

Station News

The Connecticut Agricultural Experiment Station

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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.



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The Connecticut Agricultural Experiment Station

Putting Science to Work for Society since 1875

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JASON C. WHITE, PH.D., participated in the weekly NSF Center for Sustainable Nanotechnology (CSN) all hands call (May 1, 8, 15, & 22); participated in a Zoom call with colleagues at the University of Minnesota and Land o' Lakes/Winfield United to discuss collaborative research (May 3); along with **SARA NASON, PH.D.**, **NUBIA ZUVERZA-MENA, PH.D.**, and **Trung Bui, Ph.D.**, participated in a Zoom meeting with collaborators at Yale University and the University of Minnesota for a joint NIEHS grant (May 7); along with **NUBIA ZUVERZA-MENA, PH.D.**, and **Mila Pavlicevic, Ph.D.**, met with collaborators at the University of Texas El Paso and the University of Rhode Island to discuss progress on a collaborative USDA grant (May 7); participated in a Zoom call with collaborators at the University of Birmingham and others in the EU about a joint grant proposal to the Horizon 2020 program (May 9 & 24); along with **JASMINE JONES** participated in the monthly CT PFAS Analysis Working Group call (May 14); hosted by Zoom the monthly CSN Nanochemistry-Plant Working Group call (May 14); along with **YI WANG, PH.D.**, participated in a Zoom call with colleagues at Louisiana State University and the University of Auckland to discuss collaborative research (May 14); held a Teams call with the University of Connecticut Technology Commercialization Services group (May 14 & 17); along with **CHRISTIAN DIMKPA, PH.D.**, hosted a Zoom call with a post-doctoral candidate from the University of Tehran (May 15); met by Teams with Convergent Bio scientists to discuss collaborative research (May 15); participated in the bi-monthly Farmland Preservation Advisory Board meeting (May 16); hosted a Teams call with collaborators at Rutgers University (May 16); participated in the monthly CSN Faculty call (May 17); along with **Susanna Kerio, D.Sc.**, spoke by Zoom with a potential visiting post-doc from the University of Eastern Finland (May 20); spoke by phone with Paul Johnson of Focus-Cuba about a potential trip to initiate outreach and collaborative research programs in Cuba (May 20); participated in the NERA Multi-state Activities Committee meeting (May 20); along with **CHRISTIAN DIMKPA, PH.D.**, hosted a Zoom call with collaborators at Johns Hopkins University and Stony Brook University to discuss progress on a joint USDA nanoscale phosphorus project (May 20); hosted the quarterly CAES Board of Control meeting (May 21); participated in a Zoom meeting with colleagues at Columbia University to discuss collaborative research on a joint USDA project (May 21); hosted the monthly CAES j-visa recipient meeting (May 24); along with **Chaoyi Deng, Ph.D.**, and **Hina Ashraf, Ph.D.**, hosted a Zoom meeting with colleagues at the University of Wisconsin to discuss collaborative research (May 28); presented welcome remarks to a group of students and faculty from Albertus College being hosted by **Susanna Kerio, D.Sc.**, and other CAES scientific (May 31); and participated in a Zoom call with colleagues at the University of Rhode Island to discuss a micro-nanoplastics workshop at the upcoming Sustainable Nanotechnologies Organization (SNO) meeting in November (May 31).

PUBLICATIONS:

1. Zhang, S., Fang, Y., Zhou, J., Wang, H., Cai, Y., Ge, T., Luo, Y., **White, J. C.**, and Li, Y. (2024). Maize straw and associated biochar differentially impact native organic carbon mineralization in a subtropical forest soil. *Sci. Tot. Environ.* 939, 173606. DOI: [10.1016/j.scitotenv.2024.173606](https://doi.org/10.1016/j.scitotenv.2024.173606)

Abstract: Organic soil amendments have been widely used to for enhance soil organic carbon (SOC) stocks in agroforestry ecosystems. However, the variable impacts of pyrogenic and fresh organic matter on native SOC-derived mineralization and the underlying mechanisms mediating those processes remain poorly understood. Here, an 80-day experiment was conducted to quantify the mineralization of native SOC after application of maize straw or its derived biochar at 10 g C kg⁻¹ soil. The measured endpoints in a subtropical Moso bamboo (*Phyllostachys edulis*) forest soil included quantity and quality of SOC, the expres-

sion of microbial C-cycling genes, and associated enzyme activities. The native SOC-derived CO₂ emissions were enhanced by maize straw, whereas levels were decreased with maize straw biochar (cf. control). This indicates that maize straw amendment induced a positive priming effect (PE), while the application of biochar had a negative PE. The addition of maize straw (cf. control) significantly enhanced the O-alkyl C, activities of β-glucosidase (BG), cellobiohydrolase (CBH), and dehydrogenase (DH), as well as the abundance of *GH48* and *cbhI* genes, and decreased aromatic C, RubisCO enzyme activities, and the abundance of *cbbL* genes; the application of biochar induced the opposite effects. Interestingly, regardless of the treatment, the cumulative native SOC-derived CO₂ efflux increased with higher O-alkyl C levels, the activities of BG, CBH, and DH, and the abundance of *GH48* and *cbhI* genes, albeit with decreases in aromatic C, RubisCO enzyme activities, and the abundance of *cbbL* genes. This study highlights the application of biochar as an effective strategy for enhancing soil C stocks in subtropical forests.

- Zhang, P., Jiang, Y., Schwab, F., Monikh, F. A., Grillo, R., **White, J. C.**, Guo, Z., and Lynch, I. (2024). Strategies for enhancing plant immunity and resilience using nanomaterials for sustainable agriculture. *Environ. Sci. Technol.* 58(21), 9051–9060. DOI: [10.1021/acs.est.4c03522](https://doi.org/10.1021/acs.est.4c03522)

Abstract: Research on plant-nanomaterial interactions has greatly advanced over the past decade. One particularly fascinating discovery encompasses the immunomodulatory effects in plants. Due to the low doses needed and the comparatively low toxicity of many nanomaterials, nanoenabled immunomodulation is environmentally and economically promising for agriculture. It may reduce environmental costs associated with excessive use of chemical pesticides and fertilizers, which can lead to soil and water pollution. Furthermore, nanoenabled strategies can enhance plant resilience against various biotic and abiotic stresses, contributing to the sustainability of agricultural ecosystems and the reduction of crop losses due to environmental factors. While nanoparticle immunomodulatory effects are relatively well-known in animals, they are still to be understood in plants. Here, we provide our perspective on the general components of the plant's immune system, including the signaling pathways, networks, and molecules of relevance for plant nanomodulation. We discuss the recent scientific progress in nanoenabled immunomodulation and nanopriming and lay out key avenues to use plant immunomodulation for agriculture. Reactive oxygen species (ROS), the mitogen-activated protein kinase (MAPK) cascade, and the calcium-dependent protein kinase (CDPK or CPK) pathway are of particular interest due to their interconnected function and significance in the response to biotic and abiotic stress. Additionally, we underscore that understanding the plant hormone salicylic acid is vital for nanoenabled applications to induce systemic acquired resistance. It is suggested that a multidisciplinary approach, incorporating environmental impact assessments and focusing on scalability, can expedite the realization of enhanced crop yields through nanotechnology while fostering a healthier environment.

