmail.com

85. Sleeping Giant Park Association
Mick Martucci
SGPA is an all-volunteer 501(c)3 non-profit organization, dedicated to protecting and caring for the Sleeping Giant. The Sleeping Giant Park Association, Inc., was founded in 1924 to protect the Sleeping Giant from quarrying, and to establish the iconic ridgelines as a park for the people of Connecticut. SGPA is Connecticut's oldest state park "friends group" and has a tremendous history of conservation and stewardship. The mission of SGPA, in partnership with the State of Connecticut, is to build upon a legacy of conservation and stewardship to expand the park and the opportunities it offers for physical recreation, spiritual renewal, and enjoyment of and learning about the natural world. www.sgpa.org, hiking@sgpa.org, (203) 430-7721

86. The American Chestnut Foundation - CT Chapter

Jack Swatt

More than a century ago, nearly four billion American chestnut trees were growing in the eastern U.S. They were among the largest, tallest, and fastest-growing trees. The wood was rot-resistant, straight-grained, and suitable for furniture, fencing, and building. The nuts fed billions of wildlife, people and their livestock. It was almost a perfect tree, that is, until a blight fungus accidentally introduced by humans killed it more than a century ago. Since then, The American Chestnut Foundation (TACF) is committed to restoring the American chestnut tree to its native range (200 million acres of eastern woodlands). Unlike other environmental organizations, TACF's mission is not about preventing environmental loss or preserving what we already have. The loss already occurred and TACF is trying to restore an entire ecosystem. Our goal is to create a template for the restoration of other chestnut tree species throughout the world. During the Plant Science Day Event, members of the TACF Connecticut Chapter will be there to answer all your chestnut-related questions and show you the various species of chestnut trees in the Lockwood orchard we are using to help restore this great tree to Connecticut and the US.
https://tacf.org/ct, CTChapter@tacf.org, (203) 821-1021

87. U.S. Department of Labor - Occupational Safety and Health Administration (OSHA)

Tom Zack

OSHA's Mission: With the Occupational Safety and Health Act of 1970, Congress created the Occupational Safety and Health Administration (OSHA) to ensure safe and healthful working conditions for workers by setting and enforcing standards and by providing training, outreach, education and assistance. www.osha.gov, zack.thomas.f@dol.gov

88. U.S. Department of Labor, Wage and Hour Division

Heather Callahan

The U.S. Department of Labor, Wage and Hour Division's (WHD) mission is to promote and achieve compliance with labor standards to protect and enhance the welfare of the nation's workforce. WHD enforces federal minimum wage, overtime pay, recordkeeping, and child labor requirements of the Fair Labor Standards Act. WHD also enforces the Migrant and Seasonal Agricultural Worker Protection Act, the Employee Polygraph Protection Act, the Family and Medical Leave Act, wage garnishment provisions of the Consumer Credit Protection Act, and a number of employment standards and worker protections as provided in several immigration-related statutes. Additionally, WHD administers and enforces the prevailing wage requirements of the Davis-Bacon and Related Acts and the Service Contract Act and other statutes applicable to federal contracts for construction and for the provision of goods and services. www.dol.gov/agencies/whd, callahan.heather@dol.gov , (860) 240-4911

89. UConn 4-H

Emily Picard

UConn 4-H, the youth development program of UConn Extension, is part of the nation's largest youth organization. For over 100 years, 4-H has connected Connecticut youth ages 5-18 with hands-on learning, mentorship, and real-world experiences that build leadership, confidence, and essential life skills. Each year, more than 22,500 young people across Connecticut participate in UConn 4-H programs focused on STEM, healthy living, civic engagement, the environment, and more. Supported dedicated volunteers and backed by UConn's research-based resources, 4-H prepares youth to be Beyond Ready—equipped to lead, adapt, and thrive in a rapidly changing world. Youth can join UConn 4-H to explore their interests, take on leadership roles, and make a difference in their communities. Visit our booth to learn more about 4-H opportunities in Connecticut and take part in a hands-on environmental project! https://4-h.extension.uconn.edu/, emily.picard@uconn.edu

