

Station News

The Connecticut Agricultural Experiment Station

Volume 15 Issue 10 | October 2025



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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JASON C. WHITE, PH.D. along with **Drs. Sara Nason, Nubia Zuverza-Mena and Jingyi Zhou**, participated in a monthly Zoom call with collaborators at the University of Minnesota and Yale University to discuss joint PFAS research (September 2); was interviewed by Larry Rifkin for a story on CAES at 150 years (September 2); along with **Sudhir Sharma, Ph.D.** participated in a bimonthly Zoom meeting with collaborators at Columbia University to discuss joint USDA funded research (September 2); along with collaborators at the University of Minnesota and Convergent Bio, met with CT Innovations by Teams (September 3, 23); met by Teams with Paul Johnson to discuss agricultural research in Cuba (September 4); along with **Yi Wang, Ph.D.** met by Zoom with collaborators at LSU and the University of Aukland to discuss a joint USDA project (September 4); participated in a Zoom call with collaborators at Clemson University and Purdue University to discuss a joint research proposal (September 5, 12); hosted the monthly CAES j-visa recipient meeting (September 5); met by Zoom with collaborators at the University of Wisconsin and the University of Minnesota to discuss a joint USDA research proposal (September 5); along with **Terri Arsenault** attended by Teams the Laboratory Preparedness Advisory Council meeting (September 8); along with **CHRISTIAN DIMKPA, PH.D.** met by Zoom with collaborators at Stonybrook University and Johns Hopkins University to discuss a collaborative USDA research proposal (September 9); met by Teams with Professor Jorge Gardea-Torresdey to discuss a paper for the 60th anniversary of Environmental Science and Technology (September 9); met with Professor John Fortner of Yale University to discuss expanded collaborative research (September 9); met by Zoom with collaborators from Rutgers University to discuss a new joint research project (September 9); hosted several staff from Senator Chris Murphy's office and provided a tour and a description of CAES research programs (September 10); participated in an organization Teams meeting for the 2026 International Phytotechnologies Conference (September 11); met by Zoom with Dr. Timothy Duncan and Gordon Research Conference staff to discuss the 2026 Nanoscale Science and Engineering for Agriculture and Food Systems we are co-chairing (September 12, 19); participated in a Zoom call with collaborators at the University of Minnesota to discuss a collaborative PFAS phytoremediation project (September 12); along with **Megan Linske, Ph.D., Kelsey Fisher, Ph.D., PHIL ARMSTRONG, PH.D., Goudarz Molaei, Ph.D., and John Shepard** met with colleagues at the Yale Quantum Institute to discuss collaborative research (September 12); attended the NanoInnovation 2025 Conference and Exhibition in Rome Italy and gave an invited plenary talk entitled "Nano-enabled agriculture: A path to global food security in a changing climate" (September 14-17); met with collaborators at Convergent Bio to discuss joint projects (September 18); along with **Yingxue Yu, Ph.D. and Yi Wang, Ph.D.** met with colleagues at the University of Rhode Island to discuss a collaborative USDA research proposal (September 19); along with **Yi Wang, Ph.D.** met with colleagues at Baylor University and McGill University to discuss a collaborative USDA research proposal (September 19); hosted Prof. Rahul Bhattacharyya and Dr. Fatima Villa Gonzalez of MIT for a Lockwood lecture and discussion of future collaborative research projects (September 22-23); met with NIH staff concerning service on an upcoming study

section (September 24); met with collaborators at Auburn University, Clemson University and Johns Hopkins University to discuss a joint research project (September 25); along with **Sudhir Sharma, Ph.D.** met by Zoom with collaborators at the University of Massachusetts Amherst to discuss a joint research project (September 29); testified in front the Environment Committee at the Legislative Office Building on the impacts of changes in federal funding on CAES operations (September 29); hosted the CAES quarterly Safety Committee meeting (September 30); met by Zoom with colleagues from the University of Tennessee to discuss collaborative research (September 30).

PUBLICATIONS:

1. Tao, X., Lin, X., Lin, M., White, J.C., Li, Z., Wu, X., Hou, J., Liu, Y., Qin, Z., Xu, J., Yang, K., Lin, D. (2025). A nanoplatform for enhancing maize growth through controlled P delivery in P-deficient soils. *Environ. Sci. Technol.* DOI: [10.1021/acs.est.5c09016](https://doi.org/10.1021/acs.est.5c09016)

Abstract: Nano-enabled phosphorus fertilizers exhibit controlled release profiles that have the potential to dramatically improve phosphorus utilization efficiency (PUE) and mitigate environmental damage caused by P loss. However, their ability to promote crop growth compared to conventional formulations remains a topic of concern. Their effectiveness is particularly evident in acidic soils, but efficacy under alkaline conditions is more limited, thus restricting their wide application. Herein, a pH-resilient P-delivery nanoplatform (PDN) was constructed utilizing a nanoscale magnesium phosphate (nMgP)-supported iron-based layer double hydroxide (green rust) nanocomposite. Efficacy of the PDN was investigated with maize grown in P-deficient soils across a wide pH range of 4.9 to 8.5. Soil-applied PDN (180 mg P/kg soil) significantly enhanced maize photosynthesis by 122.3-126.3% and fresh biomass by 2.2-2.5 times compared to the control, while enhancing agronomic efficacy (AE) by 21.1-39.3% compared to conventional P fertilizers (CPFs). Importantly, lower doses of PDN (45-90 mg P/kg soil) could also improve maize growth as effectively as CPFs, enhancing PUE by 1.6-2.0 times and AE by 159.8-189.5%. Mechanistically, PDN sustainably and efficiently delivered available P species into the maize rhizosphere from nMgP and green rust, simultaneously reducing P loss and ultimately facilitating P uptake by maize plants. In addition, PDN enriched plant-beneficial bacteria, including *Arthobacter*, *Allorhizobium-Neorhizobium-Pararhizobium-Rhizobium*, *Sinomonas*, and *Sphingomoas*, contributing to enhanced maize growth. This work presents a new strategy for designing nanomaterials as P-delivery platforms to optimize PUE in crop production and promotes the continued development of sustainable nano-enabled agriculture.

2. Sun, X., Liu, S., Tang, C., Zhou, J., Jiang, Z., Dong, C., Luo, Y., Gee, T., White, J.C., Yu, B., Li, Y. (2025). Nanozeolite-coupled biochar-based phosphorus fertilizer decreases soil N₂O emissions in a subtropical Moso bamboo forest. *J. Environ. Manage.* 394: 127430.