- Lowry, G. V., Giraldo, J. P., Steinmetz, N., Avellan, A., Demirer, G. S., Ristroph, K., Wang, G. J., Hendren, C. O., Alibi, C. A., Caparco, A., **da Silva, W.**, Gonzalez, I., Greiger, K., Jeon, Su-Ji, Khodakovskaya, M. V., Kumar, V., **Muthuramalingam, R.**, Poffenbarger, H. J., Tilton, R. D., and **White, J. C.** (2024). Towards realizing nano-enabled precision delivery in plants. *Nature Nano*. DOI: [10.1038/s41565-024-01667-5](https://doi.org/10.1038/s41565-024-01667-5)

Abstract: Nanocarriers (NCs) that can precisely deliver active agents, nutrients and genetic materials into plants will make crop agriculture more resilient to climate change and sustainable. As a research field, nano-agriculture is still developing, with significant scientific and societal barriers to overcome. In this Review, we argue that lessons can be learned from mammalian nanomedicine. In particular, it may be possible to enhance efficiency and efficacy by improving our understanding of how NC properties affect their interactions with

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plant surfaces and biomolecules, and their ability to carry and deliver cargo to specific locations. New tools are required to rapidly assess NC–plant interactions and to explore and verify the range of viable targeting approaches in plants. Elucidating these interactions can lead to the creation of computer-generated *in silico* models (digital twins) to predict the impact of different NC and plant properties, biological responses, and environmental conditions on the efficiency and efficacy of nanotechnology approaches. Finally, we highlight the need for nano-agriculture researchers and social scientists to converge in order to develop sustainable, safe and socially acceptable NCs.

ANALYTICAL CHEMISTRY

Yi Wang, Ph.D., gave an invited talk in the Asa Gray Biological Seminar Series at Utica University titled "Nano-enabled agriculture: Agro-nanomaterials and their effects in plant nutrition, metabolic profiling, and disease suppression"(30-40 attendees) (April 17).



Adewale Tolulope Irewale (Tolu) joined CAES as a visiting scholar in May. Tolu is a dynamic natural and social scientist, strategist, operations researcher and team player. He is currently working on research in Nanotechnology with the World Bank sponsored African Center of Excellence in Future Energies and Electrochemical Systems (ACEFUELS) at the Federal University of Technology, Owerri, Nigeria. He has over two decades of experience working in both research organization as well as a multi-disciplinary and complex upstream oil and gas industry. He holds a BSc from University of Ilorin and MSc and MPDI from the University of Ibadan both in Nigeria. His current doctoral research seeks to formulate biochar-based fertilizer from an invasive aquatic plant and to test the nano-formulation for its effectiveness to fortify plants with nutrients against commercially available ferti-

lizers. At CAES, Tolu seeks to characterize the biochar derived from the plant, formulate the nano-enabled fertilizer and also characterize the product to ascertain readiness for field trials.

Tyler Hall is a student at the University of Florida. In late May, he joined the Analytical Chemistry Department as an intern through the Yale Conservation Scholars program. At CAES he is working with Yi Wang, Ph.D., and Dr. LuYao to test sulfur nanoparticles to determine impacts on plant viability. Tyler has a personal interest in toxicology and hopes to expand his knowledge of the chemical processes that occur at nanoscale levels. Further, Tyler is interested in learning how to interpret data from and use TEM and ICP-OES instruments at the station. Tyler is interested in the toxicology of biomass flyash as well as in studying its impacts on human health. Tyler's tenure at CAES ends in late July.



Daniel Penaloza is a rising junior at Claremont McKenna College in California. Daniel arrived at the CAES on May 27 as part of the Yale Conservation Scholar program. He is working under the mentorship of Milica Pavlicevic, Ph.D., testing plant-derived nanoparticles to improve plant growth. Daniel hopes to use these research skills to improve his understanding of biochemistry and, more broadly, how plants can be used to support human development and health. He will be concluding his stay at CAES on July 28, having a clearer picture of what biochemical research looks like, and the mentorship needed to pursue it further.



Stefanía Borges-Rivera is from the University of Puerto Rico of Cayey. Stefania arrived CAES in May as a research intern from the Center of Sustainable Nanotechnology (CSN) program. During her time, Stefania will work under the mentorship of PhDs Chaoyi Deng and Hina Ashraf. Her goals are to develop herself professionally and to gain a new set of research skills that can be applied to the career she wants to pursue as a pharmacist. Research about nano-enabled agriculture intertwines with pharmacy in a way whereby together they can lead to solving problems related to environmental sustainability and human health. Stefania will be at CAES until August 2024, but she is excited to make a lasting impact with her collaborations and contributions with the ongoing research projects at CAE

Don Dao is a rising junior at California Polytechnic State University of Pomona (Cal Poly Pomona) in Pomona, California. He is part of the CSN (Center for Sustainable Nanotechnology) internship program and joined CAES in late May. Don is hoping to learn about nanoparticle synthesis, application, mechanisms for nutrient delivery as part of nano-enabled agriculture, and nanoparticle life cycle/degradation. In addition, he hopes to gain some more insight into genetic modification for microbes and plants and assist in writing papers. These experiences will support Don's future career goals of research in plastic bioremediation using microbes (which may be genetically modified). Don's mentors are Drs. Chaoyi Deng and Hina Ashraf, and he also will assist several other researchers CAES. Don's time at CAES ends early August.



PUBLICATIONS:

1. Christudoss, A. C., Kundu, R., **Dimkpa, C. O.**, and Mukherjee, A. (2024). Time dependent release of microplastics from disposable face masks poses cyto-genotoxic risks in *Allium cepa*. *Ecotoxicology and Environmental Safety*. DOI: [10.1016/j.ecoenv.2024.116542](https://doi.org/10.1016/j.ecoenv.2024.116542)

PHILIP ARMSTRONG, PH.D., held an online meeting with members of the Connecticut Mosquito Management Program from the Departments of Public Health and Energy and Environmental Protection to review surveillance and response plans for 2024 (May 20). **Tia M. Blevins** completed required periodic Interagency Aviation Training online with USDA-FS Forest Health Protection and passed the A-200 exam with a grade of 90% (May 3); participated in a webinar presented by Environmental Protection Agency (EPA) on managing fungal diseases on ornamental plants. Topics included the identification of fungal pathogens, how to prevent and control them, and the importance of the use integrated pest management in production wholesale nurseries (May 7); participated in an online pre-season training for digital mobile sketch mapping with USDA-FS and their Forest Health Assessment and Applied Sciences Team which included overview of new materials and resources, deadline scheduling, and field season support and troubleshooting (May 15).

