

Station News

The Connecticut Agricultural Experiment Station
Volume 13 Issue 3 | March 2023



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

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DR. JASON C. WHITE participated in the weekly Center for Sustainable Nanotechnology (CSN) all hands Zoom call (February 1, 8, 15, and 22); along with **DR. YI WANG** participated in a Zoom call with collaborators at the University of Auckland to discuss a visit from their PhD student to The CAES to conduct joint experiments on the use of nanoscale sulfur and copper sulfide to manage grape pathogens (February 1); spoke by Microsoft Teams with the University of Connecticut Technology Commercialization Services about potential intellectual property of The CAES's work on two projects (February 2); along with **DR. CHRISTIAN DIMKPA** spoke by Zoom with staff of the American National Standards Institute concerning participation in a potential work group and project on nanomaterials and fertilizers (February 3); participated by Zoom as a Committee Member in the Dissertation Defense of a PhD student at Johns Hopkins University (February 3); participated in a Zoom call with collaborators at the University of Wisconsin concerning a joint manuscript (February 4); attended the monthly Laboratory Preparedness Meeting at the CT Department of Public Health (February 6); along with **DR. SARA THOMAS, DR. SARA NASON,** and **DR. NUBIA ZUVERZA-MENA** participated in a Microsoft Teams call with NIEHS staff regarding participation of **DR. SARA THOMAS** in the KC Donnelly Externship Program (February 6); participated by Zoom in the NERA Multistate Activities Committee Meeting (February 7); along with **DR. SARA NASON** and **DR. PEIYING WANG** participated in a Zoom call with collaborators at Johns Hopkins University to discuss collaborative research (February 7); along with **DR. SARA THOMAS, DR. SARA NASON,** and **DR. NUBIA ZUVERZA-MENA** participated in a Zoom meeting with collaborators on a phytoremediation project at a PFAS contaminated site in Maine (February 8); participated in the bi-weekly CSN Faculty meeting (February 9 and 23); participated in a Zoom meeting with colleagues at the University of Minnesota, Johns Hopkins University, and University of Wisconsin to discuss a collaborative NSF grant (February 10 and 13); along with **DR. YI WANG** hosted a Zoom call with collaborators at the University of Massachusetts Amherst to discuss progress on a joint USDA nanoscale sulfur project (February 10); participated in a CSN Zoom call to begin preparations for an NSF Site Visit (February 10); hosted the monthly CSN Nanochemistry-Plant working group Zoom call (February 14); participated in the Farmland Preservation Advisory Board Zoom meeting (February 15); participated in the bi-weekly organizational meeting for the 2023 International Phytotechnologies Conference (February 17); participated by Zoom as the external examiner in the PhD Dissertation Defense of a graduate student at Colegio de Postgraduados in Montecillo, Mexico (February 17); travelled to Auburn University and Tuskegee University to meet with collaborators and give a seminar titled "Nanotechnology-enabled agriculture: A path to global food security?" (February 20-21); along with **DR. CHRISTIAN DIMKPA, DR. WADE ELMER,** and **DR. SHITAL VAIDYA** hosted a Zoom call with collaborators at Johns Hopkins University to discuss progress on a joint USDA nanoscale phosphorus project (February 23); hosted the monthly CAES J-Visa recipient meeting (February 24); along with State Entomologist **DR. VICTORIA SMITH** participated in a USDA call to discuss funding for spotted lanternfly control (February 24); testified in front of the Appropriations Committee at the State Legislature regarding The CAES's budget (February 27); met with collaborators in Duke University's sponsored INFRAMES program to plan for an upcoming meeting in Venice, Italy (February 27); along with **DR. NUBIA ZUVERZA-MENA** met by Zoom with collaborators at the University of California Irvine and Houston Christian University to discuss a collaborative grant proposal (February 28).

PUBLICATIONS

1. Luo, X., Wang, Z., Wang, C., Yue, L., Elmer, W., White, J. C., Cao, X., and Xing, B. (2023). Nanomaterial size and surface modification mediate disease resistance activation in cucumber (*Cucumis sativus*). *ACS Nano*. DOI: [10.1021/acsnano.2c11790](https://doi.org/10.1021/acsnano.2c11790).