90. UConn IPM Program

Vickie Wallace

UConn's College of Agriculture, Health and Natural Resources IPM Team is composed of horticultural specialists who work with CT agricultural producers and residents to educate and support the use of IPM strategies when dealing with plant pest issues. The IPM Team supports commercial agricultural producers, green industry professionals and residents of CT. https://ipm.cahnr.uconn.edu/, victoria.wallace@uconn.edu, (860) 885-2826

91. U.S. Department of Agriculture - Forest Service Northern Research Station

Nathan Havill

In a region extending from Maine to Minnesota and from Missouri to Maryland, the USDA Forest Service Northern Research Station's science aims to understand all of the elements of forests and related landscapes. The station manages 22 of the 80 experimental forests that are part of the Forest Service Experimental Forest Network; most of these long-term research sites lie within National Forests. The Forest Service's ability to conduct scientific research in-house, apply research findings on National Forest System lands, and transfer these findings to others for use on all of the nation's forest land distinguishes it as a leading natural resource agency. The Forest Service lab in Hamden is part of the Ecology and Management of Invasive

Species Unit of the Northern Research Station. This research unit provides knowledge and methods for protecting and sustaining healthy forests affected by invasive species and other disturbances focusing on three major problems:

- Understanding the biology and ecology of invasive species and their interactions with native species;
- Developing strategies and tactics to control invasive species; and
- Developing integrated strategies for sustaining forest ecosystems that are resilient to invasive species and other disturbances.

www.fs.usda.gov/research/nrs, nathan.p.havill@usda.gov, (203) 230-4320

92. USDA APHIS PPQ

Sara Carson

APHIS' Plant Protection and Quarantine (PPQ) program safeguards U.S. agriculture and natural resources against the entry, establishment, and spread of economically and environmentally significant pests, and facilitates the safe trade of agricultural products. www.aphis.usda.gov/aphis/ourfocus/planthealth, sara.carson@usda.gov, (203) 837-7711

93. U.S. Department of Agriculture - Farm Service Agency

Karen Murray

The Connecticut division of the Farm Service Agency (FSA) offers farmers a variety of assistance through farm programs, farm loans and ad hoc disaster programs. Our employees work with farmers daily to identify assistance we can provide for their specific operations. We've been serving farmers since 1935 and we're always looking for opportunities to strengthen Connecticut's agricultural community. To learn about what we can do for you, contact your local county office.

The New Haven-Middlesex County Farm Service Agency is located at 97 Barnes Road Suite 2 in Wallingford. Call (203) 269-6665 or contact karen.murray@usda.gov.

94. Wild Ones Connecticut Mountain Laurel Chapter

Lydia Pan

Wild Ones is a national 501(c)(3) organization that promotes environmentally sound landscaping practices to support biodiversity through education, advocacy and collaborative action. Our vision is native plants and natural landscapes thriving in every community. Wild Ones publishes a quarterly e-journal, awards Seeds for Education grants, certifies native habitat gardens, and provides a library of native garden designs for residential properties across the country. The mission of Wild Ones is translated to the local level by over 90 chapters across the United States. The Mountain Laurel Chapter is based in New London, CT and sponsored by the Connecticut College Arboretum. Our chapter provides mentorship and local learning opportunities for those new to gardening with native plants through educational programming, volunteer opportunities and our human community of native plant enthusiasts. We curate native plant information and resources specific to our region on our chapter website. Our educational programs are generally free and open to the public. Our display will have information about ecological landscaping, native garden designs, the best native plants for wildlife, how to propagate native plants from seed and where to obtain plants and seeds for species native to our ecoregion. https://mountainlaurel.wildones.org/, wild.native.plants@gmail.com, (860) 383-3580