ANGELA BRANSFIELD participated via Zoom in Yale University's Biosafety Committee meeting (May 16); participated in a CAES DEI Disability and Accessibility subcommittee meeting (May 21).

KATHERINE DUGAS with Dom Rowland led a hands-on insect collecting and identification activity with students at Edgerton Park (30 attendees) (May 28).

KELSEY E. FISHER, PH.D., had a table display with Gale Ridge about careers in entomology at the Amity School Environmental Science Career Day (~100 high school students) (May 1); assisted a brownie girl scout troop in earning their “bug badge” (10 children) (May 3); presented “Conservation and restoration recommendations that align with monarch butterfly behavior and biological needs” for the Cheshire Public Library and Cheshire Pollinator Pathway (20 adults) (May 7); presented a research update at the CAES Board of Control meeting (May 21); presented “Conservation and restoration recommendations that align with monarch butterfly behavior and biological needs” for the Bethany Land Trust (75 adults) (May 23).

ANDREA GLORIA-SORIA, PH.D., presented the talk “Argentina may hold the key to understanding *Aedes aegypti* domestication” at the Vector Biology & Zoonotic diseases Yale Institute for Global Health Faculty Network quarterly meeting (50 attendees) (May 10). Meet with seven students enrolled in the Summer Research Training Program at Albertus Magnus College and two of their professors to talk about her research and tour the Gloria-Soria laboratory and associated CAES facilities (May 31).

MEGAN LINSKE, PH.D., participated in a collaborative Zoom call with staff from CDC Division of Vector-Borne Diseases, University of Massachusetts, University of Rhode Island, Pennsylvania State University, State of Massachusetts, MaineHealth, Michigan State University, Texas A&M University, Tufts University, and Genesis Laboratories about tick management strategies involving white-tailed deer (May 1); interviewed by Ed Ricciuti on recent study on the peridomestic habitat traits that correlate with increased nymphal, blacklegged tick abundances and the impact on pesticide applications (May 6); participated in a Zoom call with collaborators from Cornell University and White Buffalo, Inc. on a proposed project investigating tick densities in an inland setting with reduced deer densities (May 9); participated in the Wildlife Society (TWS) Leadership Institute Committee meeting as an alumnus and Committee Co-Chair (May 9); participated in a meeting with collaborators from BanfieldBio, Inc. and North Carolina State University to discuss blacklegged tick repellency trials and the upcoming field season (May 14 & 28); participated in a call with staff from the Centers for Disease Control and Prevention’s Division of Vector-Borne Diseases on progress made on a funded integrated tick management and seasonal spray projects (May 15); participated in the

CDC-funded Northeast Center for Excellence in Vector Borne Diseases and Training and Evaluation Center Boot Camp in Scarborough, Maine (May 21-23) and gave an invited lecture on tick taxonomy (May 21) followed by a tick identification lab (25 attendees) (May 22); participated in a conference call with staff from Genesis Laboratories, Inc. on upcoming CDC-funded project on an experimental host-targeted systemic bait for tick management (May 29).

GOUDARZ MOLAEI, PH.D., was interviewed by CT Insider on the activity of the American dog tick, *Dermacentor variabilis*, and human disease cases of Rocky Mountain Spotted Fever in Connecticut (May 1); discussed with the Northeast Regional Center for Excellence in Vector-Borne Diseases the establishment of vector-borne disease training programs and courses at the Southern Connecticut State University, Central Connecticut State University, University of Bridgeport, and University of New Haven (May 1); attended the monthly meeting of the longhorned tick, *Haemaphysalis longicornis*, and discussed this tick activity in CT (May 6); was interviewed with the Anna & Raven Show on STAR 99.9 about the recent increase of ticks in Connecticut (May 7); was interviewed by the Republican American about the tick activity (May 8); met with Drs. James Shepherd and Lauren Pischel of the Yale School of Medicine to discuss collaborations on tick-borne infectious diseases and tick-associated Alpha gal syndrome research projects (May 9 & 30); presented an invited talk, “Everything You Want to Know, or Don’t Want to Know, About Ticks” at the Darien, CT Public Library (May 14); and was interviewed by a writer for Valley Life, a monthly magazine that covers four towns in Hartford County: Canton, Avon, Simsbury and Farmington, about tick activity in the area (May 20).

JACOB RICKER attended a National Certified Investigator and Inspector Training course (May 20-22), held by the Council on Licensure, Enforcement, and Regulation in Austin, Texas.

CLAIRE RUTLEDGE, PH.D., served as a score keeper at the Connecticut Tree Protective Association’s annual Tree Climbing Competition (50 attendees), presented the talk ‘New Insects in Connecticut’ to the Harwinton Garden Club (30 attendees) (May 10); had a table display about emerald ash borer at Connecticut Environthon at Lockwood Farm, Hamden, CT (150 attendees) (May 23).

JOHN SHEPARD spoke to two groups of FFA Students about the state Mosquito Trapping and Arbovirus Surveillance Program (~60 attendees) (May 2); addressed media members about the state Mosquito Trapping and Arbovirus Surveillance Program and demonstrated mosquito trap types at a press conference for the Milford Health Department’s 2024 Mosquito Kick-off (May 9).

VICTORIA SMITH, PH.D., participated in a webinar sponsored by the US EPA Center for Integrated Pest Management titled “Managing fungal diseases for ornamental plants (May 7); was interviewed by WTNH Channel 8 concerning spotted lanternfly (May 8).

TRACY ZARRILLO was interviewed by Susan Freinkel, a freelance author, about wild bee conservation and the rediscovery of the chestnut bee, *Andrena rehni*, at Lockwood Farm. Ms. Freinkel toured Tracy’s laboratory and the chestnut orchards at Lockwood Farm in preparation for an article she is writing about Tracy’s work, which will be featured in Smithsonian Magazine later this year (May 16); had a table display about wild bees and was available to answer questions from the public at a pollinator event held by the Washington Depot Garden club at Judy Black Park in Washington Depot (~40 attendees) (May 18); hosted a laboratory visit from Joan Milam, Ph.D., (University of Massachusetts), Casey Johnson (University of Rhode Island), and Emma Tondre (University of Rhode Island) to discuss pollinator projects (May 23).

PUBLICATIONS:

1. Anderson, J.F., Molaei, G., Fish, D., Armstrong, P.M., Khalil, N., Brudner, S., Miencik, M.J., Bransfield, A., Olson, M., Andreadis, T.G. (2024). Host-feeding behavior of mosquitoes in the Florida Everglades. *Vector Borne Zoonotic Dis.* DOI: [10.1089/vbz.2023.0072](https://doi.org/10.1089/vbz.2023.0072).