Abstract: Crop disease represents a serious and increasing threat to global food security. Lanthanum oxide nanomaterials (La₂O₃ NMs) with different sizes (10 and 20 nm) and surface modifications (citrate, polyvinylpyrrolidone [PVP], and poly(ethylene glycol)) were investigated for their control of the fungal pathogen *Fusarium oxysporum* (Schl.) f. sp. *cucumerinum* Owen on six-week-old cucumber (*Cucumis sativus*) in soil. Seed treatment and foliar application of the La₂O₃ NMs at 20–200 mg/kg (mg/L) significantly suppressed cucumber wilt (decreased by 12.50–52.11%), although the disease control efficacy was concentration-, size-, and surface modification-dependent. The best pathogen control was achieved by foliar application of 200 mg/L PVP-coated La₂O₃ NMs (10 nm); disease severity was decreased by 67.6%, and fresh shoot biomass was increased by 49.9% as compared with pathogen-infected control. Importantly, disease control efficacy was 1.97- and 3.61-fold greater than that of La₂O₃ bulk particles and a commercial fungicide (Hymexazol), respectively. Additionally, La₂O₃ NMs application enhanced cucumber yield by 350–461%, increased fruit total amino acids by 295–344%, and improved fruit vitamin content by 65–169% as compared with infected controls. Transcriptomic and metabolomic analyses revealed that La₂O₃ NMs: (1) interacted with calmodulin, subsequently activating salicylic acid-dependent systemic acquired resistance; (2) increased the activity and expression of antioxidant and related genes, thereby alleviating pathogen-induced oxidative stress; and (3) directly inhibited in vivo pathogen growth. The findings highlight the significant potential of La₂O₃ NMs for suppressing plant disease in sustainable agriculture.



Dr. Jason C. White visiting collaborators at Tuskegee University.

DR. JASON WHITE, MS. TERRI ARSENAULT, and DR. ANUJA BHARADWAJ attended the New England Cannabis Research and Education Conference at Eastern CT State University in Storrs, CT. **MS. TERRI ARSENAULT and DR. ANUJA BHARADWAJ** presented on compliance testing of *Cannabis sativa* samples.

DR. ANUJA BHARADWAJ attended 61st EAS Symposium in Plainsboro, New Jersey, during November 14-16. Dr. Bharadwaj presented on “Compliance Testing of *Cannabis sativa L.* for Delta-9 THC and CBD using Gas Chromatography with Flame Ionization Detection and Liquid Chromatography with UV detection.”

DR. YI WANG along with **DR. JASON WHITE** and **DR. WADE ELMER** participated in a Zoom call with collaborators at the University of Massachusetts to discuss progress on a USDA nanosulfur grant (February 10); **DR. YI WANG** hosted a Zoom call with Rick Shang the CEO of Vulpes Corp. to discuss a potential collaboration (February 15); **DR. YI WANG** participated in the online event to “Help Identify Critical Nanotechnology Opportunities for Addressing Climate Change” hosted by National Nanotechnology Coordinated Infrastructure (NNCI) (February 21); **DR. YI WANG** participated in Editorial Advisory Board (EAB) meeting for *ACS Agricultural Science & Technology* via Zoom as a new EAB member.

DR. CARLOS TAMEZ presented on the laboratory analysis of processed foods, raw agricultural commodities, and animal feeds to the Department of Plant Science and Landscape Architecture at the University of Connecticut (February 3).

PUBLICATIONS

1. Giri, V. P., Shukla, P., Tripathi, A., Verma, P., Kumar, N., Pandey, S., **Dimkpa, C. O.**, and Mishra, A. (2023). A review of sustainable use of biogenic nanoscale agro-materials to enhance stress tolerance and nutritional value of plants. *Plants*, 12, 815. DOI: [10.3390/plants12040815](https://doi.org/10.3390/plants12040815)