Abstract: A novel nanozeolite-coupled biochar-based phosphorus fertilizer (NBP), synthesized by amalgamating nanozeolite particles with biochar and P nutrients, exhibited significant potential for enhancing P utilization efficiency and plant growth. However, the impact of these nanofertilizers on soil N₂O emissions as well as the underlying processes have not been fully elucidated within subtropical forest ecosystems. Here, the effects of varying NBP application rates (450, 900 and 1350 kg ha⁻¹) on soil characteristics and N₂O effluxes in a subtropical Moso bamboo forest over 12 months was investigated. The application of NBP led to a considerable reduction ($P < 0.05$) in soil N₂O emissions, with higher doses yielding greater reductions. Notably, the NBP treatments exerted no notable influence on the soil

temperature at a depth of 5 cm, nor was a strong correlation detected between N₂O effluxes and the soil water content. However, NBP amendment significantly enhanced the concentration of water-soluble organic carbon (WSOC) while decreasing the soil NH₄⁺-N, NO₃⁻-N and water-soluble organic nitrogen (WSON) pool sizes. Furthermore, the NBP reduced the activities of key nitrogen-cycling enzymes, including urease, protease, and nitrite reductase. Across all treatments the soil N₂O efflux exhibited significant positive correlations ($P < 0.01$) with the NH₄⁺-N, NO₃⁻-N and WSON concentrations, along with the urease, protease, and nitrite reductase activities, as well as the WSOC and microbial biomass carbon (MBC) concentrations. Structural equation modeling revealed that the reduction in N₂O emissions following the application of NBP was primarily driven by decreases in NH₄⁺-N and NO₃⁻-N concentrations and the inhibition of N-cycling enzyme activities. These findings demonstrate that NBP effectively mitigated soil N₂O effluxes in subtropical bamboo forests by reducing the pool sizes of labile N forms and suppressing the activities of enzymes related to N-cycling. These findings highlight NBP's potential to reduce N₂O emissions in subtropical forests, supporting climate change mitigation strategies and sustainable soil management.

3. Meselhy, A.G., Mosa, K.A., Chhikara, S., Kumar, K., Musante, C., White, J.C., Parkash Dhankher, O. (2025). Unraveling the role of OsPIP1;3 in arsenic transport in rice (*Oryza sativa* L.). *Phys. Molec. Biol. Plants*. DOI: [10.1007/s12298-025-01657-4](https://doi.org/10.1007/s12298-025-01657-4).

Abstract: Rice is the main diet for more than half of the world's population; thus, it gains special interest to ensure it is safe for consumption. Growing rice, especially in flooded paddy fields where the soil or irrigation water is contaminated with Arsenic (As) favors rice to accumulate it in biomass and edible grains. Thus, rice is the primary source of dietary As contamination, which is a major health hazard. Understanding the mechanism of As uptake and developing approaches to restrict the movement of As from soil to different plant tissues are necessary to limit As accumulation in rice. This study investigates the role of rice plasma membrane intrinsic protein, OsPIP1;3, in As transport and translocation from root to shoot in rice. Suppression of *OsPIP1;3* expression using RNAi (Ri) technology decreases As accumulation in the shoots of transgenic OsPIP1;3 Ri plants by (45.3–45.6%), with no noticeable effect on root arsenic levels. In contrast, constitutive overexpressing (OE) *OsPIP1;3* increased As in shoots of rice seedlings by 8–29%, with no significant change in root As content compared with WT. At the maturity stage, OsPIP1;3 Ri plants accumulated (29–36%) and (5–21%) less As in shoot and flag leaves, respectively, while grains show a slight reduction. Similar to the seedling stages, OsPIP1;3 OE mature plants accumulated significantly high As levels in their shoots, flag leaves, and grains compared to WT. Together, these results suggest that OsPIP1;3 contribute to As transport from root to shoot in rice. This finding could add to the current knowledge of As transporters, which are collectively considered a major genetic source for manipulation to reduce As accumulation in rice and other food crops for improved human and environmental health.

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Thank you to the CAES Board of Control for this very special evening of celebrating 150 years of research.

"A century and a half of serving the citizens of Connecticut! Guided by the principles of science, CAES continues to keep our agriculture, natural resources, and public health sustainable. With 'fierce cooperation,' CAES collaborates with other state agencies and partners in science for success and to keep Connecticut among the most vibrant and sustainable communities on our planet Earth."

Farmer Terry Jones, Vice President, CAES Board of Control

The 2025 Board of Control

- Governor Ned Lamont, *ex officio*
represented by Ms. Patti J. Maroney
- Commissioner of Agriculture Bryan Hurlburt
- Terry Jones of Shelton
- Joan Nichols of Lebanon
- Dr. Frederick M. Cohan, Wesleyan University
- Dr. Erol Fikrig, Yale University
- Dr. Kumar Venkitanarayanan, University of Connecticut
- CAES Director Dr. Jason C. White, *ex officio*

Special thank you to **Jones Family Farms** for the bottles of wine donated for the tables.



The Connecticut Agricultural Experiment Station

*150th Anniversary
Celebration Dinner
1875-2025*

Wednesday, September 24, 2025
New Haven Lawn Club
193 Whitney Avenue, New Haven, CT



Dan Wang joined CAES on September 21, 2025, as postdoctoral fellow, bringing a background in Resources and Environmental Science. She earned her bachelor's degree from the China Agricultural University and master's degree from Trinity College Dublin, where she focused on the pathogens and heavy metals in wastewater sludges. She went on to work in Veolia Water (Shanghai) Ltd. Co, where she worked as an operational support engineer for four years including internship. She then completed her Ph.D. in Environmental Science at Northwest Agriculture & Forestry University, China, focusing on the effect of DOM extracted from organic materials on the bioavailability of selenium. After her Ph.D., she secured a lecturer position at the China West Normal University from 2019 and became the director of the Basic Chemistry Teaching and Research Section at the College of Environmental Science and Engineering in 2024. At CAES, she is currently working on green Se NPs synthesis and application as fertilizers, as well as studying their transformation, efficiency and impact on plants.



PUBLICATIONS:

1. Pavlicevic, M., Rocha, R., Huntley, R., Vennapu, R. K., Morales-Acosta, M. D., Liquori, J., Zuverza-Mena, N., Dimkpa, C.O., White, J.C. (2026). Immune response of root-knot nematode-infected tomato is improved by biogenic copper nanoparticles. *Pesticide Biochemistry and Physiology*, 216, 106755. DOI: [10.1016/j.pestbp.2025.106755](https://doi.org/10.1016/j.pestbp.2025.106755)

Abstract: “Green” synthesized copper nanoparticles from hemp plant waste (Cu-G-NPs) identified as brochantite, together with chemically synthesized copper nanoparticles (Cu-C-NPs), and copper sulfate (CuSO₄) were tested as foliar spray against *Meloidogyne incognita* in tomato (*Solanum lycopersicum*). The materials were evaluated in two separate greenhouse experiments designed to assess their effectiveness at the different temperatures: one under warmer growth conditions and another stimulating cold stress. In both experiments treatments were applied at 200 mg/L of Cu and effects were assessed over a 45-day-period. Cu-G-NPs decreased nematode egg numbers by 41 % (significantly more than CuSO₄ (35 %) and Cu-C-NPs (20 %)) and the number of galls by 38 % (significantly more than Cu-C-NP (24 %) and comparable to CuSO₄ (43 %)). In treatments with Cu-G-NPs, plants had a lower content of malondialdehyde (41 % decrease, compared to 25 % and 28 % decreases with Cu-C-NPs and CuSO₄, respectively) compared to infected control plants. Addition of Cu-G-NPs modulated



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hormonal response in the plants, by upregulating ethylene biosynthesis in leaves and down-regulating salicylic acid-mediated response in roots. The presence of bioactive compounds, such as amines, carboxylic acids, esters, and sterols, on the surface of Cu-G-NPs (as determined using attenuated total reflectance Fourier-transform infrared spectroscopy) increased their effectiveness when compared to Cu-C-NPs and CuSO₄.