Abstract: West Nile virus (WNV), Everglades virus (EVEV), and five species of *Orthobunyavirus* were isolated from mosquitoes collected in the Everglades in 2016-2017. Prior studies of blood meals of mosquitoes in southern Florida have related findings to acquisition and transmission of EVEV, St. Louis encephalitis virus, and WNV, but not the *Orthobunyavirus* viruses associated with the subgenus *Melanoconion* of the genus *Culex*. **Materials and Methods:** In the present study, blood-fed mosquitoes were collected in the Everglades in 2016, 2017, 2021, and 2022, and from an industrial site in Naples, FL in 2017. Blood meals were identified to host species by PCR assays using mitochondrial *cytochrome b* gene. **Results:** Blood meals were identified from *Anopheles crucians* complex and 11 mosquito species captured in the Florida Everglades and from 3 species collected from an industrial site. The largest numbers of blood-fed specimens were from *Culex nigripalpus*, *Culex erraticus*, *Culex cedecei*, and *Aedes taeniorhynchus*. *Cx. erraticus* fed on mammals, birds, and reptiles, particularly American alligator. This mosquito species could transmit WNV to American alligator in the wild. *Cx. nigripalpus* acquired blood meals primarily from birds and mammals and frequently fed on medium-sized mammals and white-tailed deer. Water and wading birds were the primary avian hosts for *Cx. nigripalpus* and *Cx. erraticus* in the Everglades. Wading birds are susceptible to WNV and could serve as reservoir hosts. *Cx. cedecei* fed on five species of rodents, particularly black and hispid cotton rats. EVEV and three different species of *Orthobunyavirus* have been isolated from the hispid cotton rat and *Cx. cedecei* in the Everglades. *Cx. cedecei* is likely acquiring and transmitting these viruses among hispid cotton rats and other rodents. The marsh rabbit was a frequent host for *An. crucians* complex. *An. crucians* complex, and other species could acquire Tensaw virus from rabbits. **Conclusions:** Our study contributes to a better understanding of the host and viral associations of mosquito species in southwestern Florida.

2. Gómez-Palacio, A., Morinaga, G., Turner, P. E., Micieli, M. V., Elnour, M. A. B., Salim, B., Surendran, S. N., Ramasamy, R., Powell, J. R., Soghigian, J. and **Gloria-Soria, A.** (2024). Robustness in population-structure and demographic-inference results derived from the *Aedes aegypti* genotyping chip and whole-genome sequencing data. *G3: Genes, Genomes, Genetics*, 14(6). DOI: [10.1093/g3journal/jkae082](https://doi.org/10.1093/g3journal/jkae082).

Abstract: The mosquito *Aedes aegypti* is the primary vector of many human arboviruses such as dengue, yellow fever, chikungunya, and Zika, which affect millions of people worldwide. Population genetic studies on this mosquito have been important in understanding its invasion pathways and success as a vector of human disease. The Axiom *aegypti*1 SNP chip was developed from a sample of geographically diverse *A. aegypti* populations to facilitate genomic studies on this species. We evaluate the utility of the Axiom *aegypti*1 SNP chip for population genetics and compare it with a low-depth shotgun sequencing approach using mosquitoes from the native (Africa) and invasive ranges (outside Africa). These analyses indicate that results from the SNP chip are highly reproducible and have a higher sensitivity to capture alternative alleles than a low-coverage whole-genome sequencing approach. Although the SNP chip suffers from ascertainment bias, results from population structure, ancestry, demographic, and phylogenetic analyses using the SNP chip were congruent with those derived from low-coverage whole-genome sequencing, and consistent with previous reports on Africa and outside Africa populations using microsatellites. More importantly, we identified a subset of SNPs that can be reliably used to generate merged databases, opening the door to combined analyses. We conclude that the Axiom *aegypti*1 SNP chip is a convenient, more accurate, low-

cost alternative to low-depth whole-genome sequencing for population genetic studies of *A. aegypti* that do not rely on full allelic frequency spectra. Whole-genome sequencing and SNP chip data can be easily merged, extending the usefulness of both approaches.



2024 Mosquito Trapping and Arbovirus Surveillance Program, Field Staff: (l-r) Jensen Mezzio, Avraham Penso, Liz Triana, Steph Davies, Zehra Reza, John McEachern, Sam Rudolph



2024 Mosquito Trapping and Arbovirus Surveillance Program, Laboratory Staff: (front row, l-r) Kendra Gluck (Mosquito ID), Emily Stelman (Mosquito ID), Rabina Baiju (Arbovirus Testing), Daria Rolle (Arbovirus Testing). (back row l-r) Elliot Fetchin (Mosquito ID), Mike Pazareskis (Mosquito ID), Mike Olson (Mosquito ID).

SCOTT WILLIAMS, PH.D., 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, MaineHealth, Michigan State University, Texas A&M University, Tufts University, and Genesis Laboratories about tick management strategies involving white-tailed deer (May 1); gave a lecture to graduate students at Southern Connecticut State University's Medically Important Arthropods course on Integrated Tick Management Strategies (May 2); hosted an undergraduate student from Bates College as a part of their job shadow program (May 3); interviewed by outdoor writer and Killingworth native Ed Ricciuti on highlights of a recent publication on the effectiveness of fall application of synthetic pyrethroids on emerging spring nymphal blacklegged ticks while avoiding impacting beneficial insects (May 6); presented invited lecture titled "Mysterious Wildlife of Guilford" as part of a lecture series co-sponsored by the Guilford Free Library and Shoreline Village Connecticut (103 attendees) (May 7); participated in a Zoom call with collaborators from Cornell University and White Buffalo, Inc. on a proposed project investigating tick densities in an inland setting with reduced deer densities (May 9); interviewed by Associate Press reporter Michael Stobbe on the status of 2024 tick abundances (May 9); participated in the CDC-funded Northeast Center for Excellence in Vector Borne Diseases Boot Camp in Scarborough, Maine (May 21-23) and gave the Keynote Address titled "Systemic Acaricidal Treatment of Reservoir Hosts for Tick Management" (25 attendees) (May 22) and gave invited lecture on integrated tick management (25 attendees) (May 22) participated in a collaborative Zoom call with members of the Banfield Biologic NIH SBIR-funded tick repellent fabric team (May 28); participated in a conference call with staff from Genesis Laboratories, Inc. on upcoming CDC-funded project on an experimental host-targeted systemic bait for tick management (May 29); interviewed by Joe Tucci of Hearst Connecticut Media on how to repel animals from gardens and aggressive interactions during the breeding season (May 30); as the Northeast Section Representative, participated in a Zoom call for members of the Professional Certification Review Board of The Wildlife Society (May 30).

JOSEPH P. BARSKY completed the A-100 and A-200 Interagency Aviation Training Modules (May 10), attended a Digital Mobile Sketch Mapping Webinar along with **ELIZABETH WARD, PH.D.**, (May 15); organized the Safe Driving Workshop for CAES employees (May 24); met with Geraldine Vega Pizarro and Nels Barrett, Ph.D., of the USDA-Natural Resources Conservation Service to discuss a collaborative descriptive soil project on a CAES forest research area in Bridgewater (May 30); participated in the Forest Ecosystem Monitoring Cooperative training webinar (May 31).

