

# Station News

The Connecticut Agricultural Experiment Station

Volume 12 Issue 10 | October 2022



The mission of The Connecticut Agricultural Experiment Station is to develop, advance, and disseminate scientific knowledge, improve agricultural productivity and environmental quality, protect plants, and enhance human health and well-being through research for the benefit of Connecticut residents and the nation. Seeking solutions across a variety of disciplines for the benefit of urban, suburban, and rural communities, Station scientists remain committed to "Putting Science to Work for Society", a motto as relevant today as it was at our founding in 1875.



# CAES

The Connecticut Agricultural Experiment Station

*Putting Science to Work for Society since 1875*

## This Issue

Administration	2
Analytical Chemistry	4
Entomology	5
Environmental Science and Forestry	7
Plant Pathology and Ecology	11
Valley Laboratory	11
Journal Articles Approved	13

**DR. JASON C. WHITE** along with **DR. NUBIA ZUVERZA-MENA** and **DR. SARA THOMAS** participated in a Zoom call with Trajan Scientific and Medical to discuss possible collaborative research (September 1); participated by Teams in the Climate Smart Agriculture and Forestry Working Group Meeting (September 1, 29); chaired the quarterly CAES Safety Committee meeting (September 2); participated in the monthly Center for Sustainable Nanotechnology (CSN) Plant-Biosurfaces meeting (September 2, 16); along with **DR. YI WANG** and **DR. WADE ELMER** hosted a Zoom call with collaborators at the University of Massachusetts to discuss progress on a USDA nanosulfur grant (September 2); held a Zoom call with Mr. Brian Scott Smith to discuss a podcast on PFAS research at CAES (September 2); hosted a Zoom call with Qiqing Chen of McGill University to discuss collaborative research on nanoplastics (September 5); along with **DR. JOSEPH PIGNATELLO** met with Mr. Christopher Conners of the University of Connecticut Technology Commercialization Services to discuss a patent and licensing issue (September 6); along with **DR. SARA NASON**, **DR. NUBIA ZUVERZA-MENA** and **DR. SARA THOMAS** participated in a Zoom call with collaborators at Yale University and the University of Minnesota to discuss progress on a joint NIEHS grant (September 7); participated in the 2022 Plant Science Day committee meeting (September 8); hosted Amanda Irwin of Eastern Connecticut State University to discuss their upcoming Cannabis conference (September 8); participated in the NIEHS PFAS Analytical Networking Group call (September 8); attended the CSN All Hands Meeting in Atlanta Georgia (September 13-15); participated in the Northeastern Regional Association of State Agricultural Experiment Station Directors (NERA) Multistate Activities Committee call (September 16); attended a NSF-USDA funded workshop titled “Workshop to Identify Convergent Nanotechnology Approaches for Precision Delivery of Active Agents in Plants” at Carnegie Mellon University (September 18-20); participated in the weekly CSN All Hands Zoom call (September 21, 28); participated in the NIEHS RO1 Fall call (September 21); along with **DR. SHITAL VAIDYA**, **DR. CHRISTIAN DIMKPA** and **DR. WADE ELMER** hosted a Zoom call with collaborators at Johns Hopkins University to discuss progress on a joint USDA research project (September 21); along with **DR. YI WANG** hosted a Zoom with Prof. Korin Wheeler of Santa Clara University to discuss collaborative research (September 21); participated in a Zoom call with USDA NIFA staff to discuss the final report of a USDA Toxic Metals in Food workshop that I and Prof. Om Parkash Dhankher of the University of Massachusetts conducted (September 23); gave a presentation on Zoom titled “Nanotechnology-enabled agriculture: A path to global food security” for the Eco-Environment and Health Talk@EEH Webinar series (September 26); hosted Caroline Anastasia of Johns Hopkins University for a CSN Lab Exchange (September 27); along with several other CAES staff participated in a Zoom call to discuss Spotted Lanternfly regulations (September 29); participated in the monthly CSN Faculty meeting (September 29); along with **DR. CHAOYI DENG** participated in a Zoom call with Beza Tuga of the University of Massachusetts to discuss collaborative research (September 29); hosted the monthly CAES J-visa recipient meeting (September 30); along with **MR. MICHAEL LAST** and **DR. LINDSAY TRIPLETT** hosted CT DAS staff to discuss the greenhouse renovation project (September 30); along with **DR. CHRISTIAN DIMKPA** and **DR. NUBIA ZUVERZA-MENA** met with Fulbright Scholar Dr. Ileana Vera Reyes to discuss her project (September 30); met by Zoom with collaborators at the University of Maryland Baltimore County and the University of Wisconsin to discuss a collaborative project on MXenes (September 30); and met by Zoom with collaborators at the Auburn University and Johns Hopkins University to discuss a joint manuscript (September 30).