PHILIP ARMSTRONG, SC.D. gave course lectures on mosquito-borne viruses at SCSU and CCSU as a part of the NEVBD TEC grant (September 15 and 22); lectured on surveillance of vector borne diseases for a course at the Yale School of Public Health (September 30); was interviewed by a reporter from CT Public on the Connecticut Mosquito Surveillance Program (September 5).

ANGELA BRANSFIELD joined a TUSM Global Health seminar titled "Department of Defense Overseas Research Laboratories: Supporting Global Health, Biopreparedness, and Force Health Protection" (September 17); participated via Zoom in Yale University's Biosafety Committee meeting (September 18); and took part in NIH's Strengthening and Modernizing Biosafety Oversight: Region 1 Listening Session (September 30).

MEGAN LINSKE, PH.D. gave an invited presentation with Dr. Scott Williams (Department of Environmental Science and Forestry) titled "Integrated Tick Management in a Residential Setting" to the Centers for Disease Control and Prevention Division of Vector borne Diseases Lab Team meeting (Sept 16); hosted the first session of the EmpowHer: Girls in STEM program as Lead Facilitator with members of the University of New Haven Women in STEM Program (Sept 27); gave an invited lecture for a Central Connecticut State University graduate seminar titled "Tick Biology, Ecology, and Behavior" (Sept 29); was interviewed with Melissa George (Women and Family Life Center) by Aaron Rubin (Guilford Courier) about the new EmpowHer: Girls in STEM program (Sept 30).

GOUDARZ MOLAEI, PH.D. Lectured topics on vector-borne diseases at SCSU and CCSU as part of the CAES responsibility for the CDC NEVBD TEC grant to train the next generation of vector-borne disease experts (September 3 and 15); met with the CAES scientists and Yale Faculty, Victor S. Batista and Kenneth Skinner, to discuss potential collaborations on safer AI-pesticide discovery/reformulations and testing (September 12); met with Dr. Henry Feder to discuss progress on the joint CAES-UConn project on tick-bite (and tick-borne diseases) outcomes among Connecticut residents (September 18); attended the Monthly National Longhorned Tick (*Haemaphysalis longicornis*) meeting, provided the CT State report, and participated in the discussion (September 22); attended the Federal Accessibility Mandate for Digital Applications meeting to make sure that the CAES Tick Testing Laboratory (TTL) website is in compliance with the federal mandate (September 22); met with Dr. Paul Wolujewicz of Quinnipiac University to discuss and coordinate the second phase of the Nanopore Sequencing project (September 26); hosted a visit by Dr. Martina Dal Bello of the Yale Department of Ecology and Evolutionary Biology to discuss research and services (September 26); and attended the Global Consortium on Climate and Health Education at the World Health Organization (WHO) EMRO region to plan a training course on climate change and public health (including vector-borne diseases) in 2026 (September 27).

JACOB RICKER was interviewed by Anthony Carpino, NBC30 regarding potential seasonal increases to nuisance wasp populations in Fall and spotted lanternfly (September 8); attended a virtual meeting with CT Invasive Plant Working Group regarding invasive statutes and enforcement (September 10); participated as secretary-treasurer in the Eastern Plant Board's bimonthly meeting (September 18); interviewed by Paul Bass, New Haven Independent concerning issues related to spotted lanternfly (September 30).

GALE E. RIDGE, PH.D. was interviewed by Mark Sudol News 12 about spotted lanternflies and their currently high populations (September 2); attended NAISMA inaugural invasive upcycling summit (September 2); studio interview with Dennis House, WTNH TV Channel 8 about wasps and hornets in Connecticut (September 8); interviewed by Kiara Smith Channel 8 TV on yellowjackets (September 9); interviewed by Stephen Underwood,

Hartford Courant about Chagas Disease, the sylvatic reservoirs, and vectors in the United States; interviewed by Jayden Nguyen, Hearst Media about yellowjackets (September 11); met with Amity Regional Schools staff about establishing a STEM program for girls (September 11); interviewed by NBC News about the spotted lanternfly (September 16); worked at the Big -E in the Connecticut House with the Experiment Station exhibit (September 16); interviewed by Jayden Nguyen for the CT insider about Chagas disease and its vectors (September 17); interviewed by Daniel Rosenberg, Hurst Connecticut news about the spotted lanternfly (September 18); interviewed by Donna Christopher from the Redding Sentinel about spotted lanternflies (September 19); live WNPR studio show interview with Catherine Shen on “Where We Live,” about the spotted lanternfly (September 22); played piano for the Station’s 150th dinner at the Yale Lawn Club (September 24); interviewed by Stephen Underwood, Hartford Courant about yellowjackets (September 25); interviewed by Mark Sudol, Channel 12 TV, on yellowjackets (September 29); And interviewed by Kiara Smith WTNH TV about spotted lanternfly egg masses.

JOHN SHEPARD participated in an online meeting for the Board of Directors of the North-eastern Mosquito Control Association (September 10) with other CAES staff, met with representatives from Yale University to discuss potential collaborations to develop and evaluate effective and safer pesticide formulations (September 12); presented the invited lecture, “Mosquito Surveillance, Control, and Prevention of Mosquito-Borne Disease” to graduate and undergraduate students at Central Connecticut State University (September 22) (approx. 25 attendees)

KIRBY STAFFORD, PH.D. participated in a conference call with the tick management team for Cape Code, Nantucket Island, and Martha’s Vineyard at the request of Nathaniel Scott with Patrick Roden-Reynolds, Stephanie Borth, and Lea Hamner (September 30).

PAULA WOLF met with members of the Apiary Inspectors of America to prepare a three part training for Extension educators about the tropilaelaps mite. (September 11, 18 & 25th); participated in the September session of the Connecticut Beekeepers Association’s Bee Talks meeting, a monthly Q & A session for beekeepers discussing timely colony management issues (36 attendees, September 11); participated in the Connecticut Beekeepers Association’s Varroa Counts & Honey Stores Assessment Workshop (23 attendees, September 13); disseminated information about honey bees at the Experiment Station Booth in the Connecticut Building at the Big E (September 16); participated in the Apiary Inspectors of America virtual meeting (September 17); gave two invited talks about the importance of honey bees at the Beki Hebrew School (62 attendees, September 21); participated in a meeting with USDA officials and Apiary Inspectors to discuss response plans for swarms at ports (September 30); gave an invited talk about Invasive Honey Bee Pests to the Back Yard Beekeepers Association (55 attendees, September 30).