GREGORY BUGBEE judged the CT Agriculture Science and Technology Education Agriscience fair hosted in Jones Auditorium (May 2); with **JEREMIAH FOLEY, PH.D.**, participated in a video conference with John Hall from the Jonah Center in Portland CT on managing hydrilla and water chestnut in the Mattabesset River (May 21); spoke at a United States Army Corps of Engineers "Hydrilla in the Connecticut River Demonstration Project" information seminar on CAES/OAIS discovery and surveillance on the problematic invasive plant (20 participants) (May 29).

RILEY DOHERTY presented an invasive aquatic plant workshop with **SUMMER STEBBINS** for the Eightmile River Wild & Scenic Watershed and the Salmon River Watershed Partnership at the East Haddam Town Hall (20 attendees) (May 1); trained CT DEEP Boating Division seasonal employees in invasive aquatic plant identification with **SUMMER STEBBINS** (35 attendees) (May 17); attended the first of three public meetings for the Army Corps of Engineers CT River Hydrilla Herbicide Demonstration project at Goodwin University with **GREGORY BUGBEE** (May 29).

JEREMIAH FOLEY, IV, PH.D., met with the Twin Lakes Association, the US Army Corps of Engineers, and SePro Corp. on the status of growth and future management of northern hydrilla in the Twin Lakes in northwestern CT (May 7); attended the Aquatic Nuisance Species Task Force meeting, provided additional support, and updated the panel on the spread and status northern hydrilla in Connecticut (50 attendees) (May 8–9); interviewed by Michigan State University Extension for an article on the threat of hydrilla expansion in new lakes and ponds throughout Connecticut (May 15); recently published paper on new hydrilla strain escaping the Connecticut River was featured in a Weed Science Society of America press release and subsequently digested by Earth.com, PRWeb, EurekAlert!, Technology Networks, Environment + Energy Leader, and Newsweek (May 21); gave a presentation about beneficial insects titled “Big and Pretty or Both” to the YMCA Learning Community at Choate School (30 children, 4 teachers) (May 31).

SUSANNA KERIÖ, D.SC., attended a meeting organized by **ELIZABETH WARD, PH.D.**, to discuss potential collaboration to analyze non-structural carbohydrates in beech trees affected by beech leaf disease (May 10); met with Elissa Schuett and Alison Adams from University of Vermont to discuss a LOI opportunity for The Northeast Climate Adaptation Science Center RFP (May 15); met with **JASON WHITE, PH.D.**, and Dr. Mir Salam from University of Eastern Finland to discuss collaboration on a phytoremediation related project (May 20); attended the annual meeting of the Connecticut Urban Forest Council as an executive board member (May 23); coordinated a tour for seven Albertus Magnus students in collaboration with CAES Scientists (May 31).

JOSEPH PIGNATELLO, PH.D., (Emeritus) was ranked 948th Best Scientist in the field of Chemistry in the United States by Research.com. The ranking is based on D-index (Discipline H-index) metric, which only includes papers and citation values for an examined discipline. The ranking includes only leading scientists with D-index of at least 40 for academic publications made in the area of Chemistry.

SUMMER STEBBINS gave a talk titled “Hydrilla in the Connecticut River” at the Aquatic Nuisance Species Task Force meeting in Saratoga Springs, NY (50 attendees) (May 8); gave a hydrilla identification workshop to the Friends of Lake Quonnipaug in Guilford, CT (30 attendees) (May 11); gave an aquatic plant management workshop to the Amston Lake Association in Amston, CT (25 attendees) (May 18).

ELISABETH WARD, PH.D., participated in the Master Woodland Managers partners meeting (May 7); participated in the monthly State Coordinators meeting for the Forest Ecosystem Monitoring Cooperative (May 9); organized a discussion on research collaborations to assess changes in nonstructural carbohydrates from Beech Leaf Disease with **SUSANNA KERIÖ, D.SC.**, Helen Poulos, Ph.D., (Wesleyan University), Leila Fletcher, Ph.D., (Yale University),

and Jon Gerwartzman (Yale University) (May 10); met with Nate Piche (CT DEEP, Forestry Division), Lukas Hyder, Mike Berry, James Fischer (White Memorial Conservation Center), and Nicole Smith (South Central Connecticut Regional Water Authority) to select sites to assess the impacts of Emerald Ash Borer on understory plant dynamics and tree regeneration (May 13, 14, & 29).

LEIGH WHITTINGHILL, PH.D., judged the CT Agriculture Science and Technology Education Agriscience fair hosted in Jones Auditorium (May 2); presented an invited talk titled “Green roof technology in urban agriculture: Lessons in production and environmental impact” at the Green Roofs for Healthy Cities Urban Agriculture Virtual Symposium (15 participants) (May 14); attended the Envirothon career fair to talk to students and teachers about careers and opportunities in agriculture with **CLAIRE RUTLEDGE, PH.D., FELICIA MILLET, NATHANIEL WESTRICK, PH.D., Milica Pavlicevic, Ph.D., and Wren Padua** (May 23).

CHARLIE (YINGXUE) YU, PH.D., participated in a Zoom meeting with collaborators from University of Washington and Washington State University for a joint grant from the USDA NIFA SAS program (May 3 & 15); participated the Plant Health Mentors’ Meeting (May 10); demonstrated how to use NanoSight Pro for particle concentration measurements for postdocs (May 13).

NEW STUDENTS, STAFF, AND VOLUNTEERS:



Jing (Gee) Yuan, Ph.D., joined the Department of Environmental Science and Forestry as a Postdoctoral Agricultural Scientist. **Jing** comes to the Station from a position at MIT. At the CAES, **Jing** will be working with **BLAIRE STEVEN, PH.D.**, and **JASON WHITE, PH.D.**, on a project to investigate the influence of novel phosphorus nanoparticles on the composition and function of the rhizosphere microbiome. **Jing** is looking forward to the summer where you can find her playing basketball, practicing hip-hop dance, and kayaking.