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

SPEAKER BIOGRAPHIES

Scott Chaskey- Samuel W. Johnson Memorial Lecturer
Scott Chaskey is a poet, farmer, and educator. For 30 years he cultivated soil and community for the Peconic Land Trust at Quail Hill Farm in Amagansett, NY, one of the original CSA's in the country. Past president of the Northeast Organic Farming Association of New York, he was honored as Farmer of the Year in 2013. He has served as a founding Board member for the Center for Whole Communities, in Vermont, Sylvester Manor Educational Farm, Shelter Island, NY, and for the Peter Matthiessen Center, Sagaponack, NY. He is the author of *This Common Ground,* (Viking, 2005), *Seedtime, On the History, Husbandry, Politics, and Promise of Seeds (*Rodale, 2014), *Stars are Suns (*Stoneman, 1995)*,* and most recently, *Soil and Spirit* (Milkweed Editions, 2023). He lives in Sag Harbor, NY, with his wife Megan Chaskey, poet and musician, in the home in which they raised three children.

Jatinder Aulakh, Ph.D.
Jatinder Aulakh received his Ph.D. in weed science from Auburn University in Auburn, Alabama, in 2013. He started his career as an assistant weed scientist at the Connecticut Agricultural Experiment Station in 2015. His research focuses on understanding the biology and ecology of weeds of ornamental nurseries, Christmas tree plantations, and non-native invasive plants. Dr. Aulakh conducts herbicide screening trials for weed efficacy and crop tolerance, weed resistance, and is discovering chemical and non-chemical solutions for weed management.

Kelsey E. Fisher, Ph.D.
Kelsey E. Fisher has been an Assistant Agricultural Scientist II in the Entomology Department at the Connecticut Agricultural Experiment Station since January 2023. Kelsey served as a Postdoctoral Research Associate at Iowa State University (ISU) under the guidance of Steven P. Bradbury from 2021-2022. She earned her PhD in Entomology from ISU in 2021 were she studied monarch butterfly conservation, MS in Entomology from the University of Delaware in 2015 where she studied European corn borer management, and BS in Biology from Widener University in 2013. Kelsey is an agricultural entomologist and insect movement ecologist. Kelsey employes multiple research methods to address research questions related to conservation of beneficial species, including monarch butterflies and bumble bees. Results from her work inform natural resource management and conservation programs.

Joseph Liquori
Joseph Liquori joined the Station full-time in March 2023 as the first official greenhouse manager. He has recently assisted in the completion of the newly renovated Jenkins-Wagoner greenhouses. Joe comes from a nursery background, and therefore finds interest in plant production such as grafting, propagation, integrated pest management, etc.

Sara Nason, Ph.D.
Sara Nason began work at The Connecticut Agricultural Experiment Station (CAES) in 2019, conducting research at the interface of environmental science and analytical chemistry. She uses her research on mass spectrometry methods for detecting contaminants to inform and improve regulatory analyses conducted at CAES. She has studied PFAS throughout her CAES career, and is leading the new CAES program for analyzing PFAS in farm soils. She has a B.A. from Princeton University, a Ph.D. from the University of Wisconsin – Madison, and was a postdoctoral scholar at the Johns Hopkins School of Public Health.

Quan Zeng, Ph.D.
Quan Zeng obtained his Ph.D. degree from the University of Wisconsin-Milwaukee and performed post-doctoral training at Michigan State University. Dr. Zeng joined The Connecticut Agricultural Experiment Station in 2014 where he is currently an Agricultural Scientist at the Department of Plant Pathology and Ecology. Dr. Zeng is also a Gratis Faculty at the University of Connecticut. His research interests include bacterial plant diseases and plant microbiome, with a focus on fire blight, a devastating disease of apple.

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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 food for mankind. Additionally, at Lockwood Farm, experiments were conducted that 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 humans 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 sustainable nanotechnology for crop protection and health. 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 part of the federal and state 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 the 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 the growth of crops through the use of novel organic and inorganic materials that boost fertilizer use efficiency.
- 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.
- Quantifying the impacts of the establishment and maintenance of small pollinator gardens on monarch butterfly and bumble bee conservation.
- 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 those 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.

CAES
The Connecticut Agricultural Experiment Station
Putting Science to Work for Society
150th ANNIVERSARY
1875 – 2025

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: http://portal.ct.gov/caes
or just scan our QR code below with your smartphone.

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