TRACY ZARRILLO attended a zoom meeting with Dr. Neil Cobb, Dr. Erica Fischer, Dr. Luc LeBlanc, Michael Veit, and Dr. James Hung to discuss a US wild bee biogeography project (September 3); attended a meeting with Dr. Neil Cobb, Dr. Brianne DuClos, Dr. Erika Tucker, and Cody Mathis to discuss an upcoming manuscript (September 10, 24); met with Dr. Kelsey Fisher, Dr. Sarah Lawson, and Caleb Bryan about collaborations and grant opportunities (September 12, 26); gave an invited talk titled “The Chestnut Bee, a Survival Story” at the NE2333 multistate hatch chestnut meeting in Cromwell, CT (September 16, ~40 adults); met with Casey Johnson and Emma Tondre of the University of Rhode Island to discuss the NRCS meadow project (September 26).

PUBLICATIONS:

1. Donahey, E. & Fisher, K. E. (2025). Efficacy of human-managed milkweed (*Asclepias* sp.) dispersal methods to support monarch butterfly (*Danaus plexippus*) conservation.

Abstract: Milkweed (*Asclepias* sp.) loss in the United States has contributed to a significant decline in the size of the monarch butterfly (*Danaus plexippus*) overwintering population in Mexico. To support monarch conservation, milkweed restoration efforts are underway. One hands-on and low-effort strategy that is often implemented by public groups is making and dispersing seed balls, which are made of clay, compost, and milkweed seeds. This “throw-and-go” strategy for seed dispersal is an accessible method that has caught a lot of traction; however, uncertainty remains on the efficacy and germination rates of milkweed seeds imbedded within seed balls.

This study assessed the impact of seed balls on milkweed germination rates in an incubator. In a seed tray, milkweed seed was planted for three dispersion methods: seed balls, seed paper, and bare seed. Each method contained either common (*Asclepias syriaca*) or butterfly milkweed (*Asclepias tuberosa*), with either stratified or unstratified seed. Common milkweed had a higher number of seeds to germinate per replicate for stratified than unstratified seeds. Bare seed and those in seed paper had higher germination rates than those in seed balls. Germination rates for stratified butterfly milkweed seeds were lower in seed balls compared to seed paper.

Implications for Insect Conservation: These results suggest that alternative hands-on methods of milkweed seed dispersal, like making seed paper, may be more germination-efficient to support monarch butterfly conservation than seed balls.

2. Khalil, N., Chang, A., Sandland, L., Feder, H. M. Jr, **Molaei, G.** (2025). A Case of Illness Following a Bite by a Male Lone Star Tick (*Amblyomma americanum* Linnaeus) Infected With *Ehrlichia* sp. and *Rickettsia amblyommatis* in Connecticut, United States. *Clin Case Rep.* 2025 13(9):e70825. DOI: [10.1002/ccr3.70825](https://doi.org/10.1002/ccr3.70825).

Abstract: The lone star tick (*Amblyomma americanum* Linnaeus) is a species commonly found in the southeastern U.S., but in recent years its populations have expanded northward, resulting in an increased risk of tick-borne pathogen transmission in the Northeast. We report a case of local lymphadenopathy and a flu-like illness in a Connecticut man, following a bite by a male lone star tick infected with *Ehrlichia* sp. and *Rickettsia amblyommatis*. It has been documented that *Ehrlichia* sp. can cause such illness; however, we cannot entirely rule out the potential involvement of *R. amblyommatis* as a co-conspirator. Our finding highlights the importance of changing dynamics of pathogen activities and its clinical ramifications in a region with pervasive populations of the blacklegged tick (deer tick, *Ixodes scapularis* Say) and the recently established presence of at least three non-native species, including the lone star tick. The case described here with a localized reaction and flu-like symptoms following a bite by a male lone star tick and subsequent evidence of infection in the tick vector with two unique aforementioned pathogens signifies the need for early detection and treatment of these particular diseases, especially when they have specific or unusual symptoms. These efforts that can be achieved through extensive tick and tick-borne pathogen surveillance programs will help to reduce possible health hazards, guide diagnosis and treatment, and improve our understanding of the clinical consequences of related illnesses.

3. Crawford, J. E., Balcazar, D., Redmond, S., Rose, N. H., Youd, H. A., Lucas, E. R., Made, Ali R. S., Alnazawi, A., Badolo, A., Chen, C., Cosme, L.V., Henke, J. A., Hung, K., Kluh, S., Liu, W., Maringer, K., Micieli, M. V., Pless, E., Sombié, A., Surendran, S. N., Wahid, I., Armbruster, P. A., Weetman, D., McBride, C. S., **Gloria-Soria, A.**, Powell, J. R., White, B. J. (2024). 1206 genomes reveal origin and movement of *Aedes aegypti* driving increase dengue risk. *Science* 389. Issue 6766. DOI: [10.1126/science.ads3732](https://doi.org/10.1126/science.ads3732)

Abstract: The emergence and global expansion of *Aedes aegypti* puts more than half of all humans at risk of arbovirus infection, but the origin of this mosquito and the impact of contemporary gene flow on arbovirus control are unclear. We sequenced 1206 genomes from 73

globally distributed locations. After evolving a preference for humans in Sahelian West Africa, the invasive subspecies *Ae. aegypti aegypti* (*Aaa*) emerged in the Americas after the Atlantic slave trade era and expanded globally. Recent back-to-Africa *Aaa* migration introduced insecticide resistance and anthropophily into regions with recent dengue outbreaks, raising concern that *Aaa* movement could increase arbovirus risk in urban Africa. These data underscore developing complexity in the fight against dengue, Zika, and chikungunya and provide a platform to further study this important mosquito vector.