Hailey Carter (far left) is a recent graduate of Southern Connecticut State University with a major in Earth Science with a concentration in Environmental Studies. In her free time, she enjoys kayaking, hiking, and fishing. She hopes to one day obtain her Master’s degree in the field of atmospheric science or forestry. **Carlin Eswarakumar** (second from the left) is a UConn graduate with a B.Sc. in Ecology and Evolutionary Biology



(EEB) with a minor in animal science. At UConn, she worked as a field technician assisting in the Saltmarsh Habitat & Avian Research Program (SHARP) project in Dr. Chris Elphick's Lab. Carlin is an aspiring scientist who is passionate about ecology and wildlife conservation and wants to gain skills and experience in these fields. Carlin joined CAES in February, assisting **SUSANNA KERIÖ, PH.D.**, on projects focused on urban tree health. **Claire Turner** (second from the right) lives locally in the East Rock neighborhood and is a rising senior in the Department of Natural Resources and the Environment at the University of Connecticut. Claire enjoys outdoor activities, such as hiking, horseback riding and recreational swimming. She hopes to continue working outdoors in the field of wildlife biology after she graduates. **Melissa Tian** (far right) is also a rising senior at the University of Connecticut with a double major in Animal Science and Ecology and Evolutionary Biology. Melissa spends her free time playing frisbee and with her two cats. She hopes to attend veterinary school to pursue a career in wildlife medicine. Throughout the summer, **Hailey, Claire, and Melissa** will be assisting **PhDs SCOTT WILLIAMS and MEGAN LINSKE** in their integrated tick management work as will **Carlin** through June and July.



Ana Dimauro (right) is a recent graduate of the University of Connecticut where she studied Sustainable Plant and Soil Systems and was a member of the UConn Forest Crew. Her love for forestry took off in summer 2023 when she was a Plant Health Fellow at the Station assisting **SUSANNA KERIÖ, D.SC.** **José Ayala** (left) graduated from the University of Connecticut in August 2022 where he studied Natural Resources with a concentration in Sustainable Forest Environments. While there he worked with the UCONN

Forest Crew and managed/helped other organizations and clubs with forest activities such as maple sap collecting, clearing trails of debris and obstacles, and making forest wood products. Since graduating, he worked in the tree care industry with Bartlett Tree Experts. They are both excited to be spending the summer working with **JOSEPH P. BARSKY and ELI WARD, PH.D.**, on various forest health monitoring projects.

Revanth Goud Yerra is currently pursuing masters in Environmental Science at the University of New Haven after having received his BSc. (Hons) Agriculture from Suresh Gyan Vihar University. He is working as a research-for-credit-intern under **LEIGH WHITTINGHILL, PH.D.**, on her project in urban agriculture that includes examining how different nutrient management practices impact nutrient leaching and downstream water quality, which is an important consequence of agriculture.



PhDs **JASON WHITE, KELSEY FISHER, ANDREA GLORIA-SORIA, SUSANNA KERIÖ (D.SC.), CLAIRE RUTLEDGE, NEIL SCHULTES, QUAN ZENG, NUBIA ZUVERZA-MENA, GALE RIDGE** with **KATHERINE DUGAS** and **FELICIA MILLETT** presented tours of the Johnson-Horsfall and Jenkins-Waggoner laboratories and discussed their research with seven Albertus Magnus College Biology students interested in internships (May 31).

LINDSAY TRIPLETT, PH.D., conducted Mentor Training for research mentors in the Plant Health Fellows program (12 attendees) (May 10), and gave welcoming remarks at the CT Envirothon at Lockwood Farm (75 attendees) (May 23).

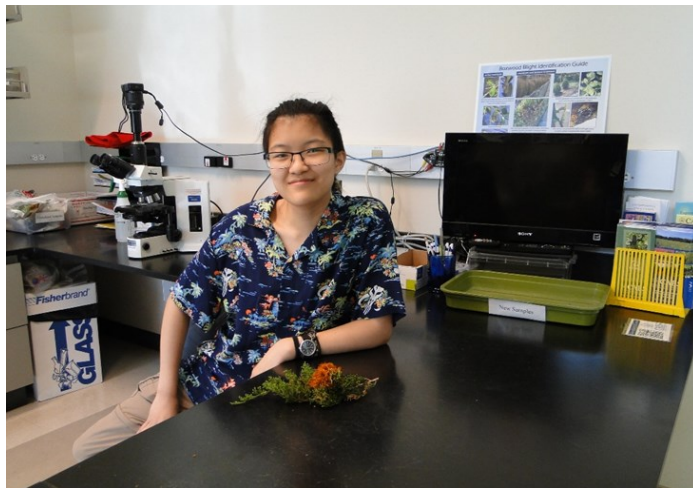
YONGHAO LI, PH.D., presented “Spring and Summer Gardening Tip” to Avon Public Library in Avon (50 attendees) (May 7); participated in the National Plant Diagnostic Network Online Communication & Web Portal Committee meeting via Zoom (11 attendees) (May 8); presented “Tomato and Pepper Diseases” to the North Haven Garden Club members in North Haven (22 attendees) (May 28).

ROBERT MARRA, PH.D., presented a seminar on beech leaf disease to the Norfolk Conservation Commission at the Norfolk Public Library (53 attendees) (May 18).

FELICIA MILLETT participated in the NEPDN monthly meeting (18 attendees) (9 May); presented “Growing Annuals from Seed” to the Watertown Garden Club (Watertown, CT) (17 attendees) (May 9); presented “Growing Annuals from Seed” to the Avon Free Public Library in Avon, CT (18 attendees) (May 14); participated in the NPDN Proficiency Committee Meeting (7 attendees) (May 21); Participated in CT Envirothon at Lockwood Farm (May 23); represented the NPDN Proficiency Committee at a meeting with NPDN Accreditation and the USDA Plant Pathogen Diagnostic Certification Program (PPDCP) (10 attendees) (May 29); and hosted a visit to Plant Disease Information Office to students from Albertus Magnus College (5 attendees) (May 31).

QUAN ZENG, PH.D., was interviewed by Ed Stannard from Hartford Courant for fire blight disease and research in controlling it (May 13): <https://www.courant.com/2024/05/14/theres-a-highly-contagious-blight-attacking-ct-orchards-how-it-causes-a-devastating-impact/>; met students from Albertus Magnus College and talked about ongoing research in fire blight resistance of apple and yeast biological controls (May 31).

NEW STUDENTS, STAFF, AND VOLUNTEERS:



Wren Padua joined the Plant Disease Information Office on May 6, 2024 as a Summer Seasonal employee. They are a recent graduate from the University of Connecticut with a bachelor's degree in Sustainable Plant and Soil Systems. Looking to learn anything and everything, they aim to apply what they learn about various plant ailments to help educate the public.