**PUBLICATIONS**

1. Sun, M., Zhao, C., Shang, H., Hao, Y., Han, L., Qian, K., **White, J. C.**, Ma, C., and Xing, B. (2022). ZnO quantum dots outperform nanoscale and bulk particles for enhancing tomato (*Solanum lycopersicum*) growth and nutritional values. *Sci. Tot. Environ.* DOI: [10.1016/j.scitotenv.2022.159330](https://doi.org/10.1016/j.scitotenv.2022.159330)

**Abstract:** Tomato was exposed by foliar or root applications to Zn in different nanoscale and non-nanoscale forms (50 mg/L) under hydroponic conditions for 15 days. Under foliar exposure, ZnO QDs significantly promoted tomato growth, while ZnO NPs and BPs had less impacts. ZnO QDs increased fresh weight and plant height by 42.02% and 21.10% relative to the controls, respectively. The ionic control decreased fresh weight by 39.31%. ZnO QDs also significantly increased the Chla/Chlb ratio, as well as carotenoids and protein content by 7.70%, 8.90% and 26.33%, respectively, relative to the controls, suggesting improvement in seedling photosynthetic performance. Antioxidant enzyme (POD, PPO and PAL) activities in ZnO QDs treated shoots were significantly decreased by 31.12%, 17.80% and 32.29%, respectively, indicating no overt oxidative damage from exposure. Importantly, the translocation factor of Zn (TFZn) in the foliar exposure of the ZnO QD treatment was 43.1%, 50.2% and 74.9% greater than the NPs, BPs, and ionic controls, respectively. Overall, these findings demonstrate that nanoscale nutrients at the appropriate concentration and size can significantly increase crop growth and be sustainable approach to nano-enabled agriculture.

**Talk @ EEH: No. 031-2022**

**Nanotechnology-enabled agriculture: A path to global food security?**

**Time: Sep 26, 2022. 09:00 pm (Beijing)**  
**Time: Sep 26, 2022. 09:00 am (New Haven)**  
**ZOOM Webinar ID: 816 9975 7155**  
**YouTube: Eco-Environment&Health**

**Eco-Environment & Health**

**Abstract**

Low use and delivery efficiency of conventional agrichemicals is a significant impediment to maintaining global food security, particularly given that a 60-70% increase in food production is needed by 2050 to support the projected population. Further confounding these efforts is a changing climate, which may force increased cultivation of crops under more marginal and stress-inducing conditions. Thus, novel and sustainable strategies for enhancing food production are needed all along the "farm-to-fork" continuum. One area we have focused on is using nanotechnology to increase the delivery efficiency and efficacy of nutrients. For example, given the known role of micronutrients in plant growth and defense against both abiotic and biotic stresses, we began mechanistic investigations into the potential of nanoscale micronutrient platforms for enhancing nutritional status and disease resistance. In a number of studies, foliar amendment of nanoscale materials such as CuO, CuS, S, and SiO<sub>2</sub> have been shown to significantly alleviate damage caused by the fungal and viral pathogens, resulting in enhanced growth and yield. Importantly, disease suppression is largely a function of modulated plant nutrition and disease resistance and not direct toxicity against the pathogen. Separately, we are also looking at novel biopolymer-based nanocomposites as a means to enhance the precision of phosphorus delivery while minimizing run-off and damage to the ecosystem. Other studies are focused on the use of nanoscale metal oxides to enhance photosynthetic efficiency under stressed and non-stressed conditions. Across all of these projects, it is clear that the ability to effectively tune nanoscale material structure and composition will be critical to maximizing positive impacts, including significantly reduced amounts of agrichemical use. Results will be presented from several studies where manipulation of nanoparticle synthesis resulted in tunable and sustainable materials that yielded greater plant health and crop yield by a range of agronomic endpoints.

**Dr. Jason C. White**  
*Director, The Connecticut Agricultural Experiment Station, New Haven CT, USA*

**Host: Prof. Lijuan Zhao**  
*School of the Environment, Nanjing University, China*

E-mail [eeh@nieps.org](mailto:eeh@nieps.org)  
Website [www.journal-eeh.com](http://www.journal-eeh.com)  
<https://www.facebook.com/eehjournal>

污染物环境行为与健康  
效应学科创新引智基地

Global Engagement for Strategic Partnership  
Nanjing University  
Nanjing Institute of Environmental Sciences. MEE

**Dr. Jason C. White** gave a presentation on Zoom titled “Nanotechnology-enabled agriculture: A path to global food security” for the Eco-Environment and Health Talk@EEH Webinar series. There were over 2000 attendees.

## ANALYTICAL CHEMISTRY

**DR. CHAOYI DENG, DR. CHRISTIAN DIMKPA** and **DR. JASON WHITE** attended the National Science Foundation Center for Sustainable Nanotechnology (CSN) All-hands meeting in Atlanta, GA in which **DR. DENG** presented a poster on "The role of  $\text{Fe}_3\text{O}_4$  nanoparticle surface charge on disease suppression in tomato plants (*Solanum lycopersicum*)" (~50 participants) (September 13-15). **DR. WHITE** and **DR. DIMKPA** joined other CSN faculty in discussions on work progress and future plans.



