

STATION NEWS

The Connecticut Agricultural Experiment Station

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Mountain Laurel by: Sonam Sah

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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ADMINISTRATION

JASON C. WHITE, PH.D. along with **MEGAN LINSKE, PH.D. AND GOUDARZ MOLAEI, PH.D.** hosted US Senator Richard Blumenthal at the CAES for a press conference and tour of our tick research program (April 1); met with Swapnil Ambade, Ph.D of Johns Hopkins University to discuss collaborative research (April 1); met by teams with colleagues at the University of Minnesota and 3M to discuss a planned PFAS phytoremediation field trial (April 2, 23); met by Teams with colleagues at the University of Minnesota and Convergent Bioscience to discuss collaborative projects (April 2, 23); attended the V-NanoDay Conference in Florence Italy and gave a presentation entitled “Controlling the oxidative stress reactome for climate-resilient crops using nanoscale stimulants”; attended the DeliSoil symposium and gave a presentation entitled “Soil Health Assessment: Toxic Elements, Emerging Contaminants and The American Perspective” (April 8-10); gave a presentation entitled “Plastics in our environment and in our food: What are the risks?” for the Microplastics and Public Health Workshop, Greater New Haven Green Fund and SCSU School of Public Health at Southern CT State University (April 13); participated as an invited attendee in a half-day workshop at MIT entitled “Biotechnologies for Sustainable Agriculture”(April 15); participated in the monthly AgInnovation NE ZOOM call (April 16); participated in an event as an invited attendee entitled “The agriculture market and common opportunities” at the Cuban Embassy in Washington DC (April 16); participated in the proposal defense of a PhD student at the University of Texas El Paso (April 16); participated in a project pitch entitled “Systemic Targeting Of MicroPlastics (STOMP) Materials Manufacturing” to ARPA-H (April 20); along with **SUDHIR SHARMA, PH.D.** met by ZOOM with colleagues at Columbia University to discuss progress on a collaborative project (April 21); gave a lecture at the University of New Haven entitled “Nano-enabled agriculture: A path to global food security in a changing climate” (April 22); along with **CHAOYI DENG, PH.D.** met by Teams with collaborators at Convergent BioScience and an industrial partner to discuss joint experiments (April 22); along with **CHRISTIAN DIMKPA, PH.D. AND YI WANG, PH.D.** met with colleagues at the University of Connecticut to discuss a collaborative NSF project (April 23); met by Team with Professor Mingyu Qiao of the University of Connecticut to discuss collaborative projects (April 23); met by Teams with Professor Christy Haynes of the University of Minnesota to discuss collaborative projects (April 23); met by ZOOM with the Editor-in-Chief of *Nature Nanotechnology* to discuss the state of the science for nanotechnology in agriculture (April 28); along with **MICHAEL LAST AND LINDSAY TRIPLETT, PH.D.** hosted the quarterly CAES Board of Control meeting (April 29); participated in an informal teleconference with CT OSHA (April 30); met by ZOOM with colleagues at the University of California Riverside and Carnegie Mellon University to discuss a collaborative USDA SCRI proposal (April 30); met by Teams with the Attorney Generals office to discuss the new language in USDA Terms and Conditions documents (April 30); and met with CT Innovation to discuss funding opportunities (April 30).

PUBLICATIONS:

1. Zhang, X.; Zhang, X.; **White, J.C.**; Xu, Y.; Yang, J.; Hou, X.; Zhao, Q.; Wu, F.; Xing, B. 2026. Understanding the regulatory mechanisms of nanomaterials on carbon fixation in plants. *Fundam. Res.* <https://doi.org/10.1016/j.fmre.2026.04.023>.

Abstract- Agricultural nanotechnology offers innovative strategies to enhance crop productivity by modulating fundamental physiological processes in plants. Despite growing evidence that nanomaterials (NMs) can significantly promote crop growth, a standardized theoretical framework explaining the underlying mechanisms remains elusive. This review proposes a systematic framework to elucidate how NMs positively regulate plant carbon assimilation and partitioning to ultimately enhance crop yield. We categorize internal carbon flow into three interconnected modules: (1) inorganic-organic carbon inter-conversion (photosynthesis and respiration), (2) organic carbon intra-conversion (sucrose and starch metabolism, alongside amino acid and fatty acid metabolism), and (3) supporting metabolic processes (nitrogen and secondary metabolism) that supply essential substrates and energy. To enhance carbon assimilation, NMs must be strategically selected to improve photosynthetic light conversion efficiency, electron transport, and enzyme activities, promote fatty acid metabolism, and bolster the glutamine synthetase-glutamate synthase (GS-GOGAT) cycle in nitrogen metabolism. Furthermore, NMs can modulate root exudates and reshape the structure and function of the rhizosphere microbiome, which in turn establishes a feedback loop that influences plant carbon assimilation and partitioning. This review also addresses the critical trade-offs between the economic potential and environmental risks of NMs, providing essential insights for their sustainable implementation in agriculture. Collectively, it provides a mechanistic framework for understanding NMs-plant interactions, paving the way for the rational design of nano-agricultural tools for sustainable yield improvement.

2. Muthuramalingam Thangavelu, R.; Gray, S.; Wu, B.; Pellagrino, R.A.; da Silva, W.; Zuverza-Mena, N.; Dimkpa, C.O.; **White, J.C.** 2026. Lignin-derived carbon dots from leaf waste as sustainable plant sunscreens and UV-protective foliar coatings. *Environ. Sci.: Nano* <https://doi.org/10.1039/D5EN01210D>

Abstract- Lignin-derived carbon dots made from leaf waste offer a sustainable tool for plant protection by converting agricultural residues into functional nanomaterials. High-purity lignin was extracted from Norway maple (*Acer platanoides*) leaves, and two classes of lignin carbon dots were synthesized by hydrothermal treatment at 200 °C (partially carbonized, pLCD-200) and 350 °C (fully carbonized, fLCD-350). Microscopy confirmed spherical nanoscale structures with mean diameters of 12.3 ± 3.8 nm for pLCD-200 and 9.3 ± 1.9 nm for fLCD-350, while zeta potential values of -13.7 and -19.9 mV indicated good colloidal stability. Spectroscopic analyses revealed distinct optical behaviors: pLCD-200 showed strong UV absorption (200–350 nm) and blue emission at 440–460 nm with excitation-dependent shifts, converting part of the absorbed UV light into photosynthetically active radiation (PAR). In contrast, fLCD-350 displayed broader UV-visible absorption and near-infrared emission around 710–730 nm with minimal excitation dependence. Under natural sunlight, pLCD-200 exhibited emission decay consistent with first-order kinetics ($k \approx 0.010 \text{ h}^{-1}$; half-life ≈ 3 days), while fLCD-350 demonstrated persistent emission and gradual photo-brightening modeled by first-order association ($k_g \approx 0.002 \text{ h}^{-1}$; doubling time ≈ 15 days). FTIR confirmed that fLCD-350 stability arises from decarbonylation, ether bond cleavage, and condensation of aromatic domains into a carbonized core with few oxygen groups. Formulation with sodium alginate produced uniform films that retained strong leaf-surface fluorescence for at least 10 days outdoors, ensuring durable adhesion and UV shielding. Short-term photosynthesis measurements (0–48 h) and greenhouse growth assays with foliar exposure to pLCD and fLCD at 300 and 600 mg L⁻¹ revealed no adverse effects on photosystem function or plant development. These findings demonstrate that lignin carbon