PUBLICATIONS:

1. Wang, N., Sundin, G. W., De La Fuente, L., Cubero, J., Tatineni, S., Brewer, M. T., Zeng, Q., Bock, C. H., Cunniffe, N. J., Wang, C., Candresse, T., Chappell, T., Coleman, J. J., and Munkvold, G. (2024). Key Challenges in Plant Pathology in the Next Decade. DOI: [10.1094/PHYTO-04-24-0137-KC](https://doi.org/10.1094/PHYTO-04-24-0137-KC)

Abstract: Plant diseases significantly impact food security and food safety. It was estimated that food production needs to increase by 50% to feed the projected 9.3 billion people by 2050. Yet, plant pathogens and pests are documented to cause up to 40% yield losses in major crops, including maize, rice, and wheat, resulting in annual worldwide economic losses of approximately US\$220 billion. Yield losses due to plant diseases and pests are estimated to be 21.5% (10.1 to 28.1%) in wheat, 30.3% (24.6 to 40.9%) in rice, and 22.6% (19.5 to 41.4%) in maize. In March 2023, The American Phytopathological Society (APS) conducted a survey to identify and rank key challenges in plant pathology in the next decade. Phytopathology subsequently invited papers that address those key challenges in plant pathology, and these were published as a special issue. The key challenges identified include climate change effect on the disease triangle and outbreaks, plant disease resistance mechanisms and its applications, and specific diseases including those caused by *Candidatus Liberibacter* spp. and *Xylella fastidiosa*. Additionally, disease detection, natural and man-made disasters, and plant disease control strategies were explored in issue articles. Finally, aspects of open access and how to publish articles to maximize the Findability, Accessibility, Interoperability, and Reuse of digital assets in plant pathology were described. Only by identifying the challenges and tracking progress in developing solutions for them will we be able to resolve the issues in plant pathology and ultimately ensure plant health, food security, and food safety.

VALLEY LABORATORY

CAROLE CHEAH, PH.D., gave an overview of biological control of HWA and inspected hemlocks at North West Camp, Appalachian Mountain Club CT Chapter in Salisbury (February 25); through a federal grant from the Lower Farmington and Salmon Brook Wild and Scenic Committee funded by the National Park Service’s Partnership Wild and Scenic River Program, 6,000 commercially purchased *Sasajiscymnus tsugae* predator of HWA were released for HWA biological control for protection of hemlocks along the Lower Farmington River and Salmon Brook in May 2024; released *S. tsugae* in Penwood and Talcott Mountain State Parks (May 12); led staff from Eversource in releases in riparian hemlocks along the Farmington River in the Town of Avon followed by releases along Punch Brook, Nassahegon State Forest, Town of Burlington (May 13); led Town of Simsbury staff and volunteers in releases along Stratton Brook on Town Forest Park, Ethel Walker Woods and Darling-Hills Forest (Simsbury Open Space) then at Tanager Hill, Simsbury Land Trust, with a volunteer (May 14); released at Belden Forest (Town of Simsbury) and Stratton Brook State Park (May 15); released at Town of Bloomfield’s Farmington River Park and state-owned Windsor Wildlife Management Area (May 21); led CT DEEP staff and a volunteer in releases along Mountain Brook, Enders State Forest, Town of Granby (May 22); with staff from the Town of Windsor’s Northwest Park Nature Center, released *S. tsugae* (May 28); with staff of McLean Game Refuge, Town of Granby, released *S. tsugae* (May 29); through a second grant from the Farmington River Coordinating Committee funded by the National Park Service’s Partnership Wild and Scenic River Program, 5,000 commercially purchased *S. tsugae* predators of HWA were released for HWA biological control for protection of hemlocks along the Upper Farmington River in May 2024; released on a Canton Land Conservation Trust property on Onion Mountain Preserve followed by an interview with reporter Natasha Sokoloff, CT Insider, who accompanied releases with staff from the Roaring Brook Nature Center in Werner Woods, Nepaug State Forest (May 20); released along Sandy Brook, Algonquin State Forest (May 21); released at Pratt Preserve, Canton Land Conservation Trust (May 22); gave an brief overview of HWA biological control and led three volunteers from the New Hartford Land Trust in *S. tsugae* releases at four land trust properties on East Mountain and Toringford Brooks (3 attendees) (May 23); gave an overview of HWA biological control and led volunteers, DEEP staff and the Community Planner from the National Park Service in releases at Mathies Grove, Peoples State Forest, followed by further releases at American Legion and Tunxis State Forests, (7 attendees) (May 25); released at Peoples State Forest with volunteers including a retired CAES technician, and was interviewed and filmed by documentary film maker Darcy Dennett of Firefly Filmworks, followed by a release at Cedar Swamp WMA in New Hartford (May 26).

ROSE HISKES participated in CIPWG symposium planning committee meetings via zoom (May 10 & 22).

NATE WESTRICK, PH.D., contributed as a panelist for a panel discussion titled “Future Careers in Mycology” to the University of Wisconsin – Madison graduate student and post-doc community (45 attendees) (April 15); hosted Emily Bick, Ph.D., for a CAES seminar titled “Digital Entomology: the sensing of insect population dynamics” (30 attendees) (May 1); gave a presentation to the Yale Plant Molecular Biology group titled “Exploring the Virulence of *Sclerotinia sclerotiorum*: a Cosmopolitan Pathogen” (20 attendees) (May 6); presented a research update to the Boxwood Blight Insight Group 3rd Annual Meeting

titled “Integrating Technologies to Improve Boxwood Blight Management” (20 attendees) (May 7); acted as a panelist for a panel discussion titled “Exploring Career Paths in Biotechnology” for the Bioengineering Applications Committee within the American Psychopathological Society (40 attendees) (May 9).

PUBLICATIONS:

1. Qiao, C., Zhao, R., Li, D.-W., and Ding, X. (2024). New species of *Biscogniauxia* associated with pine needle blight on *Pinus thunbergii* in China. *Forests*, 15, 956. DOI: [10.3390/f15060956](https://doi.org/10.3390/f15060956) .

Abstract: In June 2020, needle blight symptoms on *Pinus thunbergii* were discovered in Bazhong City, Sichuan Province, China. Fungal isolates were obtained from the pine needles of *P. thunbergii*. After examining morphological characteristics and conducting multi-locus (ITS, ACT, TUB2 and RPB2) phylogenetic analyses, the isolates SC1–SC5 were determined to be a new species, *Biscogniauxia sinensis*. Genealogical Concordance Phylogenetic Species Recognition with a pairwise homoplasy index test was used to further verify the results of the phylogenetic analyses. The morphology and phylogenetic relationships between this new species and other related *Biscogniauxia* species were discussed. To our knowledge, this is also the first report of *Biscogniauxia sinensis* associated with pine needle blight on *P. thunbergii* in China. The needle damage of *P. thunbergii* associated with *Biscogniauxia sinensis* will detrimentally affect the carbon absorption and photosynthetic efficiency of *P. thunbergii*, further reduce the absorption of nutrients by Japanese black pine and may lead to the imbalance of pine forest conditions, which will have a negative impact on the forest ecological system.

2. Li, D.-W., Ching-Yi, T., and Chin S., Y. (2024). Chapter 18 Fungi. In Springston J. et al. (ed) *Bioaerosols: assessment and control*, (2 ed.). ACGIH. Cincinnati, OH. Pages 369-400. https://store accuristech.com/standards/bioaerosols-assessment-and-control-2nd-edition?product_id=2254723.

3. Salvas, M. R., Rocha, R. O., and Westrick, N. (2024). First Report of *Neopestalotiopsis* spp. Causing Leaf Spot and Petiole Blight on Strawberry in New England. *Plant Dis*. DOI: [10.1094/PDIS-04-24-0893-PDN](https://doi.org/10.1094/PDIS-04-24-0893-PDN).