4. Saarman, N., Graybeal, K., Seeley, T., Calhoun, E., Jenkins, E., Moraes, A. D. L., Faiman, R., Markle, H., Pellegrini, R., Arent, S. and **Gloria-Soria, A.** (2025). Range expansion of *Culex quinquefasciatus* and *Culex pipiens* hybrids across mid-latitudes of North America. *One Health*, p.101205. DOI: [10.1016/j.onehlt.2025.101205](https://doi.org/10.1016/j.onehlt.2025.101205)

Abstract: We investigated recent reports of a northward expansion of *Culex quinquefasciatus* and hybrids of the *Culex pipiens* species complex, important vectors of West Nile virus in mid-latitudes of North America. Because *Cx. quinquefasciatus* more readily feeds on both birds and mammals, its movement into higher latitudes may increase the risk of WNV spillover from avian reservoirs to humans. Using an Ace2 PCR assay, we identified species and detected hybridization in mosquito specimens from 26 sites across the continental U.S. Our results reveal a strong latitudinal gradient in hybrid index values, consistent with climatic filtering of overwintering traits such as diapause. We detected both northward expansion of *Cx. quinquefasciatus* alleles and southward introgression of *Cx. pipiens*, with admixture occurring beyond previously defined hybrid zone boundaries. Hybrid zone structure varied regionally: the East Coast exhibited sharp latitudinal structuring of hybridization patterns; the Central U.S. showed broader corridors of admixture; and the Mountain/Southwest and West Coast zones of secondary contact displayed patchy *Cx. quinquefasciatus* distributions consistent with a mosaic hybrid zone. These patterns suggest incomplete reproductive isolation, with limits to interbreeding likely shaped by ecological barriers, such as winter survival constraints, and region-specific colonization histories. As climate change relaxes overwintering barriers and urbanization alters host and habitat availability, this hybrid zone may become increasingly dynamic and spatially complex. By updating the distribution of *Cx. quinquefasciatus* and hybrids, this study provides critical data for tracking range shifts, improving vector surveillance, and refining our understanding of WNV risk. More broadly, it advances integrated approaches to public health by linking mosquito ecology and evolution to emerging disease risk in both human and wildlife populations.

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

Drs. Amit Sethi and Renata Ramos Pereira from Corteva Agrosience in Johnston, IA visited **Dr. Kelsey E. Fisher** to assist with monitoring sentinel field corn plots at Valley Laboratory and Griswold Research Center on September 23, 2025.



The Station Exhibit at the Big-E, 2025. From left to right; Jamie Cantoni, Katherine Dugas, Gale Ridge, Paula Wolf, and Ella Nastri.



Gale Ridge, Ph.D. playing the piano at the CAES 150th Anniversary Dinner. Pieces played were: J.S. Bach, C Minor Prelude BWV 999; Irving Burgie, Day-O; Sondheim, Send in the Clowns; Loewe, I Could have Danced All Night from My Fair Lady; Hammerstein, Hello Young Lovers from South Pacific; Webber, The Music of the Night from Phantom of the Opera; Billy Joel, Piano Man; Wright & Forrest, And This is My Beloved from Kismet; Schönberg, Do You Hear the People Sing from Les Misérables ; Kosma, Autumn Leaves; Brubeck, Take 5; Gershwin, Summertime from Porgy and Bess; Jobim & Gimbel, The Girl from Ipanema; and Ashman & Menkin, Be Our Guest from Beauty and the Beast.



SCOTT C. WILLIAMS, PH.D. participated in a meeting with BanfieldBio on a collaborative NIH SBIR grant investigating tick repellent formulations to be integrated into fabrics (September 2); participated in the bimonthly meeting of the State of Connecticut Siting Council (September 4); attended, networked, and participated in the 17th International Conference on Lyme Borreliosis and Other Tick-Borne Diseases, Chicago, IL (September 7-10); as vice-chair, attended the evening meeting of the Town of Guilford’s Inland Wetland Commission over Zoom (September 10); participated in an evidentiary hearing and evening public comment session of the State of Connecticut Siting Council (September 11); attended the quarterly Forest Health Update headed up by **Elisabeth Ward, Ph.D.** with representatives from CT DEEP Forestry Division (September 15); participated in a meeting with BanfieldBio on a collaborative NIH SBIR grant investigating tick repellent formulations to be integrated into fabrics (September 16); with **Megan Linske, Ph.D.**, provided a research update to members of the Vector-Borne Disease Laboratory at the Centers for Disease Control and Prevention, Ft. Collins (15 attendees) (September 16); participated in the bimonthly meeting of the State of Connecticut Siting Council (September 18); as the Connecticut representative, participated in a meeting of the New England Chapter of The Wildlife Society (September 23); participated in a meeting with staff from BanfieldBio, Inc. on a collaborative CDC grant investigating botanical extracts in their potential to manage ticks in peridomestic habitats (September 23); participated in an evidentiary hearing and evening public comment session of the State of Connecticut Siting Council (September 25); participated in a meeting with BanfieldBio on a collaborative NIH SBIR grant investigating tick repellent formulations to be integrated into fabrics (September 30).



NATALIE BAILEY assisted in a demonstration of small rodent trapping, handling, and processing for undergraduate students in the wildlife techniques class at the University of Connecticut (16 attendees) (September 8); participated in a Zoom call with BanfieldBio to discuss the development of a botanical acaricide (September 9, 23); participated in a collaborative Zoom call with members of the Banfield Biologic NIH SBIR-funded tick repellent fabric team (September 16, 30); traveled to Horse Island in Branford, Connecticut, to assess American dog tick (*Dermacentor variabilis*) density as part of an ongoing tick control investigation in collaboration with the Yale Peabody Museum (September 24).



JOSEPH P. BARSKY participated in the Society of American Foresters National Convention local coordinators meeting (September 4); chaired the quarterly meeting of the New England Society of American Foresters Board of Directors (September 10); served as a judge for the 2025 Regional FFA Agriscience Fair at the Eastern States Exposition (September 12); gave an invited presentation on “Deer and Forestry” to the YMCA Men’s Group in Meriden (26 attendees) (September 23).

JESSICA E. BROWN, PH.D. participated in a virtual meeting with the current class of The Wildlife Society’s Leadership Institute to discuss upcoming presentations to

the TWS Council (September 4); traveled to University of Connecticut to demonstrate small mammal trapping and handling to an undergraduate Wildlife Techniques class (15 attendees) (September 8); as the Northeast Section chair, participated in a virtual meeting of The Wildlife Society's Conservation Affairs Network to hear updates from other regions (September 11); visited the Yale Peabody Museum's field station on Horse Island to conduct seasonal tick surveillance (September 24).

GREGORY J. BUGBEE gave a tour of the hydrilla in the CT River – Salmon Cove area – to officials from the Northeast Aquatic Plant Management Society and the United States Army Corps of Engineers (September 8); gave an aquatic plant workshop to the Great Hill Pond Lake Association in Portland (18 attendees) (September 11); gave an invited virtual talk entitled “Aquatic Plants” as part of the Federated Garden Club Environmental School (40 attendees) (September 18); provided guidance at Connecticut River Conservancy Water Chestnut Collaborators meeting (18 attendees) (September 25); interviewed by Ed Mahoney of the Hartford Courant on hydrilla in the CT River (September 26).

RILEY DOHERTY participated in two aquatic invasive species rapid response planning meetings with the CT Federation of Lakes (CFL) legislative subcommittee (September 8, 30); participated in the CAES Diversity, Equity, and Inclusion Committee meeting (September 8); participated in the CFL board meeting (September 17); participated in the Lake Lillinonah Hydrilla Management Plan stakeholder meeting with CFL, CT DEEP, and Senator Blumenthal (September 19); attended the Mapping Water in CT webinar put on by the CT GIS Office and UCONN CLEAR (September 25); attended the USGS Rapid Response Data Collection Regional Standardization meeting (September 30).