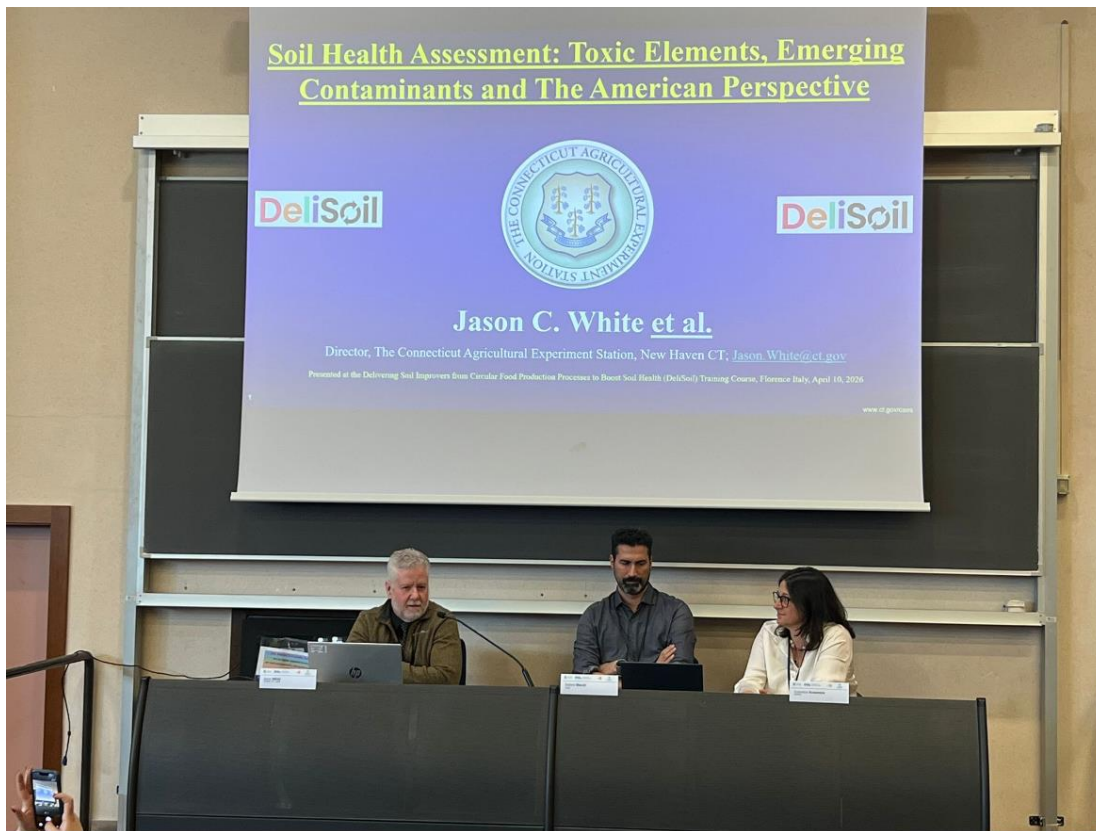
dots, particularly fLCD-350, are durable, optically versatile, and plant-compatible nanomaterials functioning as long-lasting sunscreens and UV-protective foliar coatings that convert harmful UV into photosynthetically useful light.

3. Sun, Y.; Jiang, Y.; Zhang, Z.; An, C.; Lv, Y.; Yu, X.; Wei, H.; Irshad, S.; Liu, X.; **White, J.C.**; Rui, Y.; Zhang, P. 2026. Priming of soybean seeds with nanoscale molybdenum as a sustainable strategy for enhancing crop resilience to drought and salt stress. *Indus. Crop Prod.* 244: 123205.

Abstract- Abiotic stresses are exacerbated by climate change and the overuse of agrochemicals, threatening global food security. Seed priming with molybdenum disulfide nanoflowers (MoS₂ NFs) was explored as a strategy to improve soybean resilience under stress. We hypothesize that the enzyme mimetic function of MoS₂ NFs could protect seeds from stress at an early stage and trigger corresponding prolonged protective effects. Priming seeds with 100 mg/L MoS₂ NFs for 24 h significantly improved germination (60% and 15%) and seed vigor (97.6% and 79.4%) under drought and salt stress compared with controls (untreated) through enhanced antioxidative response and reprogrammed proteomics. The metabolomic profile underwent significant reprogramming, characterized by distinct changes in amino acid metabolism and flavonoid synthesis pathways. These metabolic adjustments strengthening overall antioxidant capacity and abiotic stress tolerance. sp-ICP-MS analysis suggests that MoS₂ NFs transform in the seeds upon seed priming, releasing a fraction of Mo (1.44%-4.17%), which becomes incorporated into plant tissues afterwards. These beneficial protective properties extend to the seedling stage, with the multifunctional action of MoS₂ NFs being critical to the activity. Overall, this study demonstrates a practical and scalable seed priming strategy using MoS₂ NFs to improve crop resilience under abiotic stress.

4. Wang, Y.; Xu, Y.; Cao, Y.; Ma, C.; Cai, Z.; **White, J.C.**; Wang, Y.; Chen, G.; Yan, W.; Xing, B. 2026. Sulfur nanoparticles enhance Cd-phytoremediation in *Salix chaenomeloides* via alleviating phytotoxicity and modulating rhizosphere microbiota. *Tree Phys.* <https://doi.org/10.1093/treephys/tpag041>

Abstract- Sulfur application can enhance plant tolerance to toxic metal stress, but the the underlying physiological and microecological mechanisms in woody plants remain poorly understood. In this study, *Salix chaenomeloides* was treated with sulfur nanoparticles (S NPs) at dosages of 60 and 120 mg·kg⁻¹ under cadmium (Cd) stress. We evaluated the in planta physiological responses and rhizosphere microbial processes mediating Cd tolerance and phytoremediation efficiency. Sulfur application (sulfate and S NPs) significantly stimulated *Salix* growth, increasing above-ground and root biomass by 15.2-28.6% and 26.9-49.5%, respectively, compared to Cd alone treatment. Notably, S NPs outperformed sulfate in alleviating Cd-induced oxidative damage, reducing malondialdehyde and superoxide anion contents by 22.4-23.8% and 82.9-84.5%, respectively, compared to Cd alone. Under Cd stress, 120 mg·kg⁻¹ S NPs application significantly increased glutathione and oxidized-glutathione contents by 8.96% and 33.0%, respectively, compared to Cd alone. S NPs significantly upregulated the expression of genes involved in metal transport and sulfur metabolism. The abundance of the Cd tolerance gene *czcC* and sulfur transformation genes (*cysH*, *dsrA* and *soxB*) was significantly increased by S NPs application under Cd stress. The expression levels of functional genes linked to the S-cycle showed a noteworthy positive relationship with the translocation factor of Cd in shoots and the total accumulation of Cd. These findings demonstrate that S NPs represent a safe and sustainable strategy to enhance Cd phytoextraction and mitigate phytotoxicity in *Salix*.



Jason C. White, Ph.D., at the V-Nano Day Conference in Florence, Italy.



Jason C. White, Ph.D., at the Microplastics and Public Health Workshop, Greater New Haven Green Fund and SCSU School of Public Health at Southern CT State University



Jason C. White, Ph.D. at the Embassy of the Republic of Cuba in Washington, D.C.