**Dr. Jason White** (left), **Dr. Chaoyi Deng** in front of his poster (center), and **Dr. Christian Dimpka** (right) at the CSN All-hands meeting in Atlanta, Georgia.

**DR. NUBIA ZUVERZA-MENA, DR. YI WANG, DR. PHILIP WANG, DR. CHAOYI DENG, DR. SHITAL VAIDYA,** and Dr. Ileana Vera Reyes attended a one-day Transmission Electron Microscopy training. Training was provided by Ms. Heather Rose from Hitachi High-Tech America, Inc. (September 12).

**DR. YI WANG** participated a number of professional development meetings, including the AGRO Division combined Governance Zoom meeting of the American Chemical Society (ACS) (~20 attendees) (September 13); a workshop regarding plant genetic science and technology (September 16-18, 24-25); an ACS AGRO Division annual award release Zoom call as an awards press officer (September 27); and a monthly Zoom call to evaluate the progress of a special issue in *Plants* - MDPI as a guest editor (September 28).

**DR. SARA THOMAS**, along with **DR. JASON WHITE** and **DR. NUBIA ZUVERZAMENA**, participated in a virtual call with Trajan Scientific and Medicals Pty Ltd in Bethel, CT, to discuss potential collaborations (September 1). They also participated in various virtual meetings with the PFAS project funding and research partners at the National Institute for Environmental Health and Safety (NIEHS), Yale University, and University of Minnesota (September 7, 12).

## ENTOMOLOGY

### GRANTS AWARDED

**1. MS. TRACY ZARRILLO** received USDA NRCS Cooperative Agreement funding of \$247,597 in collaboration with the University of Rhode Island for 3 years (2023-2025).

The purpose will be to monitor wild native bees (both bumblebees and solitary bees) in Farm Bill conservation plantings in RI and CT; evaluate the efficacy of existing Farm Bill practices; and suggest practices to improve the program.

### DEPARTMENTAL RESEARCH UPDATES

**DR. GOUDARZ MOLAEI**, **DR. DOUGLAS BRACKNEY**, and **DR. MEGAN LINSKE** attended a virtual meeting with CDC scientists to discuss comparing CAES passive and active tick and tick-borne pathogen surveillance data through the CDC's Centers of Excellence (COE) and Epidemiology and Laboratory Capacity (ELC) funding mechanisms and determining if these comparisons could be useful for improving the cost-effectiveness and efficiency of tick surveillance efforts in Connecticut and throughout the US (September 27).

**DR. VICTORIA LYNN SMITH** was interviewed by Patch.com and Wicked Local regarding spotted lanternfly (September 22).

**DR. PHILIP ARMSTRONG** was interviewed by Fox 61 about human cases of West Nile virus infection in Connecticut (September 23).

**MS. ANGELA BRANSFIELD** participated in a CAES Health and Safety Committee meeting (September 2); participated via Zoom in Yale's Biosafety Committee meeting (September 15); and participated in the Federal Select Agent Program's Responsible Official webinar Forms Overview and Updates; Security, Section 11 Requirements (September 21).

**DR. MEGAN LINSKE** presented a selected poster pitch and research poster titled "Determining effects of winter weather conditions on nymphal *Ixodes scapularis* and adult *Amblyomma americanum* survival in Connecticut and Maine, USA" at the 16<sup>th</sup> International Conference on Lyme Borreliosis and Other Tick-Borne Diseases in Amsterdam, The Netherlands (September 4-7); was interviewed by the Wildlife Society's 2022 Leadership Institute (LI) member Summer Larose (REE-NIFA) about being an LI alumni and early career professional (September 9); met with Dr. Chandi Witharana and Ms. Shashika Himandi (CAHNR University of Connecticut) to discuss a collaborative project using historic data on Japanese barberry (*Berberis thunbergii*) infestations in Connecticut (September 19); met with University of Massachusetts affiliated Emeritus Professor Dr. Allison Snow about camera trapping applications and integrated tick management strategies for *Ixodes scapularis* and *Amblyomma americanum* in Tuckernuck Island, Massachusetts (September 21).

**DR. GALE E. RIDGE** was interviewed by the New York Times about Delusional Infestation and migrations of the green darner dragonfly, *Anax junius* (September 12).

**MR. JOHN SHEPARD** participated via Zoom in a Board of Directors meeting of the Northeastern Mosquito Control Association (September 9); and provided updates from the CT Mosquito Trapping and Arbovirus Surveillance Program as part of Arbovirus Situational Awareness conference calls organized by the Northeast Regional Center for Excellence in Vector-Borne Diseases (September 12, 19, 26).