Abstract: Climate change is more likely to have a detrimental effect on the world’s productive assets. Several undesirable conditions and practices, including extreme temperature, drought, and uncontrolled use of agrochemicals, result in stresses that strain agriculture. In addition, nutritional inadequacies in food crops are wreaking havoc on human health, especially in rural regions of less developed countries. This could be because plants are unable to absorb the nutrients in conventional fertilizers, or these fertilizers have an inappropriate or unbalanced nutrient composition. Chemical fertilizers have been used for centuries and have considerably increased crop yields. However, they also disrupt soil quality and structure, eventually impacting the entire ecosystem. To address the situation, it is necessary to develop advanced materials that can release nutrients to targeted points in the plant-soil environment or appropriate receptors on the leaf in the case of foliar applications. Recently, nanotechnology-based interventions have been strongly encouraged to meet the world’s growing food demand and to promote food security in an environmentally friendly manner. Biological approaches for the synthesis of nanoscale agro-materials have

become a promising area of research, with a wide range of product types such as nanopesticides, nanoinsecticides, nanoherbicides, nanobactericides/fungicides, bio-conjugated nano-complexes, and nanoemulsions emerging therefrom. These materials are more sustainable and target-oriented than conventional agrochemicals. In this paper, we reviewed the literature on major abiotic and biotic stresses that are detrimental to plant growth and productivity. We comprehensively discussed the different forms of nanoscale agro-materials and provided an overview of biological approaches in nano-enabled strategies that can efficiently alleviate plant biotic and abiotic stresses while potentially enhancing the nutritional values of plants.

2. Karmous, I., Taheur, F. B., **Zuverza-Mena, N.**, Jebahi, S., **Vaidya, S.**, Tlahig, S., Mhadhbi, M., Gorai, M., Raouafi, A., Debara, M., Bouhamda, T., and **Dimkpa, C. O.** (2022). Phytosynthesis of zinc oxide nanoparticles using *Ceratonia siliqua* L. and evidence of antimicrobial activity. *Plants*, *11*, 3079. DOI: [10.3390/plants11223079](https://doi.org/10.3390/plants11223079)

Abstract: Carob (*Ceratonia siliqua* L.) is a tree crop cultivated extensively in the eastern Mediterranean regions but that has become naturalized in other regions as well. The present study focused on the green synthesis of zinc oxide nanoparticles (ZnONPs) from Carob and their evaluation for antimicrobial activity in bacteria and fungi. The synthesized ZnONPs showed strong antibacterial activity against *Staphylococcus aureus* ATCC 25 923 (92%). The NPs inhibited the growth of pathogenic yeast strains, including *Candida albicans* ATCC90028, *Candida krusei* ATCC6258, and *Candida neoformans* ATCC14116, by 90%, 91%, and 82%, respectively, compared to the control. Fungal inhibition zones with the ZnONPs were 88.67% and 90%, respectively, larger for *Aspergillus flavus* 15UA005 and *Aspergillus fumigatus* ATCC204305, compared to control fungal growth. This study provides novel information relevant for plant-based development of new and potentially antimicrobial ZnONPs based on extracts. In particular, the development and application of phyto-genic nanoparticles enhances the biocompatibility of nano-scale materials, thereby allowing to tune effects to prevent adverse outcomes in non-target biological systems.



Anuja Bharadwaj and **Terri Arsenault** at the New England Cannabis Research and Education Conference at Eastern CT State University in Storrs.

DR. GOUDARZ MOLAEI was interviewed by Fox 61 (February 1); NPR (February 8); NPR (February 16); NBC CT (February 21) on the increased risk of human infection with tick-borne diseases as the result of climate change, warmer winters, and year-round tick activity.

DR. GOUDARZ MOLAEI, DR. MEGAN LINSKE, and MS. NOELLE KHALIL were interviewed by Connecticut Public Radio to discuss the impact of climate change on ticks and tick-borne diseases in an article titled “Health experts say warmer Northeast winters contribute to more active deer ticks.” The interview was published through several media outlets including the CT Mirror and National Public Radio (NPR): <https://www.npr.org/2023/03/03/1161051079/health-experts-say-warmer-northeast-winters-contribute-to-more-active-deer-ticks> (February 8).

MS. ANGELA BRANSFIELD gave a presentation on biosafety, biosecurity, and incident response for the annual BSL3 laboratory training (February 16).