ANALYTICAL CHEMISTRY

CHRISTIAN DIMKPA, PH.D. was an invited speaker at the *Science in the Savannah US-Africa Conference Series* with the theme of *Nanoengineering and the Environment*. The conference took place in Nairobi, Kenya between April 13 and 16, and was attended by participants from the US, Europe, Japan, India, and various African countries. Dimkpa's, Ph.D. presentation was entitled *Do Material Properties Play a Role in Agricultural and Environmental Outcomes?*



ANUJA BHARADWAJ, PH.D. gave an invited talk titled *“From Sample to Result: Analytical Techniques in Cannabis Testing”* at the Henry C. Lee College of Criminal Justice and Forensic Sciences, University of New Haven, West Haven, on April 10, 2026. The session was attended by 25 students from the Forensic Science Department.



NUBIA ZUVERZA-MENA, PH.D. presented “Nanotechnology-Based Strategies to Enhance Crop Resilience Against Environmental Stress” and volunteered to provide career guidance during the Career Central event at the Materials Research Society spring meeting; April 30 and May 1st, Honolulu, HI.

PUBLICATIONS:

1. **Alvaro G. Garcia, Carlos Tamez, Nassifatou Koko Tittikpina, Jason C. White, Christian O. Dimkpa** (2026). Analysis of vitamins B1, D2, and D3 in commercial animal feed matrices by LC-MS/MS: Method Validation of AOAC Official Methods. *Journal of AOAC INTERNATIONAL* <https://doi.org/10.1093/jaoacint/qsag027>
2. **Thangavelua, R.M., Gray, S., Wu, B., Pellagrino, R.A., da Silva, W., Zuverza-Mena, N., Dimkpa, C.O., White, J.C.** (2026). Lignin-derived carbon dots from leaf waste as sustainable plant sunscreens and UV-protective foliar coatings. *Environmental Science: Nano*. DOI, <https://doi.org/10.1039/D5EN01210D>
3. Satwik Majumder, Glen DeLoid, Milton Das, **Mandeep Kaur**, Eshun Gaddi, Sarah Alotaibi, **Nubia Zuverza-Mena**, Omowunmi Sadik, **Jason White**, and Philip Demokritou. (2026). Lifecycle Implications of Poly (vinyl chloride) (PVC) Micro(nano)plastics (MNPs): Interactions with Co-exposed Environmental Pollutants (EPs) and Impact on Their Toxicity and Bioavailability. *Environmental Science & Technology*. DOI: 10.1021/acs.est.5c14500

ENTOMOLOGY

PHILIP ARMSTRONG, SC.D. led biosafety and security drills for the annual BSL-3 laboratory training (April 17); participated in the NEVBD-TEC leadership meeting to discuss plans and research projects (April 21); and met with FBI agents from the New Haven office to discuss research and security in the BSL-3 laboratory (April 28).

TIA M. BLEVINS participated in the 51st annual meeting of the Horticultural Inspection Society - Eastern Chapter in Carroll Valley, Pennsylvania. Blevins serves as the chapter's Archivist and was chairperson of the Constitution Committee and a member of the Nominations Committee during this meeting. She presented highlights of Connecticut's regulatory program to the group. (April 6-9)

ANGELA BRANSFIELD participated via Zoom in Yale University's Biosafety Committee meeting (April 16); provided annual refresher BSL-3 laboratory training (April 17; 20 attendees); along with **Philip Armstrong, Ph.D.** and **Michael Misencik**, hosted five FBI agents from the New Haven office to discuss research activities and security relating the BSL-3 laboratory (April 28); participated via Zoom in a Yale-hosted Mock IRE Panel Group meeting to discuss mock IRE protocols that will be presented at the Harvard–Yale Biosafety Symposium to be held May 5 (April 28); and participated via Zoom in an ad hoc Yale University's Biosafety Committee meeting (April 30).

KELSEY E. FISHER, PH.D. presented "Putting science to work for society: Balancing research goals with state needs" during Iowa State University Department of Plant Pathology, Entomology, and Microbiology seminar series in Ames, IA (Apr 7); judged the Sigma Xi poster session at Quinnipiac University (Apr 21).

MEGAN LINSKE, PH.D. participated in a press event with Senator Blumenthal to discuss ongoing tick programs (April 1); participated in a field site walk with Julie Michaelson (Xerces Society), **Natalie Bailey, Jessica Brown, Ph.D.**, and **Scott Williams, Ph.D.** at the East Haddam Fishing and Game club to assess pollinator habitat (April 8); was interviewed by Annie Xia for [the CT Insider](#) on the upcoming tick season and threats to public health (April 15); hosted the Wildlife Society Leadership Institute Committee meeting as Chairperson to review the 2026 class applications (April 16); participated in the Northeast Center for Excellence in Vector Borne Disease's Training and Evaluation Center leadership meeting (April 21); was interviewed on [WFSB Great Day @ 9am](#) about ticks and tick borne diseases in Connecticut (April 22); participated in the Women and Family Life Center's Development Committee as Chairperson (April 23); was interviewed by Michael Stobbe of [Associated Press](#) along with Scott Williams, Ph.D. about current tick trends and the impact on public health (April 24); proposed advances in the current Kids in STEM program to the CAES Board of Control with Co-Chair **Summer Weidman** (April 29).

GOUDARZ MOLAEI, PH.D. moderated meetings of the Global Consortium on Climate and Health Education for the World Health Organization (WHO) EMRO region on vector-borne diseases (April 1 and 22); attended a press conference with Senator Blumenthal on ticks and tick-borne diseases; was interviewed on tick and tick-borne disease activities in Connecticut by WTIC Radio (April 6), CT News 12 (April 7), CT Insider and Connecticut Public Radio (April 8), WFSB and WTNH (April 9), NBC Universal (April 10), CT Insider (April 13), University of Connecticut Department of Journalism (April 15), Connecticut Public Radio (April 24), NBC

Connecticut (April 27), and WNPR/Where We Live (April 30); attended the Engineering, Science, and Technology Advisory Board meeting of CCSU to discuss projects and progress (April 15); attended the NEVBD-TEC leadership meeting to discuss plans and projects (April 21); and presented an invited talk, "Climate Change,

Range Expansion of Native and Invasive Ticks and Tick-Borne Diseases, and Ensuing Public Health Challenges,” to the White Memorial Conservation Center (April 23).

GALE E. RIDGE, PH.D. A speech delivered by PHD. Ridge on Delusional Infestation was launched on YouTube by the University of Tennessee (April 8), she was interviewed by Ann Nyberg of WTNH TV Channel 8 about Delusional Infestation (April 9), and presented a seminar on Delusional Infestation at Albertus Magnus College (April 16), (30 attendees).



Sometimes the idiom, “as rare as hens’ teeth” applies to our taxonomic work. As we painstakingly continue to archive the station’s insect collection, we found a hen’s tooth. It’s a gynandromorph (half male and half female) butterfly. The image shows the male on the left and female on the right. This particular butterfly is the Clouded Sulphur *Colias philodice*.

