

# Station News

The Connecticut Agricultural Experiment Station

Volume 11 Issue 3 March 2021



## This Issue

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

Grants Received	2
Administration	2
Analytical Chemistry	2
Entomology	3
Environmental Sciences	4
Forestry and Horticulture	4
Plant Pathology and Ecology	5
Valley Laboratory	6
Dept. Research Updates	6
Journal Articles Approved	9
Articles of Interest	10



# CAES

The Connecticut Agricultural Experiment Station

*Putting Science to Work for Society since 1875*

## GRANTS RECEIVED FEBRUARY 2020

Megan A. Linske (PI), Kirby C. Stafford III, and Scott C. Williams were awarded from Bedoukian Research, Inc. (BRI) of Danbury, CT a grant of \$10,000 for a “Tick Repellent Trial.” This research project will evaluate the effectiveness of eight repellent formulations in repelling nymphal *Ixodes scapularis* on mice.

## ADMINISTRATION

**DR. JASON C. WHITE** participated in a Center for Sustainable Nanotechnology (CSN) ZOOM call with colleagues at the University of Wisconsin to discuss collaborative research (February 1); participated in a ZOOM call with collaborators at Yale University and the University of Minnesota to discuss collaborative research and a newly funded NIEHS grant (February 1); received an FDA Group Recognition Award for being a member of the FDA Laboratory Flexible Funding Model Workgroup (February 1); participated in CSN all faculty calls (February 2, 23); participated in the annual Manufactured Food Regulatory Program Alliance meeting (MFRPA) via ZOOM (February 2-4); with **DR. KIRBY STAFFORD**, **DR. VICTORIA SMITH**, and **MR. MICHAEL LAST**, participated in a Teams call with the Attorney General’s office to discuss the CAES regulatory response to the spotted lanternfly (February 3); was appointed to the Farmland Preservation Advisory Board (February 4); participated in weekly CSN All-Hands calls (February 3, 10, 17, 24); gave a presentation (ZOOM) entitled “Nanoscale Micronutrients to Suppress Crop Disease” at the Division of Plant Pathology, SKUAST-K, Kashmir, India (100 attendees) (February 5); participated in the monthly FDA LFFM WebEx calls for the Human & Animal Food and Food Defense cooperative agreement programs (February 8); with **DR. WADE ELMER**, participated in a CSN ZOOM call with colleagues at Johns Hopkins University to discuss collaborative research (February 8); participated in a Teams call with the Department of Consumer Protection to discuss testing of recreational marijuana (February 10); participated in the monthly Department of Analytical Chemistry Quality Assurance meeting (February 16); hosted the monthly CSN Nanochemistry-Plant working group call (February 16); participated in an NSF I-Corp interview with Ms. Lucy Adams and Professor Jamie Lead of the University of South Carolina (February 18); participated by Teams in the Plant Science Day 2021 Planning Committee meeting (February 19); with **DRS. WADE ELMER** and **YI WANG**, hosted a monthly project meeting with collaborators at the University of Massachusetts on our joint USDA nanosulfur grant (February 19); gave a presentation (ZOOM) entitled “Chemistry at the Connecticut Agricultural Experiment Station” to the Western Connecticut State University Department of Chemistry and Biochemistry (February 19) (25 attendees); participated in a preparatory meeting for the Food and Nutrition Security Workshop hosted by the Research Triangle Nanotechnology Network (February 22); participated in a ZOOM demonstration call hosted by the Northeast Regional Association of State Agricultural Experiment Station Directors (NERA) for the National Information Management and Support System (NIMSS) (February 23); was elected to the Connecticut Academy of Science and Engineering (CASE) (February 23); participated in the Farmland Preservation Advisory Board Kick-off Meeting (February 25); participated by ZOOM in an Experiment Station Committee on Organization and Policy (ESCOP) meeting (February 25); participated in a ZOOM call with Mr. Peter Abbott, who is British Consulate-General-Boston, and staff from his Foreign, Commonwealth & Development Office to discuss ways to enhance research collaboration between the US and UK (February 25); and was given the inaugural 2020 *Environmental Science & Technology (ES&T)* Lifetime Reviewer Award (February 26).

## ANALYTICAL CHEMISTRY

**DR. CHRISTINA ROBB** attended the Eastern Analytical Symposium (EAS) board meeting (February 5) and the EAS Executive Committee meetings (February 1, 8, 15, 22); attended the FERN LFFM Chemistry Human and Animal Food meeting (February 8); and met with the editor of Portable and Handheld Infrared Applications, John Wiley Publications (February 9).