**MS. TRACY ZARRILLO** hosted a Zoom meeting with collaborators in the Tundra to Tropics project to discuss protocols for SDM map review (September 1); hosted a Zoom meeting with Laura Saucier (CT DEEP) and Spencer Hardy (The Vermont Center for Ecostudies) to discuss bee ranking and rare bee species in the Northeast (September 6); assisted Lia Florio, a senior at Ridgefield High School to develop a new research project about bumble bee floral use in CT (September 9); hosted a lab visit from David Rubin, an undergraduate student from Yale University, to provide taxonomic guidance on his wild bee research project (September 14); was interviewed by the Meriden Record Journal newspaper about the status of native bees in CT (September 19); participated in a virtual meeting hosted by Bruce Young of NatureServe to discuss progress on the assessment and ranking of bees in the northeast (September 28); and participated in a virtual meeting hosted by the US National Native Bee Monitoring RCN to discuss developments in establishing a national survey methodology (September 28);

**DR. KIMBERLY STONER** spoke to a meeting of the Middletown Pollinator Pathway, organized by the Middletown Garden Club at the CT Forest and Park Association in Middlefield, CT (September 10).

### PUBLICATIONS

1. Jeannin, C., Perrin, Y., Cornelie, S., **Gloria-Soria, A.**, Gauchet, J. D., and Robert, V. (2022). An alien in Marseille: Investigations on a single *Aedes aegypti* mosquito likely introduced by a merchant ship from tropical Africa to Europe. *Parasite*, 29. DOI: [10.1051/parasite/2022043](https://doi.org/10.1051/parasite/2022043)

**Abstract:** Control of invasive species relies partly on permanent surveillance at international points of entry. We report the exceptional trapping of one adult mosquito (Diptera: Culicidae) in the port of Marseille, France, in July 2018, during a routine survey conducted according to International Health Regulations. Morphological and molecular identification classified the specimen as a female *Aedes (Stegomyia) aegypti* (L.), vector of many arboviruses, absent from Europe and the Mediterranean rim since the 1950s. A world reference panel of approximately 23,000 genome-wide single nucleotide polymorphisms determined that the mosquito originated from Cameroon, west Africa. Cross-reference of this geographic location with boats traveling from Central Africa to Marseille during the trapping period suggests that the mosquito travelled within an identified merchant ship, a vehicles carrier connecting Douala, Cameroon to Marseille, France. This ship left Douala on June 25, 2018 and arrived 20 days later in Marseille on July 15. The mosquito was captured 350 m away from the dock. The interception of a propagule of an invasive species is a rare event that must be considered a priority to prevent its successful establishment.