JEREMIAH R. FOLEY, IV, PH.D. met with Dr. Nate Harms of the U.S. Army Corps of Engineers to discuss expanding the biological control program for Connecticut River hydrilla (September 23); met with Dr. Ben Sperry of the U.S. Army Corps of Engineers to review the status of the current cooperative agreement and outline offseason research objectives aimed at understanding the herbicide sensitivity of non-target plants (September 24); attended a Connecticut River Conservancy meeting to share updates and observations from this past season's water chestnut removal efforts (September 25); met with Connecticut State Representatives Muir, Ryan, and Shannon to provide a boat tour of the lower Connecticut River highlighting current management practices and providing an update on the hydrilla invasion (September 26).

SUSANNA KERIÖ, D.SC. gave an invited lecture titled “Tree Biology and Tree Function” to Tree Warden School (40 attendees) (September 4); administered the arborist exams as an executive board member of the Connecticut Tree Protection Examining Board (September 10); collaborated with USDA Forest Service Research Scientist Dr. Richard Hallett on phenotyping 1,500 oak trees planted in urban forest gaps on a research project established through the Urban Silvicultural Network studying assisted migration and adaptation of oaks (September 11); attended Julia Celio's thesis committee meeting at Quinnipiac University (September 12); organized the NE2333 Multistate Chestnut Research Project annual conference in Cromwell CT, lead field tours in the CAES Sleeping Giant and Lockwood Farm chestnut orchard, and gave a talk on “CAES Chestnut Research Update” (30 attendees) (September 15 – 18); attended a virtual call with collaborators from University of Delaware, USDA Forest Service, Central New York University, and John Hopkins University to discuss a grant submission to the USDA AFRI program (Physiology of Agricultural Plants) (September 22, 30); met with **Elisabeth Ward, Ph.D.** and collaborators from Wesleyan University, Bartlett Tree Experts, and Yale University to plan sample processing workflow for a collaborative forest health research project (September 26).

ITAMAR SHABTAI, PH.D. met with a collaborator from the University of Zurich to work on a joint perspective paper (September 2, 9); held a zoom call with collaborators from the

University of Minnesota and Michigan State University to discuss a joint USDA NIFA-AFRI grant proposal (September 8); met with staff scientists at the Joint Genome Institute to discuss methodology for an upcoming project (September 9); met with collaborators and beamtime scientists at the Advanced Photon Source synchrotron to discuss work in upcoming beamtime (September 23); held a zoom call with a colleague from Purdue University and a potential industry funding partner (Ag Spectrum, DeWitt, IA) to discuss funding and future collaboration (September 24); attended the Synchrotron Environmental Science 2025 conference in Stony Brook, NY (September 29-30).

ELISABETH WARD, PH.D. gave a lecture and tree identification workshop for the Tree Wardens School (40 attendees) (September 4); met with collaborators from Yale University, Wesleyan University, Bartlett Tree Experts, and University of Maine along with **Susanna Kerio, Ds.C.**, to discuss project on beech leaf disease and carbon dynamics (September 8); participated in the Northeast-Midwest State Foresters Alliance Forest Health Committee quarterly meeting and presented CT state updates (30 participants) (September 9); participated in the Forest Ecosystem Monitoring Cooperative monthly state coordinators meeting (September 11); led quarterly CT Forest Health meeting with DEEP Division of Forestry senior staff (8 attendees) (September 15); participated in the NE2333 Chestnut Research meeting hosted by CAES and presented a talk titled “Forest Health Research in Connecticut and Opportunities for Collaboration” (28 attendees) (September 16-17); met with Elena Karlsen-Ayala, Ph.D. (USDA Forest Service), and **Itamar Shabtai, Ph.D.**, to discuss project on the effects of beech leaf disease on ectomycorrhizal communities and soil carbon cycling (September 18); met with forest health staff from the USDA Forest Service and NY and RI to discuss laurel wilt monitoring efforts (September 23); met with collaborators from Yale University, Wesleyan University, and Bartlett Tree Experts at Wesleyan University with **Susanna Kerio, Ds.C.** to plan a project on beech leaf disease and carbon dynamics (September 26).

MADLINE WATTS began her Master of Science in Environmental Science at Oregon State University, focusing on ecology and geographic information systems to study threatened and endangered wetland species in the Connecticut River (September 24); met with a consultant to discuss mesocosm tank setup (September 29).



SUMMER WEIDMAN attended the Northeast Aquatic Plant Management Society (NEAPMS) annual Plant Camp in Winthrop, ME (September 2-4); participated in the NEAPMS annual board meeting including leading a tour of hydrilla on the Connecticut River (September 8-9); gave an aquatic plant workshop to youth participants from New Britain ROOTS (September 18); participated in the Connecticut River Conservancy’s virtual Water Chestnut Collaborators Meeting (September 25); chaired the virtual meeting of the Guilford Conservation Commission Lake Quonnipaug Subcommittee (September 30).

LEIGH J. WHITTINGHILL, PH.D. attended a CAES DEI committee meeting (September 8); acted as a judge at the FFA Agriscience Fair at the Big E (September 12); had several meetings with Dr. Amanda Weidhuner of Southern Illinois University, and Drs. Sohyun Park and Baikun Li of UConn to discuss potential collaboration and grant applications for research on agricultural green roofs (September 17, 19, 24).

YINGXUE (CHARLIE) YU, PH.D. gave invited talk “Biodegradable Plastic Mulch: A Promising Alternative for Sustainable Agriculture” at the Biodegradable Products Institute Summit, Atlanta, GA (100 attendees) (September 15–18).

PUBLICATIONS:

1. **Whittinghill, L. J.** (2025). Changes in green roof media properties from agricultural management and annual compost additions. *Urban Forestry and Urban Greening*: 115: 129084. DOI: [10.1016/j.ufug.2025.129084](https://doi.org/10.1016/j.ufug.2025.129084).

Abstract: The use of green roof technology to grow food on rooftops provides additional production space in urban areas. This comes with some challenges, as green roof media is typically fast draining and contains limited nutrients, requiring the use of irrigation and fertilizers to support crop plants. One nutrient management practice in use to supply the necessary crop nutrients is annual additions of compost. The long-term effect of this practice has not been studied but has the potential to increase organic matter content and therefore water holding capacity and weight of the green roof over time. Green roof platforms were constructed and treated with 0, 0.33, 0.66, and 1 kg/m² of compost annually. Media samples were taken at the start of the project and then annually after compost addition, after the growing season and in the following spring before compost addition and analyzed by Pennsylvania State University Agricultural Analytical Services Laboratory. While the compost treatments used in this study did have an effect on organic matter content and total phosphorus, they had no effect on soluble salts, any other macronutrient, or any micronutrient measured. No increase in media organic matter content over time was observed, suggesting that the compost application rates used in this study will not lead to soil building. An accumulation of macronutrients over the course of the growing season while fertilizers were being applied was observed, as was evidence of nutrient flushing, which has implications for the management of agricultural green roofs.