PAULA WOLF completed teaching the last two sessions of an Introduction to Beekeeping series for the Woodbury FFA Adult Education Program (April 1st and 8th); participated on a panel of Northeastern Apiary Inspectors answering beekeeping questions for beekeepers across New England and New York in the 2026 Northeastern US Honey Bee Update Lunch & Learn Series (April 3rd; 48 participants); met with new beekeepers at Mike’s Beehives package bee pickup (April 4th); met with new beekeepers at Stonewall Apiary package bee pickup (April 5th); participated in a collaboration of Apiary Inspectors and Extension Educators to develop a response plan for Tropilaelaps mite (April 7th); contributed to Connecticut Beekeepers Association’s Bee Talks, a Q & A session for beekeepers (April 9th; 53 attendees); met with new beekeepers at A&Z Apiaries package bee pickup (April 10th); met with beekeepers from Eastern CT Beekeepers Association and assisted with their package installation workshop (April 12th; 56 attendees); presented a talk on honey bees and pollination to the Monday Reading Club (April 13th; 36 attendees); met virtually with the Apiary Inspectors of America (April 15th); presented a talk about honey bees and the dynamics of the bee colony to the congregants of the Bethany Lutheran Church (April 16th; 14 attendees); met with new beekeepers at Mike’s Beehives package pickup (April 18th); met with new beekeepers at Stonewall Apiary package bee pickup (April 19th); participated in the Back Yard Beekeepers Association’s New Bee Fundamentals/Special Topics virtual Q&A meeting (April 21st); presented about honey bees at the Alternative Center for Excellence (April 23rd; 20 attendees); did a tabling event, with Katherine Dugas at the Hamden Earth Day (April 25th); presented a talk about honey bees to the Daytime Gardeners Club of North Haven (April 28th; 23 attendees); met with beekeepers and answered questions at the

Back Yard Beekeepers General Meeting (April 28th; 87 attendees); taught 5th grade classes about honey bees at Binney Park (April 29th; 90 attendees).

TRACY ZARRILLO attended the 2026 Northeast Natural History Conference held at the Double Tree Hilton in Burlington, VT in support of her research assistant, David P. Mantack, who was presenting a talk about the sweat bee subgenus *Dialictus* and was a co-author of a presentation titled “Planting for native bees in Farm Bill

conservation plantings in southern New England” (April 17-20, 30 attendees); presented a talk about CAES wild bee research projects to the Experiment Station Associates via Zoom (April 29).

PUBLICATIONS:

1. Lau N., Gupta S., Sharma R., Williams A., Sanchez-Vargas I., Rose N., Zhang Ch., Crosbie-Villaseca A., Zh A., Dayama G., **Gloria-Soria A.**, Brackney D., Manning J., Wheeler A., Caranci A., Reyes T., Sylla M., Badolo A., Akorli J., Aribodor O., Ayala D., Liu W-L., Chen Ch-H., Vasquez Ch., Acosta C., Ponlawat A., Magalhaes T., Carter B., Wesson D., Surin D., Younger M., Costa-da-Silva A., DeGennaro M., Bergman A., Lambrechts L., McBride C., Olson K., Calvo E., and Kyza-Karavioti M. Small RNA genomics of *Aedes aegypti* mosquitoes discovers infectious viruses that trigger an RNA interference response. *Nat Commun* **17**, 3658 (2026). <https://doi.org/10.1038/s41467-026-71964-1>.

We report a global survey of viral small RNAs (vsmRNAs) from >200 *Aedes aegypti* samples to identify many mosquito viruses that actively infect this prominent arboviral vector. *Ae. aegypti* viruses in the Americas are abundant, with some displaying geographical boundaries. Viruses infecting Asian *Ae. aegypti* are similar to those in the Americas and reveal the first wild example of dengue vsmRNAs. African *Ae. aegypti* display vsmRNAs from viruses unique to these African strains. Academic lab colonies generally lack viruses, yet two commercial strains are deeply infected by a tombus-like virus that is related to plant viruses. Comparing matched viral long RNAs to vsmRNAs reveal viral transcripts evading the mosquito RNA interference (RNAi) pathway. By infecting mosquito cells with *Ae. aegypti* homogenates, we generate stably infected cell lines which produce vsmRNAs that were comparable to native mosquito vsmRNA patterns. Lastly, we demonstrate that these stably infected mosquito cells producing vsmRNAs can exert gene silencing of reporters bearing viral sequence segments, providing a potential explanation for how *Ae. aegypti* can resist viral infections. This vsmRNA genomics approach in *Ae. aegypti* can add to existing vector surveillance approaches by discovering new viruses that persist in mosquito populations.

2. Morinaga G., **Gloria-Soria A.**, Hanley K. A., Ponlawat A., Powell J. R. , Soghigian J. Two chromosome-scale genomes of wild *Aedes aegypti aegypti* from North America and South-East Asia (2026). *Journal of Heredity*. esag032. <https://doi.org/10.1093/jhered/esag032>

The yellow fever mosquito (*Aedes aegypti*) is the primary vector for diseases such as chikungunya, dengue fever, yellow fever, and Zika fever. These mosquitoes have been designated as two subspecies: *Ae. aegypti formosus* (Aaf) and *Ae. aegypti aegypti* (Aaa)—the former being a darker form limited to sub-Saharan Africa and the latter referring to lighter colored individuals found circumglobally in the tropics and sub-tropics. In addition to morphology and distribution, these two sub-species differ in their behavior and ecology—Aaf females generally feed on non-human mammals and live in rural and sylvatic areas, while Aaa females preferentially feed on humans and are found in human dwellings in urban areas. These characteristics and differences make them species of great medical importance, and the development of resources for

understanding their biology has high priority. We recently published a chromosome-scale wild Aaf genome assembly and here we add to this body of resources by presenting two *de novo* chromosome-scale genome assemblies of wild-caught Aaa from North America and Southeast Asia. Using the Pacific Biosciences HiFi sequencing platform combined with HiC sequencing, we achieved high continuity (N50: >400 Mb; L50: 2) and completeness (BUSCO Single-copy: approximately 97%; diptera set). These assemblies will contribute to further elucidate the global genetic diversity of this major disease vector and uncover the genetic basis of phenotypic differences between the sub-species.

GRANTS AWARDED:

TRACY ZARRILLO Mapping and Monitoring At-Risk Bees: Species of Greatest Conservation Need (SGCN) and State Assessment Priority Species (SAPS) in Connecticut, John T. and Jane A. Wiederhold Foundation, a supporting organization of the Northwest CT Community Foundation, Dr. Kelsey Fisher, \$34,600.

Native wild bees are vital pollinators of wild plants and agricultural crops, yet many species are declining or remain data deficient. In CT, 9 bee species are listed as SGCN and 39 are designated as SAPS, including 31 pollen specialists with specific host-plant associations. Surveying and monitoring these bee species are essential for understanding their abundance and distribution, identifying threats, and guiding targeted, science-based conservation actions. Among CT's native bees, *Bombus terricola* is of particular conservation concern. This species has declined by 49.94% across its historic range in the northeastern and upper midwestern US. Once widespread across six of CT's eight counties, *B. terricola* went undetected from 2009 until its rediscovery in Litchfield County in 2018. Since then, detections have been limited to eight towns in the northwest corner of the state. Documenting its persistence and potential range expansion is essential for understanding its recovery trajectory and informing management strategies.



Bowling to celebrate
the conclusion of a
~3 year project!
Thanks to all the
people who made
this research
possible! 🐝



Celebration at Norwich Bowling and Entertainment Center to commemorate the end of the research project titled “Assessing plant and pollinator response to practices installed through the New England Pollinator Partnership in Rhode Island and Connecticut”. **Left to right, top row:** Connor Grace, David Mantack, Tracy Zarrillo, Kelsey Fisher, Fiona Dellantonio, Ren Johnson, Aidan Castricone; **bottom row:** Emma Tondre, Casey Johnson, Rachel Bonoan, and Kate Perzanowski.