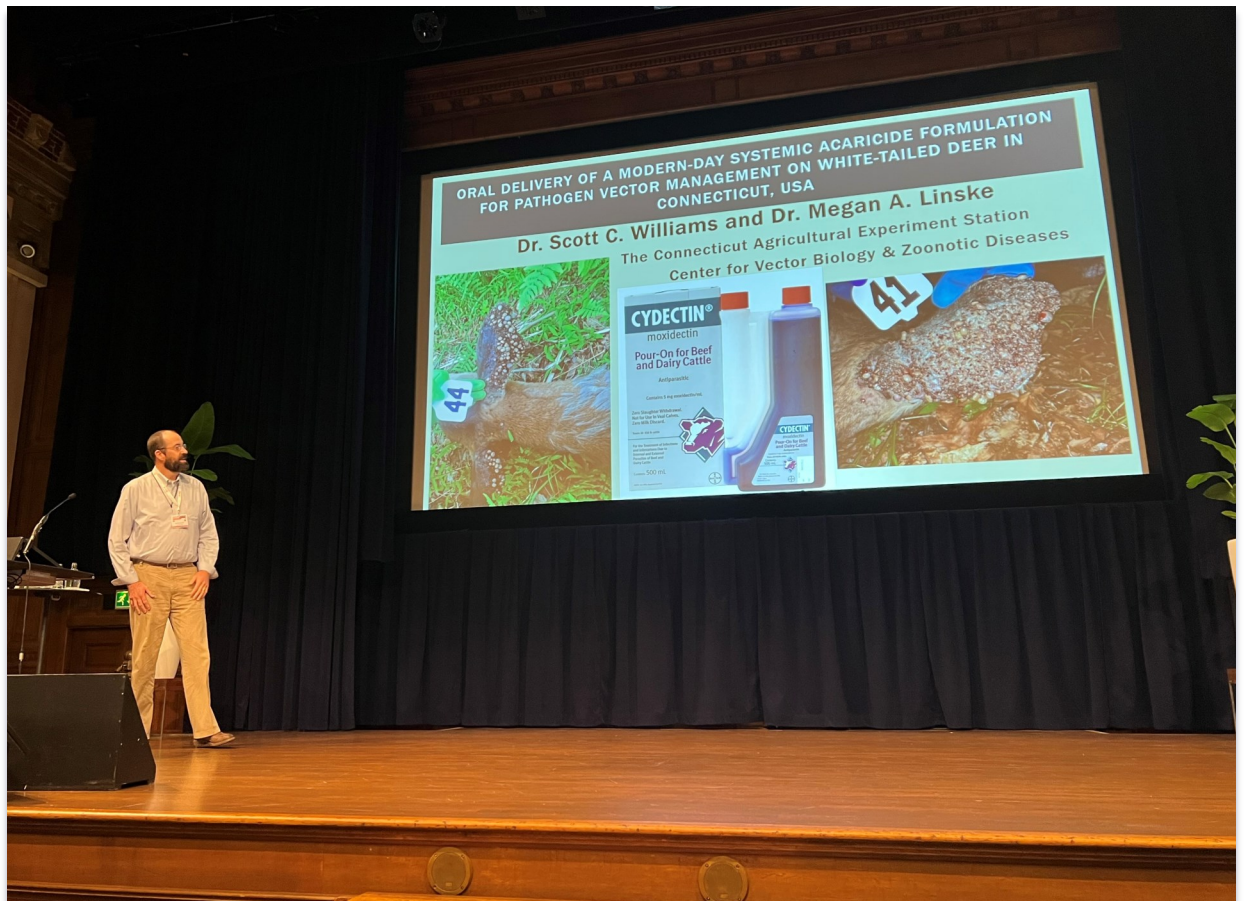
# ENVIRONMENTAL SCIENCE AND FORESTRY

## GRANTS AWARDED

1. **DR. LEIGH WHITTINGHILL** was awarded a USDA Specialty Crop Block Grant to study The Effects of Management Practices on the Nutritional Quality of Cut-and-Come-Again Greens from Urban Farms in Connecticut. \$58,494.69.

The Connecticut Agricultural Experiment Station (CAES) will analyze the mineral nutrient content of successive harvests of greens grown using cut-and-come-again harvesting practices in a controlled experiment and on urban farms to identify the effect of different management practices on crop quality and develop cut-and-come-again production guidance. Greens are a high-value crop with high nutrient content and relatively quick growing times. This makes them valuable in urban agriculture where space is limited and food security is a motivational factor. Information gained from the analysis of leaf samples from farms using cut-and-come-again harvesting will enable us to identify management practices that promote high quality greens, especially from later harvests, and start to develop management guidance.

## DEPARTMENTAL RESEARCH UPDATES



**Dr. Scott Williams** presents a lecture titled “Oral Delivery of a Modern-Day Systemic Acaricide Formulation for Pathogen Vector Management on White-Tailed Deer in Connecticut, USA” at the 16<sup>th</sup> International Conference on *Lyme Borreliosis* and Other Tick-Borne Diseases in Amsterdam, the Netherlands (September 6).

**DR. SCOTT WILLIAMS** hosted a Zoom meeting with collaborators regarding a recent CDC grant award on systemic acaricide treatment of wildlife reservoirs against blacklegged ticks (September 1); attended and presented a lecture titled “Oral Delivery of a Modern-Day Systemic Acaricide Formulation for Pathogen Vector Management on White-Tailed Deer in Connecticut, USA” at the 16<sup>th</sup> International Conference on Lyme Borreliosis and Other Tick-Borne Diseases in Amsterdam, the Netherlands (325 attendees) (September 4-7); spoke with Central Connecticut State University biology professor Dr. Michelle Kraczkowski about student interns with CAES (September 15); Zoom call with CDC staff and collaborators regarding new grantee orientation on a recent CDC grant award on systemic acaricide treatment of wildlife reservoirs against blacklegged ticks (September 15); with **DR. MEGAN LINSKE** guest lectured and conducted a small mammal trapping and processing demonstration for undergraduate students in the Wildlife Techniques class within the College of Agriculture, Health, and Natural Resources at the University of Connecticut, Storrs (20 students, 1 professor) (September 19); met with University of Massachusetts-affiliated Emeritus Professor Dr. Allison Snow about systemic acaricide treatment of white-tailed deer against lone star and blacklegged ticks on Tuckernuck Island, Massachusetts (September 21); Zoom call with University of Massachusetts professor Dr. Stephen Rich and graduate student Eric Siegel about small rodent and acorn abundances (September 26); gave an invited lecture to members of the Daytime Gardeners of North Haven about the use of deer and rabbit repellents for averting herbivory damage to gardens (24 attendees) (September 27).

**MR. JOSEPH P. BARSKY** attended the quarterly meeting of the New England Society of American Foresters Executive Committee (September 14); served as a judge at the 2022 Regional Agriscience Fair at the Big E (September 16); interviewed by Brian Hallenbeck of The Day about the importance of oak acorns for forest ecology, “Deer could be hungrier than usual this fall” (September 23); co-lead an interpretive biodiversity hike at Sleeping Giant State Park (September 24); conducted a vegetation survey for the Guilford Land Conservation Trust (September 26); interviewed by Robert Miller of Hearst Media Group regarding the importance of acorns for forest ecology (September 27).