OTHER DEPARTMENTAL NEWS:

DR. SUSANNA KERIÖ HOSTS NE2333 MULTISTATE CHESTNUT RESEARCH PROJECT MEETING

The NE2333 Multistate Project, initially started as NE140 in 1982, is a multistate research project that has a key role in coordinating chestnut research in the United States. The current NE2333 project has three objectives: 1) develop and evaluate disease resistant chestnuts for food and fiber; 2) evaluate biological approaches for controlling chestnut blight; and 3) investigate chestnut conservation in orchard and forest settings. The project participants meet annually and this year the project meeting was organized in Connecticut, bringing together 30 attendees from Connecticut, Georgia, Kentucky, Maryland, Massachusetts, Mississippi, New Hampshire, New York, North Carolina, Virginia, and West Virginia along with a virtual component. The scientific program was organized in Cromwell on September 16, followed by tours of the CAES chestnut orchards in Sleeping Giant State Park and Lockwood Farm on September 17. The meeting was organized by **Susanna Keriö D.Sc.**, the CAES Representative on the NE2333 project, who presented a talk on CAES Chestnut Research and lead the field tours. CAES scientists **Elisabeth Ward, Ph.D.**, **Nathaniel Westrick, Ph.D.**, and **Tracy Zarrillo, M.Sc.** gave presentations on forest health, chestnut blight biocontrol, and chestnut pollinators, respectively. Elodie Eid, a grant recipient from the Northern Nut Growers Association, presented her work on characterizing promising nut producing cultivars in the CAES Sleeping Giant chestnut orchards. Special guests during the field tours at Lockwood Farm included **Sandra Anagnostakis, Ph.D.** and **Richard Jaynes, Ph.D.**, both founding members of the NE140 project, who talked about their research on chestnut breeding and chestnut blight biocontrol during their years of service as CAES Scientists. Research Farm Manager **Richard Cecarelli** with **Rollin Hannan** and **Joseph Toth** facilitated hosting the meeting at Lockwood



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Pavilion and orchard tours at Sleeping Giant chestnut orchards. **MICHAEL LAST** and **Justin Lizon** from the CAES Business Office coordinated the registrations for the meeting.

PLANT PATHOLOGY AND ECOLOGY

LINDSAY TRIPLET, PH.D. spoke at an internship opportunity fair at Quinnipiac University about research opportunities at CAES (September 5, 27 adults)

ROBERT MARRA, PH.D. participated in an Executive Committee meeting for the Northeastern Division of the American Phytopathological Society (4 adults)(September 4); administered the arborist certification oral exam (“TPX”) (12 adults) (September 10); presented a talk on beech leaf disease and oak wilt at the Essex Public Library (45 adults)(September 6); participated in the monthly meeting of Divisional Forum Representatives of the American Phytopathological Society, via Zoom (10 adults)(September 18)

PUBLICATIONS:

1. Wolf, E., **R. Marra**, P. Vieira. Selection of Stable Real-Time Quantitative PCR Reference Genes for the Beech Leaf Disease Nematode *Litylenchus crenatae*. *2025 Forest Pathology*, 55:e70039, DOI: [10.1111/efp.70039](https://doi.org/10.1111/efp.70039)

Abstract: Beech leaf disease (BLD) is rapidly spreading throughout beech forests in the northeastern regions of North America, posing a significant ecological threat to these ecosystems. The biological agent implicated in this disease is the foliar nematode *Litylenchus crenatae*, which has been closely associated with the characteristic symptoms of BLD. In order to unravel the molecular mechanisms governing *L. crenatae* parasitism and pathogenicity, it is essential to analyze its gene expression profiles. Accurate quantification of gene expression using reverse transcription quantitative PCR (RT-qPCR) requires stable internal reference genes for normalization. To date, no comprehensive studies have identified or validated suitable internal reference genes for *L. crenatae* across relevant stages of BLD. In this study, we evaluated nine candidate reference genes from *L. crenatae* and systematically evaluated their expression stability across various developmental stages and plant interaction conditions. Our analysis identified two genes coding an *EF-hand domain-containing protein (EF-hand)* and a *Ubiquitin-conjugating enzyme 2 (UBQ2)*, that exhibited the most stable expression profiles, indicating their suitability as internal controls for RT-qPCR assays in this nematode. Utilizing these validated reference genes, we further characterized the expression profiles of four parasitism-related genes. These target genes were assessed across different nematode developmental stages, as well as during key phases of host invasion and tissue interaction. Overall, our results provide suitable reference gene candidates for accurate gene expression studies in *L. crenatae*, contributing to a better understanding of the molecular interaction between this nematode and its beech tree hosts.

VALLEY LABORATORY

JATINDER S AULAKH, PH.D. attended the IR-4 horticultural research priorities zoom meeting (September 3, 2025); and submitted two popular articles entitled “SureGuard Xtra-A New Herbicide for Christmas Tree Growers” and “Interpreting Pesticide Label Directions” to The Real Tree Line Magazine (September 8, 2025); and hosted a Lockwood lecture on “Challenges and Opportunities for Emerging Weed Problems in the Northeastern Field Crops” by Dr. Vipin Kumar, weed scientist at Cornell University (September 17, 2025); and published a research paper entitled “Christmas Tree Tolerance and Weed Control with Postemergence Topramezone (September 25, 2025).

RICHARD COWLES, PH.D. presented “Preventing Needle Loss,” and discussed fungicides for managing needle cast diseases, insecticides for managing ants and soil microbial diversity for countering phytophthora root rot at the joint meeting between the Maine Christmas Tree Association and the Christmas Trees Atlantic (New Brunswick, Nova Scotia, and Quebec growers) meeting, Richmond Corner, NB (Sept. 13 and 14, 75 participants). He talked about “Phosphites for treating beech leaf disease,” Sept. 30, at the Cooperative Extension nursery tour, Bethel and Newtown, CT (6 participants).

NATHANIEL WESTRICK, PH.D. was presented a talk entitled "Etiology and management of boxwood blight " to the Boxwood Blight Insight Group (September 5) (35 Participants); attended the NE2333 Chestnut meeting and presented a research seminar entitled "Ecological Implications of Historical and Future Approaches to Chestnut Blight Biocontrol" (September 16-17) (32 Participants).