ENVIRONMENTAL SCIENCE AND FORESTRY

SCOTT C. WILLIAMS, PH.D. met with scientists from USDA Agricultural Research Service (ARS) regarding a potential, collaborative, host-targeted tick management research opportunity (April 1); participated in a meeting with scientists from USDA ARS, White Buffalo, Inc., Genesis Laboratories, Inc., the State of Massachusetts Division of Fisheries and Wildlife, as well as the Universities of Massachusetts and Rhode Island under the umbrella of the Centers for Disease Control and Prevention-funded New England Center for Excellence in Vector-Borne Diseases regarding a potential collaborative integrated tick management research opportunity (April 2); as a Governor Lamont-appointed member with expertise in the field of ecology, participated in the regular meeting of the State of Connecticut Siting Council (April 2); chaired the evening meeting of the Town of Guilford's Land Acquisition Commission (April 2); as Northeast Section Representative, participated in a meeting of the Professional Certification Review Board of The Wildlife Society (April 3); participated in an evidentiary hearing of the State of Connecticut Siting Council (April 7); along with **NATALIE BAILEY, JESSICA BROWN, PH.D.** and **MEGAN LINSKE, PH.D.**, attended a site visit at the East Haddam Fishing and Game Club with Julie Michaelson from The Xerces Society to learn more about pollinator habitats (April 8); as a sitting commissioner, participated in the evening meeting of The Town of Guilford's Inland Wetlands Commission (April 8); participated in an afternoon and evening evidentiary hearing of the State of Connecticut Siting Council (April 9); participated in an Office of Aquatic Invasive Species Zoom call with State Representatives Renee LaMark Muir (Chester, Deep River, Essex, Haddam) and John-Michael Parker (Durham, Madison) regarding emergency response legislation for CT River hydrilla management in Connecticut waterbodies (April 13); met with Yale University Ecology and Evolutionary Biology Professor Dr. Vanessa Ezenwa and her Ph.D. student Isaac Osew regarding collaborative research in vector-borne pathogens (April 14); participated in an afternoon evidentiary hearing of the State of Connecticut Siting Council (April 14); participated in the regular meeting of the State of Connecticut Siting Council (April 16); as the Inland Wetlands Commission representative, participated in the late afternoon meeting the Town of Guilford's Conservation Commission's Lake Quonnipaug lake management subcommittee (April 21); as a sitting commissioner, participated in the evening meeting the Town of Guilford's Conservation Commission (April 21); participated in an afternoon and evening evidentiary hearing of the State of Connecticut Siting Council (April 23); with **MEGAN LINSKE, PH.D.**, interviewed by Michael Stobbe and Mary Conlon of the Associated Press "[Tick season seems to be off to a fast start, and some experts worry about future illnesses](#)" (April 24); participated in the internal CAES collaborative meeting of the Office of Forest Health led by **ELISABETH WARD, PH.D.** (April 28); participated in an afternoon evidentiary hearing of the State of Connecticut Siting Council (April 28); participated in the regular meeting of the State of Connecticut Siting Council (April 30).

NATALIE BAILEY participated in a Zoom call with BanfieldBio Inc. to discuss the development and field testing of a novel botanical acaricide (April 7, 21); presented a lecture alongside **JESSICA BROWN, PH.D.** on tick ecology and control as part of the Glastonbury Partners in Planning semiannual meeting (52 attendees) (April 13); participated in a collaborative Zoom call with members of the Banfield Biologic NIH SBIR-funded tick repellent fabric team (April 14, 28); met with collaborators from Columbia University via Zoom to discuss the design of an online survey aimed at quantifying homeowner knowledge and behaviors regarding tick control (April 22).

JOSEPH P. BARSKY participated in the 2026 White Oak Initiative Researchers' Roundtable (April 8); participated, as chair, in the 2027 Society of American Foresters Regional Leadership Academy Planning Committee Meeting (April 22); completed the Interagency Aviation Training A-110 "Transportation of Hazardous Materials" course (April 24).

JESSICA E. BROWN, PH.D. as an invited speaker, presented lecture titled “Ticks of Connecticut: Distribution, Control, and Prevention” at the annual meeting of the Glastonbury Partners in Planting group in Glastonbury, CT (52 attendees) (April 13); as a committee member, participated in a virtual meeting of The Wildlife Society’s Leadership Institute to discuss applicants for the 2026 class (April 16); participated in a virtual meeting with collaborators from Columbia University to discuss ongoing efforts to survey public attitudes toward acaricide use (April 22); presented a virtual guest lecture on vectors and vector-borne diseases to students and public health professionals as part of a co-sponsored educational initiative between Southern Connecticut State University and the Connecticut Department of Public Health (20 attendees) (April 29).

GREGORY J. BUGBEE gave a seminar entitled “Connecticut’s Invasive Aquatic Plants” at Three Rivers Community College (35 attendees) (April 8); participated in the CT DEEP Aquatic Invasive Species Task Force meeting (April 13); gave invited talk entitled “Improving Soil in the Home Garden” to the Chester Garden Club at the United Congregational Church in Chester (30 attendees) (April 14); co-chaired a meeting of the Northeast Aquatic Nuisance Species Panel (April 21); gave invited talk entitled “Aquatic Plant Management Options for West Lake in Guilford” to a consortium on lake associations at the Guilford Community Center (50 attendees) (April 22); participated in the Connecticut Invasive Plant Working Group Symposium Planning Committee (April 23); participated in the CT DEEP Natural Diversity Database review meeting (April 24).

RILEY DOHERTY participated in the Project Delivery Team meeting with the US Army Corps of Engineers to discuss the CT River Hydrilla Demo Project (April 1); presented an aquatic invasive species identification workshop to potential DEEP State Parks seasonal employees at the Montville American Job Center with **GREG BUGBEE** (10 attendees) (April 2); presented at the Connecticut Federation of Lakes Annual Meeting about hydrilla rapid response, the CT AIS web app, and the US Army Corps of Engineers 50/50 cost share program (April 4); participated in a quarterly meeting with CT DEEP Boating and Fisheries to discuss aquatic invasive species issues in the state (60 attendees) (April 13); participated in a meeting with Representatives Renee LaMark Muir and John-Michael Parker to discuss the language of HB 5525 (April 13); participated in the Connecticut Federation of Lakes monthly board meeting (April 15); participated in the CAES Professional Development and Resources Committee meeting (April 20); attended the NDDDB Report Findings Forum in Hartford with **GREG BUGBEE** and **MADELINE WATTS** (April 24); participated in the US Army Corps of Engineers Aquatic Plant Control Cost Share Program planning meeting (April 27).

JEREMIAH R. FOLEY, IV, PH.D. met with Michael Rossi, Ph.D. Professor Emeritus of Biology and Environmental Science at the University of New Haven (UNH), to discuss a potential teaching opportunity in UNH’s prison education program focusing on native versus invasive plants at the Danbury Federal Correctional Institute (April 2); met with Ph.D. student Ellie Loew to discuss a proposed project focused on the ecophysiology of the Connecticut River hydrilla ecotype, including carbon pool exploitation and ecosystem cycling impacts (April 10); gave a condensed lecture and assisted in the setup of ecocolumns with students at Cooperative Arts & Humanities High School as they prepared for the New Haven Science Fair and developed ecosystem museums (15 students) (April 22); gave an aquatic invasive species lecture to biology students at Tunxis Community College (12 attendees) (April 24).