**MR. GREGORY BUGBEE** as Past President and Chair of the Scholarship Committee, attended a virtual meeting of the Board of Directors of the Northeast Aquatic Plant Management Society (September 8); with **SUMMER STEBBINS** attended a virtual meeting of the United States Army Corps of Engineers CT River hydrilla control work group (September 12); judged the Future Farmers of America Science Fair at the Big E in West Springfield, MA (September 16); gave a talk titled “Improving Soil in the Home Garden” to the Garden Club of Cheshire at the Cheshire Senior Center (50 attendees) (September 21); gave a virtual presentation on “Biodiversity” to the Federated Garden Club Environmental School (50 attendees) (September 23); gave a talk titled “Container Gardening Indoors and Out” to the Long Hill Garden Club at the Trumbull Public Library (50 attendees) (September 26).

**DR. SUSANNA KEIRÖ** served on the Connecticut Urban Forest Council's Conference Planning Committee (September 13); administered the Connecticut Tree Protection examinations (September 14); served on the Yale University Biosafety Committee (September 15); served as CAES representative to Connecticut Urban Forest Council at their September meeting (September 22); and gave an interview on chestnut research in CAES to Valley Shore Community Television program "Slice of Life" (September 23).





**Joseph P. Barsky** and CAES seasonal employee **Jessica Shanley** recently identified and measured a Connecticut champion tree, the small bayberry (*Morella caroliniensis*), at the Barn Island Wildlife Management Area in Stonington. With a circumference of 12”, height of 15’, and average spread of 8’, it is the largest of its kind reported in Connecticut. This official record has been recorded in the [Connecticut Notable Tree database](#).

**DR.**

**ITAMAR SHABTAI** attended a video meeting for the Climate-Smart Agriculture & Forestry Working Group hosted by DEEP Office for Climate Planning (September 1); met with subcommittee members of the CT Council on Soil and Water Conservation to work on a Soil Health Action Plan for CT (September 7); met with a colleague from Cornell University to discuss synchrotron-radiation x-ray absorption spectroscopy of biochar samples (September 9).

**DR. JEFFREY WARD** participated in a (FEMC) Forest Ecosystem Monitoring Cooperative State Coordinators virtual meeting (September 8); spoke on invasive species identification for the Friends of American Legion and Peoples State Forest in Barkhamsted (9 attendees) (September 10); attended virtual Updated Silvics of North America Project (USNAP) – Core Committee Meeting (September 13); participated in a meeting of Mountain Forest Trustees in Norfolk (September 17); was interviewed about impact of acorn crop failure on forest health by Robert Miller, Danbury News-Times (September 27); participated in a Connecticut Forest and Park Association (CFPA) Board of Directors meeting (September 28).

## NEW STUDENTS, STAFF, AND VOLUNTEERS



**DR. MIRZA FAISAL QASEEM** (Faisal) joined CAES in September and will work as a Postdoctoral Scientist in collaboration with **Dr. Susanna Keriö**, **Dr. Leigh Whittinghill** and **Dr. Nubia Zuverza-Mena**. Dr. Qaseem received his Ph.D. from PMAS Arid Agriculture University in Rawalpindi, Pakistan. In his Ph.D., Dr. Qaseem evaluated wheat performance under both independent and combined heat and drought stress. During this project, he had the opportunity to work in the gene and genome mapping group at IPK Gatersleben, Germany. After his Ph.D. he accepted a postdoctoral position at South China Agriculture University in Guangzhou, China where he worked on the modification of cell wall hemicellulose and its effects on biomass scarification and plant properties. In a separate project, he investigated transcriptomic and metabolomic changes in trees in response to mechanical stress. During his postdoc, he was awarded a research grant from the National Natural Science

Foundation of China to study “Overexpression of UAM and UXT genes in *Populus* and their effects on cell wall composition, biomass yield and scarification efficiency.” At CAES, Dr. Qaseem will work on a project to evaluate the impact of drought stress, urban heat island effects, and soil conditions on the distribution of nonstructural carbohydrates in urban trees. His work at CAES is funded by the Louis A. Magnarelli Postdoctoral Program.

**AALIYAH SANTINI** joined **Dr. Susanna Keriö’s** laboratory as a Seasonal Assistant in August 2022. Before this, she completed an internship in **Dr. Keriö’s** laboratory in spring 2022. Aaliyah earned her Bachelor’s Degree from Albertus Magnus College in May 2022, with major in biology and minor in biochemistry. Aaliyah’s work at CAES includes tissue culture in chestnuts, media preparation, microbial cultures, pathogen inoculations on trees, tree phenotyping in the greenhouse, greenhouse maintenance, laboratory management, data collection and management, and chlorophyll analyses. She is currently working on her graduate school application and is searching for job opportunities related to clinical research.



## PLANT PATHOLOGY AND ECOLOGY

**DR. DONALD E. AYLOR** gave an invited lecture titled “Aerial Dispersal of Pathogens Over Multiple Spatial and Temporal Scales: Interdisciplinary Challenges in Measurement and Modeling” at the Gordon Research Conference on Fluids in Disease Transmission and Contamination held August 14-18 at Mount Holyoke College, South Hadley, MA (78 adult attendees) (August 16).