Abstract: In October 2023, a Connecticut grower contacted The Connecticut Agricultural Experiment Station about a field of strawberry plants (*Fragaria × ananassa*) (cv. Ruby June) showing symptoms of severe leaf spotting and visual wilting. Upon visiting the field, leaves had lesions with a diffuse black halo and a light brown center and wilting symptoms, which appeared driven by petiole lesions and presented as dark brown stripes with a reddish-purple halo. Symptoms were observed on 80 to 90% of plants within the block, nearly all of which (>90%) presented with both leaf spots and severe wilting. Diseased tissue was collected from 20 leaves and 25 petioles, sterilized in 0.6% NaOCL, and plated on potato dextrose agar. After hyphal tipping a morphologically identical fungus was isolated from 70% of leaves and 88% of petioles, which formed a dense white mycelial mat with moderate aerial mycelium and conidiomata that exuded dark brown conidial masses. The underside of the mycelial mat was yellowish. Conidia were fusoid, ellipsoid, straight to slightly curved, 4-septate with a single basal appendage and 2-5 apical, matching the description of species within the genus *Neopestalotiopsis* (Maharachchikumbura et al. 2014). The average conidia (n=74) length, not including appendages, was $29.9 \pm 2.1 \mu\text{m}$ and the average width, at the widest point, was $7.5 \pm$

0.7 μm . Aerial hyphae were collected from two isolates, CT58-1 and CT62-2, and DNA was extracted for further molecular characterization. PCR was performed with primers targeting actin (ACT), β -tubulin (TUB2), and ITS prior to amplicon sequencing (Carbone and Kohn 1999; Hassan et al. 2018). Sequences were queried against the NCBI whole genome shotgun database, and aligned sequences from 13 species (including *Neopestalotiopsis*, *Pestalotiopsis*, and *Pseudopestalotiopsis*) were collected for each locus. Sequences were aligned, trimmed, and concatenated using Mega11, and IQ-TREE was employed for model selection (Nguyen et al. 2015; Tamura et al. 2021). A maximum-likelihood tree placed the isolates in a high-confidence cluster with *Neopestalotiopsis rosae*, confirming this placement of these isolates within the genus (CT58-1 Accession #: PP715979-89; PP707735). To confirm pathogenicity, CT58-1 was grown on autoclaved strawberry leaves to induce sporulation, and a suspension of 105 spores/ml was made. Five milliliters of this spore suspension was sprayed on six 6-week-old strawberries (cv. Jewel), and water was sprayed on the same number of control plants. Plants were at 100% humidity for two days and then kept in the greenhouse for 3 weeks to observe symptoms. Inoculated plants presented with identical leaf spot and petiole lesions to field samples and no visual symptoms were observed on control plants. New isolations were made from infected petioles, which produced morphologically identical spores to those described above, and ITS/ACT loci sequencing yielded sequences identical to those of CT58-1. Spore production and plant inoculations were repeated with this new isolate, and identical symptoms were observed. This is the first report of *Neopestalotiopsis* infecting strawberries in New England and given the high disease incidence in the initial infected field and relative lack of disease in a neighboring field, it is likely that this pathogen was introduced on bare root plants. As the plants were sourced from a nursery in Ontario, Canada, it is likely that the pathogen is capable of overwintering in the Northeastern United States.

Ahmed, T., Noman, M., Qi, X., and **White, J.C.** Protein nanocarrier-enabled plant genetic engineering systems. *Molecular Plant*.

Bai, Y.-Q., Li, H., Wan, Y., **Li, D.-W.**, and Zhu, L.-H. Leaf spots of *Magnolia × soulangeana* caused by *Colletotrichum gloeosporioides* newly reported in China. *Crop Protection*.

Bugbee, G.J., Doherty, R.S., and Stebbins, S.E. Lake Housatonic Monitoring Report - Invasive Aquatic Plants – 2023. *CAES Bulletin*.

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Bui, T.H., Zuverza-Mena, N., Nason, S., Dimkpa, C.O., Jones, J.P., and White, J.C. Iron-fortified hemp-derived biochar enhances PFAS immobilization in soil and reduces bioavailability to radish (*Raphanus sativus* L.). *Environmental Pollution*.

Cowles, R.S. and Aulakh, J.S. Frost/freeze injury. *The Real Tree Line*.

Cowles, R.S. Pest management strategies and banker plant systems to consider. *The Real Tree Line*.

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Doherty, R.S., Stebbins, S.E., and Bugbee, G.J. Amos Lake, Preston, CT Aquatic Vegetation Survey, Water Chemistry, Aquatic Plant Management Options 2023. *CAES Bulletin*.

Gao, G., Kuzyakov, Y., **Shabtai, I.**, Li, G., and Liu, M., Professor Zhongpei Microbial communities follow organic matter formation in paddy soils: the molecular perspective. *Nature Communications*.

Guo, Y., Gan, Y., **White, J.C.**, Zhang, X., **Wei, D.**, Liang, J., **Wang, Y.**, and Song, C. Fe₂O₃ nanoparticles facilitate soybean resistance to root rot by modulating metabolic pathways and defense response. *ACS Nano*.

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Huang, F., Chen, L., Zhou, Y., Huang, J., Wu, F, Hu, Q., Chang, N., **White, J.C.**, Qiu, T., Zeng, Y., He, H., and Fang, L. Exogenous selenium promotes cadmium reduction and selenium enrichment in rice: Evidence, mechanisms, and perspectives. *Trends in Food Science and Technology*.

Irshad, S., Jiang, Y., Sun, Y., **White, J.C.**, Rui, Y., and Zhang, P. Mo-Nitrogen Nexus: Current state of knowledge and recent advances in Mo-based efficient nitrogen fixation. *Nature Geoscience*.

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STATION NEWS

Kang, Z., Zhang, J., **Wang, Y.**, Lu, J., Zhuang, D., Chen, S., Zheng, S., Gardea-Torresdey, J., **White, J.C.**, and Zhao, L. Silica-triggered redox signaling enhances rice drought resilience and grain yield. *ACS Nano*.

Molaei, G.*, **Khalil, N.**, Ramos, C., and Paddock, C.D. The Rising Tide of Tickborne Diseases — Another Tick, Another Pathogen, and Another Public Health Challenge in the Northeast. *New England Journal of Medicine*.

Siegel, E., **Barksy, J.P.**, Xu, G., **Williams, S.C.**, **Molaei, G.**, and Rich, S.M. Acorns and Lyme disease, revisited: Connecticut, U.S.A. *Parasites & Vectors*.

Stebbins, S.E., **Doherty, R.S.**, and **Bugbee, G.J.** Pachaug Pond, Griswold, CT - Aquatic Vegetation Survey, Water Chemistry, Aquatic Plant Management Options. *CAES Bulletin*.



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