MS. JAMIE CANTONI participated in a Zoom call with Lisa Lumar and Brandon Gilbrech of the CW television program “Mysteries Decoded” about filming an episode on the origin of Lyme disease and other tick-borne diseases (February 16 and 24); and attended and staffed the CAES informational booth at the Annual Connecticut Flower and Garden Show at the Connecticut Convention Center in Hartford, CT (February 23).

MR. MARK CREIGHTON gave a presentation on “Beekeeping Basics” at the East Grandy Public Library. The presentation highlighted a modern beehive structure, described the communal organization of bees within a hive, the life cycle of worker bees and basic bee genetics. A brief history of Connecticut beekeeping was included in the presentation (February 21)

DR. HANY DWECK met with Wendy Valencia Montoya, a graduate student from Harvard University, to teach her how to do electrophysiology in beetles (February 15); along with Dr. Todd Uginé from the Department of Entomology at Cornell University, submitted an abstract to organize a symposium on “New Advances in Insect Chemoreception” during the upcoming annual meeting of the Entomological Society of America 2023.

DR. KELSEY FISHER presented a webinar titled "Monarch Butterfly Biology, Ecology, and Conservation Needs" for the Iowa Learning Farms monthly webinar series (February 1).

DR. MEGAN LINSKE participated in The Wildlife Society Leadership Institute Committee Meeting to discuss the 2023 application (February 9); participated in a conference call with staff from Genesis Laboratories, Inc. on collaborative research efforts for the upcoming summer field season (February 15); participated in a Zoom call with collaborators from Maine Medical Center Research Institute (MMCRI) and Columbia University on methods for upcoming first field season for CDC-funded collaborative grant research project (February 15); participated in a Zoom call with producers Lisa Lumar and Brandon Gilbrech of the CW television program “Mysteries Decoded” about site locations and content for filming in Connecticut (February 16 and 24); met with Quinnipiac Valley Health District

Director Richard Matheny and Director of Community Programs Alicia Mulvihill on steps forward for establishing a CDC-funded tick management study in the Towns of Bethany and Woodbridge (February 22); participated in a Zoom call with staff from the MMCRI on small mammal and tick sampling on Isle au Haut, ME (February 27).

MR. JOHN SHEPARD attended Board of Directors meeting of the Northeastern Mosquito Control Association in Mystic, CT (February 24)

DR. VICTORIA SMITH presented an invited talk, “Spotted Lanternfly Lunch and Learn” at SiteOne Landscape Supply in East Haven (February 21).

MS. TRACY ZARRILLO participated in a virtual meeting with **DR. KELSEY FISHER**, **DR. KIMBERLY STONER**, and leaders of the Connecticut Pollinator Pathway to discuss future collaborations (February 21).

DR. KIMBERLY STONER (Emeritus Scientist) testified in a public hearing in the Environment Committee, presenting alternative language for SB 963, An Act Concerning Neonicotinoids for Non-Agricultural Use on behalf of the Pollinator Advisory Committee (February 15).

NEW STUDENTS, STAFF, AND VOLUNTEERS



Abigail Urbina, a graduate student in the Cellular and Molecular Biology program at the University of New Haven, is currently working at the CAES Tick Testing Laboratory as an intern. With her degree, Abigail hopes to transition into clinical research regarding tropical infectious diseases and immunity.