**DR. YONGHAO LI** presented “Tips of Container Gardening” for Spring Glen Garden Club in Hamden (12 adults) (September 12); participated in the National Plant Diagnostic Network Online Communication & Web Portal Committee meeting via Zoom (6 adults) (September 14); presented a poster “Dutch Elm Disease” at the Tree Warden Association of Connecticut Fall Gathering in Madison (25 adults) (September 16); gave a lecture “Tree Diseases” to Connecticut Tree Warden School in New Haven (34 adults) (September 22); participated in the National Plant Diagnostic Network Northeast Regional Monthly Meeting via Zoom (12 adults) (September 23); participated in the National Plant Diagnostic Network Online Communication & Web Portal Committee meeting via Zoom (6 adults) (September 27)

**DR. QUAN ZENG** attended the third International Symposium on Fire Blight of Rosaceous Plants in Dresden, Germany, and gave two presentations: 1) “Glandular and non-glandular trichomes are colonization sites and host entry points of the fire blight pathogen on apple leaves” and 2) “Mycobiome-induced host resistance in apple against fire blight” (80 adults) (September 6–9).

## VALLEY LABORATORY

**DR. JATINDER S. AULAKH** presented a talk on “Christmas tree tolerance and weed control with topramezone herbicide” at the Exotic Conifer Association meeting in Hatley, Quebec, Canada (September 23); and attended the Quebec, New Hampshire, Vermont Christmas tree growers annual meeting in Hatley, Canada (September 24).

**DR. RICHARD COWLES** presented a talk “Update on armored scale management” to the Exotic Conifer Association meeting in Hatley, Quebec (~30 attendees) (September 23).

**DR. JAMES LAMONDIA** participated in the Society of Nematologists annual meeting as a member of the Honors and Awards Committee in Anchorage, Alaska (September 26-30).

**MR. JAMES PRESTE** led a tour for students from the Wamogo Regional High School (30 attendees) (September 26). The students were attending as part of food sustainability and plant science classes. **MR. PRESTE**, along with **DR. DEWEI LI**, **DR. RICH COWLES**, and **DR. JATINDER AULAKH**, explained ongoing and past research at the Valley Laboratory, including use of cover crops, non-chemical mugwort control, plant breeding, food share donation program, as well as others.

### PUBLICATIONS

1. He, Jiao, **Li, D.-W.**, Zhu, Y.-N., Si, Y.-Z., Bian, J.-Y., Cui, W.-L., and Huang, L. (2022). Diversity and pathogenicity of *Colletotrichum* species causing anthracnose on *Cunninghamia lanceolata*. *Plant Pathology*, 71(8), 1757-1773. DOI: [10.1111/ppa.13611](https://doi.org/10.1111/ppa.13611)

**Abstract:** Chinese fir (*Cunninghamia lanceolata*) is a fast-growing tree species with high economic value. Anthracnose caused by *Colletotrichum* species poses a serious threat to Chinese fir production. To investigate the *Colletotrichum* species associated with anthracnose on Chinese fir, a survey was conducted from 2016 to 2020 in China. A total of 52 *Colletotrichum* isolates was collected from six different provinces: Fujian, Guangdong, Jiangsu, Jiangxi, Shandong and Zhejiang. These isolates were identified using morphological and multilocus phylogenetic analyses with the concatenated sequences of the rDNA internal transcribed spacer (ITS), glyceraldehyde-3-phosphate dehydrogenase (GAPDH), chitin synthase (CHS-1), actin (ACT),  $\beta$ -tubulin (TUB2), calmodulin (CAL) and the intergenic region between *Apn2* and *Mat1-2-1* (*ApMat*). *Colletotrichum cangyuanense*, *C. fructicola*, *C. gloeosporioides*, *C. karstii* and *C. siamense* were revealed to be associated with anthracnose on Chinese fir. Pathogenicity tests showed that there were significant differences in the pathogenicity of these *Colletotrichum* species on the host plants. To our knowledge, this study reports the pathogen diversity of anthracnose on Chinese fir for the first time.

2. Yuan, Y., Wu, Y.-D., Wang, Y.-R., Zhou, M., Qiu, J.-Z., Li, D.-W., Vlasák, J., Liu, H.-G. and Dai, Y.-C. (2022). Two new forest pathogens in *Phaeolus* (Polyporales, Basidiomycota) on Chinese coniferous trees were confirmed by molecular phylogeny. *Front. Microbiol.*, 13. DOI: [10.3389/fmicb.2022.942603](https://doi.org/10.3389/fmicb.2022.942603)

**Abstract:** *Phaeolus schweinitzii* (Fr.) Pat. was originally described in Europe and is considered a common forest pathogen on conifers in the Northern Hemisphere. Our molecular phylogeny based on samples from China, Europe, and North America confirms that *P. schweinitzii* is a species complex, including six taxa. *P. schweinitzii* sensu stricto has a distribution in Eurasia; the samples from Northeast and Southwest China are distantly related to *P. schweinitzii* sensu stricto, and two new species are described after morphological, phylogenetic, and geographical analyses. The species growing on *Larix*, *Picea*, and *Pinus* in Northeast China is described as *Phaeolus asiae-orientalis*. Another species mostly occurring on *Pinus yunnanensis* in Southwest China is *Phaeolus yunnanensis*. In addition, three taxa distributed in North America differ from *P. schweinitzii* sensu stricto. *Phaeolus tabulaeformis* (Berk.) Pat. is in Southeast North America, “*P. schweinitzii*-1” in Northeast North America, and “*P. schweinitzii*-2” in western North America.