PUBLICATIONS:

1. Zhou, L., Zhang, Q.-Y., Wan, Y., Chen, Y.-L., Li, D.-W., Tan, Y.-H., Sun, H., Zhu, L.-H. (2025). Three novel species of *Cladosporium* and *Sarocladium* isolated from Palm trees. MycoKeys 123: 29-51. DOI: [10.3897/mycokeys.123.165471](https://doi.org/10.3897/mycokeys.123.165471)

Abstract: Palm trees (Arecaceae) are among the most widely used ornamental plants in southern China. In this study, samples of senescent leaves and petioles from four species of palm plants were collected in Yunnan Province, China, and fungal isolations were performed. Species identification was conducted using a phylogenetic approach based on combined sequence data from the internal transcribed spacer (ITS) region, large subunit ribosomal DNA (LSU), actin gene (ACT), and translation elongation factor (TEF), together with morphological studies. As a result, three new species—*Cladosporium menglunense*, *Sarocladium menglaense*, and *S. yunnanense*—are proposed. By providing detailed morphological and molecular data, this study lays a foundation for future research on species diversity and diseases of palm plants.

2. Aulakh, J., Kumar, V., Paine, E., Mohanpuria, R. (2025). Christmas tree tolerance and weed control with postemergence topramezone. *Journal of Environmental Horticulture*, 2025. Available online at: <https://jeh.kglmeridian.com/view/journals/jenh/43/3/article-p138.xml>

Abstract: Topramezone was evaluated in an outdoor container experiment for tolerance of multiple conifer species in Windsor, CT and for postemergence weed control and Fraser × balsam hybrid fir tolerance on a Christmas tree farm in Enfield, CT in 2022 and 2023. In both experiments, topramezone was applied to actively growing Christmas trees at 49 g ai·ha⁻¹ (0.04 lb ai·A⁻¹), 98 g ai·ha⁻¹ (0.09 lb ai·A⁻¹), or 196 g ai·ha⁻¹ (0.17 lb ai·A⁻¹). Balsam fir [*Abies balsamea* (L.) Mill. var. *balsamea*], canaan fir [*Abies balsamea* (L.) Mill. var. *phanerolepis* Fernald], Fraser fir [*Abies fraseri* (Pursh) Poir], Nordman fir [*Abies nordmanniana* (L.)], Norway spruce [*Picea abies* (L.) Karst), and white pine [*Pinus strobus* (L.)] in the container experiment and Fraser × balsam hybrid fir [*Abies fraseri* (Pursh) Poir] × [*Abies balsamea* (L.) Mill. var. *balsamea*] in the field experiment were not injured from topramezone rates ranging from 49 g ai·ha⁻¹ (0.04 lb ai·A⁻¹) to 196 g ai·ha⁻¹ (0.17 lb ai·A⁻¹). Colorado blue spruce [*Picea pungens* (Engelm)] in 2022 and 2023 and Douglas fir [*Pseudotsuga menziesii* (Mirb.) Franco] in 2023 showed temporary bleaching/yellowing of the new growth with topramezone at 196 g ai·ha⁻¹ (0.17 lb ai·A⁻¹). The highest injury was observed at 3 weeks after treatment and ranged from 9% in Colorado blue spruce to 23% in Douglas fir. Common ragweed [*Ambrosia artemisiifolia* (L.) var. *artemisiifolia*], horseweed [*Conyza canadensis* (L.) Cronquist], fall panicum [*Panicum dichotomiflorum* (L.)], large crabgrass [*Digitaria sanguinalis* (L.) Scop.], and yellow foxtail [*Setaria pumila* (Poir.) Roem. & Schult. ssp. *Pumila*] were controlled 61 to 91%, 66 to 98%, and 45 to 99% by 4, 8, and 12 weeks after treatment, respectively, depending upon topramezone rate. Weed density 12 weeks after treatment showed a 58 to 100% reduction depending upon topramezone rate applied and weed species tested. Overall, these results suggest that postemergence topramezone at the labelled rate (98 g ai·ha⁻¹ or 0.09 lb ai·A⁻¹) can be safely used for effective weed control in Christmas trees. Further research is needed to evaluate postemergence topramezone in conjunction with preemergence and other postemergence herbicides for enhanced crop safety and weed control.

Aulakh, J. S. SureGuard Xtra-A New Herbicide for Christmas Trees Growers. *The Real Tree Line*.

Chen, Z., Allabakshi, S. M., and **Pignatello, J. J.*** Buffer salts enhance peroxide-assisted defluorination of sulfuranyl fluoride fumigant by both pH control and general base catalysis: Implications for hydrogen peroxide as a nucleophilic reagent. *ACS ES&T Engineering*.

Cowles, R. and **Aulakh, J. S.** Interpreting pesticide label directions. *The Real Tree Line*.

Ibengbo, S., Compton, S., Breban, M., Redmond, S., Grubaugh, N., Tanner, W., **Linske, M., Williams, S.,** Zyskowski, K., Watkins-Colwell, G., Lewis, J., Syracuse, M., Risatti, G., Zeiss, C. SARS-CoV-2 continues to infect diverse animal species in the northeastern United States. *npj Viruses*.

Liu, Z., Pan, J., Li, W., Jia, T., Sun, X., Qin, M., Li, R., Liu, P., Shi, Q., **White, J.C.** Nanoscale magnesium oxide reduces the accumulation and toxicity of micro/nanoplastics by accelerating root lignification and alleviating endoplasmic reticulum stress. *Environmental Science and Technology*.

Majumdar, S., Bazina, L., DeLoid, G., **Garcia, A. G., Zuverza-Mena, N.,** Konkol, J., Verzi, M.,

Meizoso-Regueira, A., **Yu, Y.,** Flury, M., Rillig, M. C. Critical thresholds in soil physical properties driven by microplastics. *Science of The Total Environment*.

Meselhy, A. G., Mosa, K. A., Chhikara, S., Kumar, K., **Musante, C., White, J. C.,** Parkash Dhankher, O. Unraveling the role of OsPIP1;3 in arsenic transport in rice (*Oryza sativa* L.). *Physiology and Molecular Biology of Plants*.

Qin, L., Deng, C., Boyjoo, Y., **Sharma, S., Ashraf, H.,** Wang, M., Zhao, L., Sabliov, C. M., Bhaw-Luximon, A., **Dimkpa, C. O., Wang, Y.*,** Chen, S.*, **White, J. C.*** Nano-Stimulated Immunity: Modified CuS Nanoparticles Trigger Multi-Level Defense Against Fusarium in Tomato (*Solanum lycopersicum*). *Chemical Engineering Journal*.

Tsilomelekis, G., **White, J. C.,** Demokritou, P. Impact of UV-aging on the toxicity and bioavailability of traceable core-shell polystyrene nanoplastics in an in vitro triculture small intestinal epithelium model. *Toxics*.

Wu, Y., Lian, J., Xin, X., Wang, X. Cheng, L., Chen, L., Wei, Y., He, Z., **White, J. C.,** Yang, X.,

Xue, Q. and **Dweck, H. K. M.** Genomic plasticity drives olfactory adaptation in a pest fly. *Nature*.

Yao, W. Foliar application of green-synthesized ZnO nanoparticles reduces cadmium accumulation in wheat grains by mediating sulfur-molybdenum antagonism. *Nano Today*.



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