DR. SCOTT WILLIAMS met with aquatic invasive plant CAES scientist candidate Dr. Jeremiah Foley (February 3); participated in a Zoom call with staff from United States Department of Agriculture’s Agricultural Research Service discussing data analysis on a collaborative research project (February 3); met with aquatic invasive plant CAES scientist candidate Dr. Timothy Earley (February 7); met with and advised Dr. Allison Snow, University of Massachusetts research affiliate, on research regarding the systemic acaricide treatment of hosts for tick management on Nantucket, MA (February 8); participated in a Zoom call with staff from the Maine Medical Center Research Institute and Maine Department of Inland Fisheries and Wildlife on permitting research on the collaborative systemic acaricidal treatment of deer and mice on Isle au Haut, ME (February 10); participated in a Zoom call with staff from the Department of Microbiology at the University of Massachusetts on the influence of acorn abundance on mouse populations and tick-borne pathogen presence (February 10); participated in a conference call with staff from Genesis Laboratories, Inc. on collaborative research efforts this upcoming summer (February 15); virtually attended the dissertation defense of Ms. Elisabeth Ward, new forest ecology scientist hire at CAES (February 15); participated in a Zoom call with collaborators from Maine Medical Center Research Institute and Columbia University on solidifying research methodologies for a CDC-funded collaborative grant research project (February 15); participated in a Zoom call with staff from CDC Division of Vector-Borne Diseases, University of Massachusetts, University of Rhode Island, Penn State University, State of Massachusetts, and Michigan State University future research efforts on the systemic treatment of white-tailed deer as a tick management strategy (February 15); was interviewed by Lisa Lumar, producer of the CW television program “Mysteries Decoded” about filming an episode on the origin of ticks and tick-borne diseases in Connecticut (February 16); met with Quinnipiac Valley Health District Director Richard Matheny and Director of Community Programs Alicia Mulvihill on steps forward for establishing a CDC-funded tick management study in the Towns of Bethany and Woodbridge (February 22); met with soil and water treatment CAES scientist candidate Dr. Osmar Menezes (February 23); participated in a Zoom call with producers Lisa Lumar and Brandon Gilbrech of the CW television program “Mysteries Decoded” about site locations and content for filming in Connecticut (February 24); met with soil and water treatment CAES scientist candidate Dr. Yingxue (Charlie) Yu (February 27); participated in a Zoom call with staff from the Maine Medical Center Research Institute on logistics for sampling mice and ticks on Isle au Haut, ME (February 27).

MR. JOSEPH P. BARSKY participated in a Zoom call with staff from the Department of Microbiology at the University of Massachusetts on the influence of acorn abundance on mouse populations and tick-borne pathogen presence (February 10); offered a walk-and-talk presentation to the Active Adventures on “Forest History in Connecticut” (February 21); participated in the quarterly meeting of the Connecticut State Consulting Committee for Agricultural Science and Technology Education and shared an update on recent CAES initiatives (February 23).

MR. GREGORY BUGBEE participated in a meeting of the Connecticut Invasive Working Group Steering Committee (February 7); presented a virtual lecture titled “Green Pond Aquatic Plant Survey 2022” to the Green Pond Ecological Society (~10 attendees)

(February 8); presented a seminar on “Composting” to the Milford Garden Club at the DAR Chapter House (approx. 30 attendees) (February 14); staffed the Connecticut Invasive Working Group display at the Hartford Flower Show (February 23).

DR. SUSANNA KERIÖ met with Dr. Cynnamon Dobbs and Dr. Mayra Rodríguez-González from UConn to discuss collaboration related to urban forestry (February 9); performed tree planting inspections in New Haven for the Connecticut Urban Forest Council's Urban Forestry Climate Change Grants Program (February 15 and 24); served on Yale University's Biosafety Committee (February 16); gave a 10-minute radio interview on the impact of warming winters on trees for the Connecticut Public Radio Program “Where We Live” (February 17); participated in the Connecticut Urban Forest Council's grant review meeting (February 22).

DR. SARA NASON coached students on science fair projects at the Sound School in New Haven, CT (February 1, 8, and 27); met with the Benchmarking and Publications for Non-targeted Analysis working group (February 2, 9, 10, and 21); met with collaborators from the University of Albany and Princeton University to discuss an ongoing PFAS phytoremediation project in Maine (February 3, 7, and 8); met with collaborators from Yale University, the University of Minnesota, and NIH officials to discuss ongoing work on an NIEHS project on PFAS (February 6-7); met with regulatory stakeholders to discuss use of non-targeted analysis for decision making for PFAS and risk assessment (February 21-22).

MS. SUMMER STEBBINS presented a lecture titled “*Hydrilla* invades the Connecticut River” at the Northeast Aquatic Biologist Conference in Plymouth, MA (25 attendees) (February 17).