JACK HATAJIK presented an invited talk on forest inventory results and management recommendations at the Flanders Nature Center & Land Trust Annual Meeting (Woodbury, CT, 50 attendees) (April 8); participated in a community workday to establish deer fencing in urban natural areas affected by Beech Leaf Disease with **ELISABETH WARD, PH.D.**, **ANNA WIX**, Annie Mixsell (Tree System Coordinator/Tree Warden for the City of New Haven Parks Department), Danica Doroski, Ph.D. (Urban Forestry Coordinator for CT DEEP), Chris Ozyck (Urban Resources Initiative), and volunteers from Friends of Edgewood Park at Edgewood Park in New Haven, CT (April 14); led the monthly Society for Ecological Restoration – Northeast Chapter (SER-NE) Emerging Professionals Committee Meeting (April 14); led an introductory spring ephemeral and understory plant identification field walk for Yale School of the Environment graduate students at East Rock Park in New

Haven, CT (10 attendees) (April 16); participated in a community workday to establish deer fencing in urban natural areas affected by Beech Leaf Disease with **ELISABETH WARD, PH.D. JOSEPH P. BARSKY, ANNA WIX**, Annie Mixsell (Tree System Coordinator/Tree Warden for the City of New Haven Parks Department), Chris Ozyck (Urban Resources Initiative), Marlyse Duguid, Ph.D. and students from her Ecological Restoration class (Yale School of the Environment), and volunteers from Friends of East Rock Park at East Rock Park in New Haven, CT (April 18); participated in the monthly SER-NE Communications Committee Meeting (April 22); presented updates at the monthly SER-NE Executive Board Meeting (April 28).

SUSANNA KERIÖ, D.SC. attended calls to discuss a grant application on urban tree health with Roz Remsen (April 2, 9), Grant Thompson, Ph.D. (April 9), Zane Raudenbush (April 9, 30), and William Ayersman (Davey Resource Group) (April 30); collaborated to establish a butternut common garden experiment with 100 butternuts and hybrids at Lockwood Farm with **RICHARD CECARELLI**, Elena Karlsen-Ayala, Ph.D. (USFS Northern Research Station), and graduate student Dylan Ridle (Purdue Forestry and Natural Resources, Hardwood Tree Improvement and Regeneration Center) (April 15); attended a call with **ELISABETH WARD, PH.D.**, Isabel Munck, Ph.D. and Elena Karlsen-Ayala, Ph.D. (USFS Northern Research Station), and Deni Rangelova (American Chestnut Foundation) to discuss collaboration on chestnut regeneration (April 22).

ELISABETH WARD, PH.D. met with collaborators at Great Mountain Forest and Yale School of the Environment (YSE) to discuss project assessing impacts of beech leaf disease on forest carbon dynamics (April 2); appointed to an Associate Research Scientist position by the faculty at Yale School of the Environment (April 6); participated in the monthly Forest Ecosystem Monitoring Cooperative state coordinators meeting (April 9); organized and led community work days with Friends of Edgewood Park (18 participants) (April 14) and Friends of East Rock Park (20 participants) (April 18) for a project investigating different management practices to improve forest health in response to beech leaf disease along with **JACK HATAJIK, ANNA WIX, JOSEPH P. BARSKY**, and collaborators from YSE, City of New Haven Parks Department, YSE's Urban Resources Initiative, and the CT Department of Energy and Environmental Protection; met with collaborators from USDA Forest Service (April 15) and the Yale Center for Geospatial Solutions (April 24) to discuss remote sensing products to map regional declines in forest productivity from beech leaf disease; organized and led the biannual CAES Office of Forest Health meeting (April 28); interviewed by the Westport Journal about beech leaf disease (April 30).

MADELINE WATTS met with collaborators at the University of Florida Center for Aquatic and Invasive Plants and US Army Corps of Engineers, Engineering Research and Development Center to discuss collaborative research projects (April 1); attended a study review forum for CT DEEP Natural Diversity Database focused on how to streamline the oversight process (April 24).

SUMMER WEIDMAN gave an aquatic plant identification workshop at the Connecticut Federation of Lakes annual meeting in Bristol (40 attendees) (April 4); participated in the virtual Aquatic Invasive Species quarterly meeting with CT DEEP (April 13); gave a presentation entitled "Multi-Scale Remote Sensing Modeling for Hydrilla Detection: Integrating Mesocosms, UAV, and Satellite Imagery" as part of the CAES Seminar Series in Jones Auditorium (April 15); spoke to first grade students with Mayor Dorinda Borer at Washington Elementary School and Mackrille Elementary School about Earth Day and protecting our lakes and ponds (80 students) (April 20); chaired the virtual meeting of the Guilford Conservation Commission Lake Quonnipaug Subcommittee (April 21); participated virtually in the North American Lake Management Society planning committee meeting for the 2027 annual conference (April 22); gave a presentation entitled "Successful Control of Four Invasive Aquatic Plants in Lake Quonnipaug" at the Guilford Library (30 attendees) (April 23); gave an aquatic plant identification workshop to biology students at the Tunxis Community College (12 attendees) (April 24); attended the spring CAES Board of Control meeting to discuss a student in STEM program (April 29); participated in virtual meetings with the US Army Corps of Engineers to discuss CT River hydrilla projects (April 1, 2, 8, 27); participated in CAES accessibility and web modernization meetings (April 1, 7, 10, 22, 30).

LEIGH J. WHITTINGHILL, PH.D. attended the CT Council on Soil and Water Conservation quarterly meeting and gave updates on CAES activities (April 1); met with the CAES Website Accessibility Committee to discuss which websites can be archived (April 7); attended the CAES DEI committee meeting (April 20); judged the Sigma Xi Student Research Conference at Quinnipiac University (April 21); presented talk “Monitoring Urban Farm Nutrient and Irrigation Use Efficiency: A Pilot Project” at the CAES seminar series (50 attendees) (April 29); met with the CAES Website Accessibility committee to discuss next steps for pdf remediation through the extended accessibility deadline (April 30).



It is always exciting to watch spring ephemerals emerge after the snow has melted such as bloodroot (*Sanguinaria canadensis*) and Dutchman's breeches (*Dicentra cucullaria*) as documented by Jack Hatajik.

PLANT PATHOLOGY & ECOLOGY

ROBERT MARRA, PH.D. presented a talk on ecology of fungi in forests at the Simsbury Public Library (23 adults) (April 28); participated in the monthly meeting of Divisional Forum Representatives of the American Phytopathological Society, via Zoom (10 adults) (April 29)

YONGHAO LI, PH.D. presented “Selection and Care of Houseplants” to Village Garden Club in Wethersfield (April 1, 10 adults); instructed “Phytophthora Bleeding Canker” for the CTPA Arboriculture 101 review night (April 9, 30 adults); presented “Spring and Summer Gardening Tips” Cromwell Senior Center (April 10, 17 adults); presented “Container Gardening” to Brookfield Garden Club (April 16, 15 adults); discussed “Vegetable Gardening Tips” with Hamden Community Garden members (April 18, 7 adults).

FELICIA MILLETT participated in the NEPDN monthly meeting (13 adults) (April 9); led a discussion on Diseases of Trees at CTPA Arboriculture 101’s Review Night (27 adults) (April 9); participated in the NPDN Professional Development Committee monthly meeting (10 adults) (April 16); and presented “Growing Annuals from Seed” for the Perennial Planters of Manchester Garden Club (13 adults) (April 20).