Jia, W., Ma, C., **White, J. C.**, Qi, Y., Wang, J., Cao, H., Zhu, Q., Sun, H., Wang, C., and Xing, B. Magnetic biochar mediates BDE-153 accumulation and metabolism in rice (*Oryza sativa* L.) by modulating iron plaque and the fatty acid profile. *Nature Sustainability*.

**Aulakh, J.** Asiatic dayflower (*Commelina communis* L.) control in Douglas fir. *The Invasive Plant Science and Management*.

Karmous, I., Taheur, F. B., Jebahi, S., Tlahig, S., Mhadhbi, M., Gorai, M., Raouafi, A., Debara, M., Bouhamda, T., and **Dimkpa, C. O.** Phytosynthesis of zinc oxide nanoparticles using *Ceratonia siliqua* L. and evidence of antimicrobial activity. *Plants*.

Xiong, Z., Zhang, X., **White, J. C.**, Liu, L., Sun, W., Zhang, S., Zeng, J., Deng, S., Liu, D., Zhao, Q., and Xing, B. Transcriptome analysis reveals the growth promotion mechanism of Enteropathogenic *Escherichia coli* induced by black phosphorus nanosheets. *Nature Nanotechnology*.

Hussain, M., Shakoor, N., Arslan, M., Zhang, Z., Adeel, M., Xu, M., and **White, J. C.** Nano-enabled plant microbiome engineering for disease resistance. *Nano Today*.

Ma, C., Han, L., Shang, H., Hao, Y., Xu, X., **White, J. C.**, **Wang, Z.**, and Xing, B. Nanomaterials in agricultural soils: Ecotoxicity and application. *Current Opinions in Environmental Science and Health*.

Lian, J., Huang, X., Cheng, L., Zhai, X., Wu, R., Chen, Y., **Deng, C.**, Wang, Y., Pan, J., Shohag, M. J. I., Xin, X., He, Z., Yang, X., and **White, J. C.** Tailored ZnO nanoparticles improve grain yield, zinc biofortification and Cd mitigation in wheat. *Environmental Science and Technology*.



# CAES

The Connecticut Agricultural Experiment Station

*Putting Science to Work for Society since 1875*

## The Connecticut Agricultural Experiment Station

Main Laboratories  
123 Huntington Street  
New Haven, CT 06511-2016  
Phone: 203-974-8500



Main Laboratories, New Haven



Lockwood Farm, Hamden

Lockwood Farm  
890 Evergreen Avenue  
Hamden, CT 06518-2361  
Phone: 203-974-8618

Griswold Research Center  
190 Sheldon Road  
Griswold, CT 06351-3627  
Phone: 860-376-0365



Griswold Research Center, Griswold



Valley Laboratory, Windsor

Valley Laboratory  
153 Cook Hill Road  
Windsor, CT 06095-0248  
Phone: 860-683-4977

Putting Science to  
Work for Society.

## The Connecticut Agricultural Experiment Station

Back and Current issues of Station News are located on our website at <https://portal.ct.gov/CAES/Publications/Publications/Station-News>

Equal employment opportunity means employment of people without consideration of age, ancestry, color, criminal record (in state employment and licensing), gender identity or expression, genetic information, intellectual disability, learning disability, marital status, mental disability (past or present), national origin, physical disability (including blindness), race, religious creed, retaliation for previously opposed discrimination or coercion, sex (pregnancy or sexual harassment), sexual orientation, veteran status, and workplace hazards to reproductive systems unless the provisions of sec. 46a-80(b) or 46a-81(b) of the Connecticut General Statutes are controlling or there are bona fide occupational qualifications excluding persons in one of the above protected classes. To file a complaint of discrimination, contact Dr. Jason White, Director, The Connecticut Agricultural Experiment Station, 123 Huntington Street, New Haven, CT 06511, (203) 974-8440 (voice), or [Jason.White@ct.gov](mailto:Jason.White@ct.gov) (e-mail). CAES is an affirmative action/equal opportunity provider and employer. Persons with disabilities who require alternate means of communication of program information should contact the Chief of Services, Michael Last at (203) 974-8442 (voice), (203) 974-8502 (FAX), or [Michael.Last@ct.gov](mailto:Michael.Last@ct.gov) (e-mail).



<https://portal.ct.gov/CAES>