DR. BLAIRE STEVEN presented a lecture titled "Biological Soil Crusts: Microbial Ecological Indicators of Climate Disturbances" at the Geobiology Symposium XXIX at the University of Delaware (50 attendees) (February 24).

DR. JEFFREY WARD presented an invited seminar "Forests and Carbon Management" at the Pennsylvania Bureau of Forestry Winter Management Conference in State College, PA (300 attendees) (February 1); participated in a meeting of the Great Mountain Forest Trustees in Norfolk (February 5); participated in a Forest Ecosystem Monitoring Cooperative Joint Committee meeting (February 7); participated in a Forest Ecosystem Monitoring Cooperative State Coordinators virtual meeting (February 9); participated in a Connecticut Forest and Park Association Governance Committee meeting (February 9); participated in a Connecticut Forest Practices Advisory Board meeting in Middlefield (February 27).

DR. LEIGH WHITTINGHILL gave the morning keynote speech titled “Green Roof Technology in Urban Agriculture: Lessons learned in the last decade” at the Toronto Metropolitan University Urban Farm Living Lab roundtable meeting (February 15); met with Bonnie Potocki and Dennis Hicks from Green Skies to discuss possible collaborative work researching vegetable production under solar panels (February 17); presented a talk for the CAES Seminar Series titled “Small Plastic Pool Container Production of Cucumbers: Preliminary Results from the First Year” (February 22); met with a team from CW resources to discuss two projects they are investigating: indoor hydroponic food production and the potential installation of a green roof on one of their Connecticut buildings (February 23).

PUBLICATIONS

1. Bugbee, G. J., Stebbins, S. E., Barton, M. E., and Wostbrock, J. A. G. (2022). Connecticut's Invasive Aquatic Plant, Clam, and Mussel Identification Guide: 4th Edition. [CAES Bulletin 1087](#).

PLANT PATHOLOGY AND ECOLOGY

DR. LINDSAY TRIPLETT led an orientation session for newly hired scientists, covering the basics of CAES organizational structure, the reporting calendar, and expectations for group leaders (5 attendees) (February 14) .

DR. YONGHAO LI was interviewed by Abby Weiss from the CT Insider about warmer winter temperatures and spring bulbs via phone (February 15); was interviewed by Michael Fuller at NBC Connecticut about warmer winter and gardening via Zoom (February 16); gave a lecture titled “Diseases of Trees” for the Connecticut Tree Protective Association Arboriculture 101 Course in New Haven (42 adults) (February 16); attended the Plant Diagnostic Network Northeast Regional monthly meeting and Core Accreditation Training via Zoom (February 24).

DR. ROBERT MARRA gave a presentation, via WebEx, on beech leaf disease for the University of Massachusetts Amherst Extension (620 attendees) (February 15).

MS. FELICIA MILLETT made a site visit to Nielsen’s Florist in Darien, CT (February 1); staffed the CAES booth at the Connecticut Grounds Keepers Association’s Turf and Landscape Conference (February 21); and participated in the monthly meeting of the Northeast Plant Diagnostic Network via Zoom (20 adults) (February 24).

NEW STUDENTS, STAFF, AND VOLUNTEERS



DR. RAQUEL ROCHA joined the Department of Plant Pathology and Ecology in February 2023. She received her Ph.D. in Agronomy, specializing in Plant Pathology, from the University of Nebraska-Lincoln in 2019. There, her research focused on identifying molecular components necessary for the wheat and rice blast fungus to access and colonize plant cells to cause disease. In 2020, Dr. Rocha joined the University of Georgia as a Postdoctoral Researcher. There, she continued studying plant-pathogen interactions by using root-knot nematodes as the main system to identify new proteins involved in nematode plant parasitism. At The CAES, her research will continue to investigate the molecular interactions between plant parasitic nematodes and hosts of interest to the state of Connecticut. Dr. Rocha moved to CT with her husband, Martônio, and their two dogs, Linus Pawling and Linnaeus. When not thinking about science and nematodes, Dr. Rocha enjoys reading comics while having coffee or ice cream.

DR. CAROLE CHEAH gave an overview of biological control of HWA to members of Hartland Land Trust (6 attendees) (February 2) and of East Granby Land Trust (4 attendees) (February 8) and toured the land trust properties with them to assess the hemlocks.