QUAN ZENG, PH.D. Himanshi Jayasinghe gave a presentation entitled “Impact of agricultural streptomycin use on bumble bee health and gut microbiome” at the Plant Science and Landscape Architecture Series (March 27) at University of Connecticut (~40 attendees); **Naziya Nabi** gave a presentation entitled “Identifying a fire blight-resistant apple cultivar and efforts to investigate the resistance mechanism.” at the Plant Science and Landscape Architecture Series (April 10) at University of Connecticut (~40 attendees); **Jewell Jung** gave a presentation entitled “” at the Plant Science and Landscape Architecture Series (date) at University of Connecticut (~40 attendees)

PUBLICATIONS:

1. Tatianne Alves, Ana Paula de Moura, Jarlan Silva, Vitória Souza, Silvan Silva Filho, Juliano Fernandes, Diogo Araújo, Luiz Evangelista, Vanuza Ávila Filha, **Washington da Silva**, Márcia Ambrósio. Integrated use of bacteria and microbial metabolites for management of soil-borne root rot in melon. *Eur J Plant Pathol* (2026). <https://doi.org/10.1007/s10658-026-03209-2>

Abstract: This study evaluated sustainable biocontrol strategies for managing soil-borne pathogens in melon (*Cucumis melo* L.) production using bacterial consortia, *Trichoderma* spp., and microbial metabolites. Following a greenhouse pilot, a randomized field trial tested six treatments across two cycles, measuring plant growth, disease severity, yield, and soil enzyme activity. Results showed that treatments **T1** and **T4** (integrated consortia and metabolites) reduced disease severity by **50%** compared to the control. Notably, **T4** significantly improved soil health—evidenced by increased β -glucosidase, arylsulfatase, and acid phosphatase activity—while yielding **3.5 fruits per plant**. These findings suggest that integrated microbial consortia and metabolites are viable, effective alternatives to conventional chemical management.

2. Wilanyi R Alvarez Reyes, Rima Jamous, Juliana Milagres, Rania El-Tanbouly, Raja Muthuramalingam Thangavelu, Vivian E Ferry, **Washington da Silva**, Christy L Haynes. dsRNA-Loaded Silica Nanoparticles for the Management of Potato Virus Y in Potato Plants. *ACS Nano* 2026, 20, 13, 10429–10441. <https://doi.org/10.1021/acsnano.5c19462>

Abstract: Food insecurity is a prominent global issue. With a predicted global population of 9 billion by 2050, food production must double at a minimum to accommodate these growing numbers. One approach to combat food insecurity is targeting plant pathogens that affect crop quality and yield, resulting in an overall increase in edible food production. Plant pathogen management has previously utilized the RNA interference (RNAi)

mechanism for remediation; however, its widespread use has technical limitations. In this study, silica nanoparticles (SiO₂ NPs) were utilized as nanocarriers of therapeutic double-stranded ribonucleic acid (dsRNA) to enhance dsRNA delivery into plant cells, thereby activating the RNAi system and suppressing the occurrence of potato virus Y (PVY). This highly mutable pathogen causes several adverse effects in potato and other crop plants. Fast-dissolving silica (FDS) nanoparticles, mesoporous silica nanoparticles (MSNs), and ultraporous mesostructured silica nanoparticles (UMNs) with negative and positive surface charges were synthesized. After thorough characterization, nine distinct SiO₂ NP formulations were loaded with dsRNA, with UMNs showing the best loading capacity. Due to the negatively charged nature of dsRNA, positively charged UMNs were favored and employed in further application experiments. Gel electrophoresis indicated that dsRNA loaded into/onto these UMNs was released over several days. Fifteen days after inoculation, greenhouse experiments with tobacco plants demonstrated that dsRNA-loaded UMNs effectively suppressed PVY. In a field study, dsRNA loaded into/onto UMNs showed a 0% disease incidence, an improvement compared to dsRNA or nanoparticle application alone. These findings reveal that UMNs are an efficient nanocarrier for delivering dsRNA against PVY, thereby increasing crop health and yield. A techno-economic analysis was performed to evaluate the economic viability of this nanomaterial for industrial commercialization.

3. Jarlan Lucas dos Santos Silva, Elisandra Alves Bento, Ana Paula de Moura, Tatianne Raianne Costa Alves, Igor Vinícius Pereira da Silva, Vitória Maria Gomes Souza, Vanuza Maria Ávila Filha, Jemerson Williami Silva Ribeiro, **Washington Luís da Silva**, Márcia Michelle de Queiroz Ambrósio. Characterization and Aggressiveness of *Fusarium* spp. Associated with Root and Stem Rot in Carica papaya in Northeast Brazil. Plant Disease (2026). <https://doi.org/10.1094/PDIS-02-25-0400-RE>

Abstract: In the past 5 years, papaya farmers in northeastern Brazil have been reporting major losses in fruit production, up to 50% in some years, because of diseases caused by soilborne pathogens. To diagnose the causal agents of this disease's complex in the region (root and stem rots), we collected root and stem samples from papaya plants in commercial fields exhibiting yellowing, wilting, and plant collapse. Fifteen *Fusarium* isolates were obtained from six production areas sampled, and Koch's postulates were carried out to confirm the pathogenicity of these isolates. Five species were identified causing this disease in the region: *F. falciforme* (*F. solani* species complex [FSSC] 3 + 4), *F. petroliphilum* (FSSC 1), *F. pernambucanum* (*F. incarnatum-equiseti* species complex [FIESC] 17), *F. sulawesiense* (FIESC 16), and *F. delphinoides* (*F. dimerum* species complex). Among these species, the

most aggressive was *F. delphinoides* followed by *F. pernambucanum*, *F. falciforme*, and *F. petroliphilum*, and the least aggressive was *F. sulawesiense*. Our findings will aid the development of strategies to manage these disease complexes to help farmers reduce the damage caused by these pathogens in papaya in Brazil and other papaya production areas in the world.

4. Raja muthuramalingam Thangavelu, Sarah Gray, Binlin Wu, Richard A Pellegrino, **Washington da Silva**, **Nubia Zuverza-Mena**, **Christian Dimkpa**, **Jason C White**. Lignin-derived carbon dots from leaf waste as sustainable plant sunscreens and UV-protective foliar coatings. Environ. Sci.: Nano, 2026. <https://doi.org/10.1039/D5EN01210D>

Abstract: Lignin-derived carbon dots made from leaf waste offer a sustainable tool for plant protection by converting agricultural residues into functional nanomaterials. High-purity lignin was extracted from Norway maple (*Acer platanoides*) leaves, and two classes of lignin carbon dots were synthesized by hydrothermal treatment at 200 °C (partially carbonized, pLCD-200) and 350 °C (fully carbonized, fLCD-350). Microscopy confirmed spherical nanoscale structures with mean diameters of 12.3 ± 3.8 nm for pLCD-200 and 9.3 ± 1.9 nm for fLCD-350, while zeta potential values of -13.7 and -19.9 mV indicated good colloidal stability. Spectroscopic analyses revealed distinct optical behaviors: pLCD-200 showed strong UV absorption (200–350 nm) and blue emission at 440–460 nm with excitation-dependent shifts, converting part of the absorbed UV light into photosynthetically active radiation (PAR). In contrast, fLCD-350 displayed broader UV-visible absorption and near-infrared emission around 710–730 nm with minimal excitation dependence. Under natural sunlight, pLCD-