DR. RICHARD COWLES presented “Pest management for initial establishment of Christmas trees” for the Michigan State University Christmas Tree Management Web Series, (60 participants) (February 9). He spoke to Québec Christmas tree growers about “Conifer root aphid and balsam woolly adelgid management” (40 participants) (February 17). Presented “Beech leaf disease and life without neonics” to the Connecticut Grounds Keepers Association in Plantsville (475 participants) (February 21). He lectured on “Neonics, bees, and neonicotinoid alternatives” to the University of Massachusetts pesticide applicators virtual course series (167 participants) (February 22). He presented “Armored scale biology and management” to the North Carolina Christmas tree growers via Zoom (100 participants) (February 23). He discussed “Climate change and its impacts on rose culture” at the Hartford Flower Show (20 participants) (February 24).

MS. ROSE HISKES with the Connecticut Pest Management Association, taught a Basic Entomology Course to pest control operators and landscapers at Cabela’s in East Hartford and the Valley Laboratory of The CAES in Windsor (16 attendees) (January 19, 26, and February 2); with Emmett Varricchio and Victoria Wallace co-chaired a virtual CIPWG Steering Committee Meeting (21 attendees) (February 7); gave a talk on spotted lanternfly at SiteOne in Windsor (25 attendees) (February 15); participated in the Invasive Plants Council online meeting (February 28).

DR. JAMES LAMONDIA (Emeritus) met with nematologists Kathy Lawrence and Pat Donald, toured laboratory and field facilities and discussed research at Auburn University (February 1); toured boxwood nursery producers in Oregon’s Willamette Valley and spoke about ‘Integrating technologies to manage boxwood blight’ as a part of the SCRI BBIG Annual Meeting held in Aurora, OR (35 attendees) (February 15-16); spoke about tobacco breeding and disease management in wrapper tobaccos and Low Converter varieties of Connecticut broadleaf, and presented information about reduced tillage effects on soils and tobacco plantings at the annual Tobacco Research Meeting held in East Windsor (65 attendees) (February 22).

TOBACCO RESEARCH MEETING Sixty-five people attended the Connecticut Agricultural Experiment Station’s annual Tobacco Research Meeting held at the East Windsor Scout Hall on February 22, 2023. **DR. DEWEI LI** welcomed growers and spoke about recent developments at the Experiment Station. Dr. Srikanth Kodati was introduced as the new UConn Extension IPM and Pesticide coordinator. **DR. JATINDER AULAKH** spoke about an invasive weed threat to tobacco production, and Christina Berger of the DEEP spoke about Worker Protection Standard updates. **DR. JAMES LAMONDIA** spoke about tobacco breeding and disease management in wrapper tobaccos and Low Converter varieties of Connecticut broadleaf. He also spoke about reduced tillage effects on soils and tobacco plantings. Colleen Kisselburgh (Arthur Carroll Insurance) discussed risk management in tobacco and the tobacco insurance program. **JAMES PRESTE, ETHAN PAINE**

and MICHELLE SALVAS assisted with much of the behind the scenes work for the meeting. The meeting qualified for pesticide applicator re-certification credit in Connecticut and Massachusetts and 48 persons received credit.

GRANTS AWARDED

1. **DR. CAROLE CHEAH** in partnership with Farmington River Watershed Association and McLeans Game Refuge, was awarded a 2023 grant for \$24,000 by the Lower Farmington River and Salmon Brook Wild and Scenic Committee for a joint project to acquire and release *Sasajiscymnus tsugae* for biological control of HWA in the Lower Farmington River and Salmon Brook watershed, January 26, 2023.

2. **DR. SRIKANTH KODATI** received a \$29,900 grant through The Horticulture Research Institute's grant program for the year 2023 to study "Copper-based nanoparticles in the management of boxwood blight."