200 exhibited emission decay consistent with first-order kinetics ($k \approx 0.010 \text{ h}^{-1}$; half-life ≈ 3 days), while fLCD-350 demonstrated persistent emission and gradual photo-brightening modeled by first-order association ($k_g \approx 0.002 \text{ h}^{-1}$; doubling time ≈ 15 days). FTIR confirmed that fLCD-350 stability arises from decarbonylation, ether bond cleavage, and condensation of aromatic domains into a carbonized core with few oxygen groups. Formulation with sodium alginate produced uniform films that retained strong leaf-surface fluorescence for at least 10 days outdoors, ensuring durable adhesion and UV shielding. Short-term photosynthesis measurements (0–48 h) and greenhouse growth assays with foliar exposure to pLCD and fLCD at 300 and 600 mg L⁻¹ revealed no adverse effects on photosystem function or plant development. These findings demonstrate that lignin carbon dots, particularly fLCD-350, are durable, optically versatile, and plant-compatible nanomaterials functioning as long-lasting sunscreens and UV-protective foliar coatings that convert harmful UV into photosynthetically useful light

5. Sundin, G.W., Castiblanco, L., **Zeng, Q.** (2026) Pathogenicity and virulence of *Erwinia amylovora*. **Virulence** 17(1) <https://doi.org/10.1080/21505594.2026.2664987>

Abstract: Fire blight, caused by the bacterial pathogen *Erwinia amylovora*, is the most significant global threat to commercial apple and pear production. Outbreaks resulting in flower infection cause yield losses accompanied by internal systemic spread of pathogen cells through trees that can lead to tree death in a single season. The type III secretion system and the exopolysaccharide (EPS) amylovoran are pathogenicity factors, and biofilm formation in leaf xylem is a critical virulence factor. We review our current knowledge of *E. amylovora* pathogenesis and how pathogenesis strategies intersect and facilitate systemic movement in the host. Fire blight management remains extremely difficult due to the high susceptibility of host plants and the aggressive virulence of the pathogen. We suggest that future management will rely on innovative strategies for resistance breeding or those that directly target bacterial populations and condition the host by eliciting a resistance response prior to pathogen arrival.

6. **Yonghao Li.** Cherry Leaf Spot. CAES Fact Sheet. 2026. <https://portal.ct.gov/-/media/caes/pdio/fact-sheets/cherry-leaf-spot-2026.pdf?rev=57c124bd0dd042218d602408cf1742da&hash=4266671BAF116CFB784501E46DA3FC46>
7. **Yonghao Li.** Rose Downy Mildew. CAES Fact Sheet. 2026. <https://portal.ct.gov/-/media/caes/pdio/fact-sheets/rose-downy-mildew-2026.pdf?rev=8e76d02da3fe4b728d314b32bb769534&hash=2B320237908D25875A50CE14A57714CB>

PERSONAL NEWS, SOCIAL EVENTS, VISITORS, AND NEW EQUIPMENT:

Thanks to all the CAES staff who served as judges in the 15th annual Quinnipiac Chapter of Sigma Xi Student Research Conference (April 21) at Quinnipiac University, Hamden, CT (~75 attendees). Analytical Chemistry; **ANUJA BHARADWAJ, PH.D.** Entomology; **CALEB RYAN, PH.D.** and **KELSEY FISHER, PH.D.:** Environmental Science and Forestry; **REBECCA JOHNSON, PH.D.** and **LEIGH WHITTINGHILL, PH.D.:** Plant Pathology & Ecology **RAVI PATEL, PH.D.** **RAQUEL ROCHA, PH.D.** and **NEIL SCHULTES, PH.D.**

VALLEY LABORATORY

JATINDER S AULAKH, PH.D. published (co-author) a popular article entitled “Multiple Herbicide-Resistant Horseweed (*Conyza canadensis* L.) in New York: Management Implications in Field Crops” in the Cornell Field Crop Blog “What is Cropping Up?” (April 21, 2026) and submitted a grant proposal entitled “Evaluation of New Herbicides for Weed control and Christmas Tree Safety” (April 29, 2026). Multiple Herbicide-Resistant Horseweed (*Conyza canadensis* L.) in New York: Management Implications in Field Crops. <https://blogs.cornell.edu/whatscroppingup/>

CAROLE CHEAH, PH.D. gave a presentation on hemlock woolly adelgid impacts and biological control strategy for the Master Woodlot Management Program run by Connecticut Forest and Parks Association on April 2 (33); met with private property owners in East Hampton (April 22) and North Torrington (April 27) to assess their hemlock stands for HWA biological control implementation.

ROSE HISKES led a Connecticut Invasive Plant Working Group (CIPWG) steering committee meeting on Zoom (April 1) (14 adults) and participated in a CIPWG Symposium Planning Committee meeting on Zoom (April 23) (8 adults)

JOURNAL ARTICLES APPROVED APRIL 2026

Kelly S. Aho, **Jeremiah R. Foley IV**, **Madeline R. Watts**, Sage Stockdale, Abby Beilman, and **Riley S. Doherty** An invasive macrophyte increase net heterotrophy and CO₂ production, while management strategies differentially affect carbon cycling and greenhouse gas production. *Limnology and Oceanography*.

R. S. Cowles The state of Christmas tree research in the United States. *The Real Tree Line*.

Ghribi, S.; Degli Esposti, L.; Steve, B.; **Zuverza-Mena, N.**; **Yuan, J.**; **White, J.C.**; Jais, D.P.; Adamiano, A.; Iafisco, M. Potassium-doped amorphous calcium phosphate nanoparticles functionalized with urea as a sustainable controlled-release NPK fertilizer. *ACS Applied Nano Materials*.

Uloma E. Onyeka, Eluchie Chioma, Anyanwu Blessing, **Carlos Tamez**, Sali A. Ndindeng, Kalimuthu Senthilkumar, and **Christian O. Dimkpa** Microbiological, Toxicological, and Chemical Safety Assessment of Germinated Brown Rice from Nigerian Paddy Cultivars. *Scientific African*.

Wang, W.; Xiao, Z.; **White, J.C.**; Kah, M.; Cao, X.; Yue, L.; Dai, Y.; Wang, C.; Zhang, L.; Ma, L.; Bai, Z.; Wang, X.; Rasmann, S.; Xing, B. Nano-agrochemical use in sustainable agriculture and environmental protection. *Nature Reviews Earth & Environment*.

Elisabeth B. Ward Promoting forest health in New Haven parks impacted by Beech leaf disease. *CAES Fact Sheet*.

Jing Yuan, **Jacquelyn C. LaReau**, **Doug E. Brackney**, **Blaire Steven** Adaptive Metagenomic Sequencing Resolves Complete Genomes from the Mosquito Microbiome: Mapping Bacterial Function to Larval Development. *ISME Host Microbe*.

Qiu-Yue Zhang, Yu-Han Cao, Hui Sun, Lin Zhou, Lin Huang, Yun-Hong Tan, **De-Wei Li***, Li-Hua Zhu* Two novel species of Symptoventuriaceae from palms in China. *MycoKeys*.

Zhu, Y.; Deng, X.; Wang, Q.; Song, H.; Wang, L.; Zhou, D.; Gardea-Torresdey, J.; **White, J.C.**; Zhao, L. SiO₂@CuO nanozyme boosts seed respiration to increase maize yield and promote soil health. *ACS Nano*.



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