Abstract: Boxwood blight is the most important disease of boxwood with limited management options. With the interest in environment and human health protection, development of alternative/sustainable management methods for plant diseases has gained interest. The project will evaluate the Copper-based nanoparticles (Cu-NPs) for their efficacy in inhibition of the growth of boxwood blight pathogen, *Calonectria pseudonaviculata* in *in-vitro* conditions. This project will also conduct the *in-planta* study to evaluate the fungicidal efficacy of Cu-NPs in the management of boxwood blight in the greenhouse and landscape settings.

PUBLICATIONS

1. Liao, Y.-C.-Z., Wan, Y., Geng, J.-X., Li, D.-W., and Zhu, L.-H. (2023). Leaf spot of *Ligustrum japonicum* caused by *Diaporthe eres* newly reported in China. *Crop Protection*, 164. DOI: [10.1016/j.cropro.2022.106139](https://doi.org/10.1016/j.cropro.2022.106139)

Abstract: *Ligustrum japonicum* is widely cultivated as ornamental and hedges in residential areas, parks and roadsides in China. A leaf spot disease has been extensively observed on *L. japonicum* in Nanjing, Jiangsu, China since September 2020. This disease not only affects the plant's growth, but also leads to unsightly appearances. A fungal species was isolated from symptomatic leaves. Its colony on PDA was white with aerial mycelia; the reverse of the colony was white. Both α - and β -conidia were observed. Morphological features of this fungus matched those of *Diaporthe* spp. For accurate identification, partial sequences of the internal transcribed spacer region (ITS), elongation factor 1-alpha (*EF*), calmodulin (*CAL*), beta-tubulin (*TUB*), and histone H3 (*HIS*) genes were amplified and sequenced. Phylogenetic trees verified that this species is *Diaporthe eres*. Pathogenicity tests were conducted by inoculating healthy leaves with mycelium plugs and Koch's postulates were confirmed by pathogen re-isolation and identification. This is the first report that *D. eres* causes *L. japonicum* leaf spot in China.

2. He, J., Li, D.-W., Bian, J.-Y., and Huang, L. (2023). Unravelling species diversity and pathogenicity of *Colletotrichum* associated with anthracnose on *Osmanthus fragrans*. *Plant Disease*, 107(2) 350-362. DOI: [10.1094/PDIS-04-22-0810-RE](https://doi.org/10.1094/PDIS-04-22-0810-RE)

Abstract: *Osmanthus fragrans* is a popular ornamental tree species known for its fragrant flowers and is widely cultivated in Asia, Europe, and North America. Anthracnose is a disastrous threat to the growth and development of *O. fragrans* and has caused significant economic losses. To reveal the potential pathogen diversity of anthracnose, 127 isolates of *Colletotrichum* were isolated from the symptomatic leaves. Morphological studies and multilocus phylogenetic analyses with the concatenated sequences of the internal transcribed spacer, glyceraldehyde-3-phosphate dehydrogenase, chitin synthase, actin, beta-tubulin, calmodulin, and the intergenic region between *Apn2* and *Mat1-2-1*, as well as a pairwise homoplasy index, test placed the causal fungi as two new species, *Colletotrichum anhuiense* (two isolates) and *C. osmanthicola* (12 isolates), and three known taxa, *C. fructicola* (18 isolates), *C. gloeosporioides* (62 isolates), and *C. karstii* (33 isolates). Among them, *C. gloeosporioides* was the most dominant, and *C. anhuiense* was occasionally discovered from the host tissues. Pathogenicity tests in vivo on *O. fragrans* leaves revealed a significant difference in virulence among these species. Of them, *C. gloeosporioides*, *C. osmanthicola*, and *C. anhuiense* were significantly more virulent than *C. fructicola* and *C. karstii*, while *C. karstii* was the least virulent. To our knowledge, this study was the first to report the pathogen diversity of anthracnose on *O. fragrans*.



Dr. James LaMondia giving a presentation on tobacco breeding.



Tobacco farmers and CAES scientists and staff at the meeting.

Almeida, B. H., Negreiros, A. M. P., Melo, N. J. A., Ambrósio, M. M. Q., Armengol, J., Maniçoba, F. E., **da Silva, W.**, and Júnior, R. S. Evaluation of fungicides and *Trichoderma* spp. to control soil-borne fungal pathogens on melon crops. *Crop Protection*.

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