**DR. BRIAN EITZER** attended the ASTM International Subcommittee D37 (cannabis standards) ZOOM meeting (February 4); the FERN LFFM Human and Animal Food and Food Defense meetings (February 8); the meeting of the organizing committee of the North American Chemical Residue Workshop (February 11); the APHL Cannabis Community of Practice meeting (February 11); and had a series of calls with Michael Rickenbach, Na Liu, and Kayliegh Ryder of the chemical analysis section of the State of Connecticut Department of Emergency Service and Public Protection to assist them in their use of liquid chromatography high resolution mass spectrometry (February 22-24).

**DR. WALTER KROL** and **MS. TERRI ARSENAULT** attended a day-long virtual annual meeting with those involved in the Multistate Research Project S1084 - “Industrial Hemp Production, Processing, and Marketing in the U.S.” and presented findings from the 2020 hemp growing season (approx. 75 attendees) (February 11).

**MS. KITTY PRAPAYOTIN-RIVEROS** presented “ORA Data Exchange (DX) - Data Sharing from the Program Standpoint” at the Roundtable Session of the 10th Manufactured Food Regulatory Program Alliance Virtual Meeting (February 3).

## ENTOMOLOGY

**DR. KIRBY C. STAFFORD III** presented a talk on ticks and tick control for the EPA Region 1 Pesticide Inspector Residential Training via ZOOM (40 attendees) (February 22).

**MS. KATHERINE DUGAS**, with **DR. YONGHAO LI**, taught a 2-hour virtual course via WebEx about insect and plant disease issues to a Master Gardener class (51 attendees) (February 19) and gave a one-hour virtual lecture on insect pest issues to the Duck River Garden Club of Old Lyme (40 attendees) (February 22).

**DR. MEGAN LINSKE** participated in a virtual meeting with members of the Wildlife Society Bylaws Subcommittee as President-Elect of the Northeast Section of the Wildlife Society (February 22); gave an invited lecture about the role of wildlife diversity in tick and tick-borne pathogen life cycles for the “Wildlife in Connecticut” speaker series for the Meig’s Point Nature Center, Hammonasset Beach State Park (February 27).

**DR. GALE E. RIDGE’S** article entitled “Delusional Infestation Surges During COVID-19 Pandemic,” which focused on the work Dr. Ridge and her team are currently doing in the care of delusional infestation patients, was published in MD Edge (February 4); delivered via ZOOM a two-part presentation on delusional infestation at the EPA Region 1 Pesticide Inspector Residential Training (February 23).

**DR. VICTORIA L. SMITH** participated in a webinar for Authorized Certifying Officials (ACOs) on re-export certification, sponsored by USDA Export Services (30 participants) (February 16).

**DR. KIMBERLY A. STONER** met with Lilian Ruiz, Executive Director of the CT Council on Soil and Water Conservation, and Denise Savageau, Chair of the CT Council on Soil and Water Conservation, about soil health legislation proposed for the current legislative session (February 5).

**MS. JAMIE CANTONI** prepared a fact sheet on the CAES active tick surveillance program.

## ENVIRONMENTAL SCIENCES

**DR. JOSEPH PIGNATELLO** gave a virtual departmental seminar entitled “Interactions of Organic Compounds with Natural and Human-made Pyrogenic Carbonaceous Materials—Sorption, Reaction, and Catalysis” to the Department of Chemistry, Michigan Technological University (February 19); and met virtually with collaborators from Villanova University, Pacific Northwest National Laboratory, and Oregon Health and Science University on a SERDP grant project (February 22).

**MS. ANGELA BRANSFIELD** participated in BioRAFT’s EHS Community Connection webinar entitled “Fit Testing Do’s & Don’ts” (February 25).

**MR. GREGORY BUGBEE** was featured in a video entitled “Invading the Connecticut River - The Spread of Hydrilla” produced by the Connecticut Resource Conservation and Development Area <https://youtu.be/OZ2baYSgl8Y> (February 2); spoke virtually on “Changes in the Aquatic Vegetation in Lake Quonnipaug from 2000 to Now” to the Lake Quonnipaug Preservation Committee (approx. 12 attendees) (February 8); with **MS. SUMMER STEBBINS**, provided testimony virtually on proposed changes to Lake Beseck’s winter drawdown protocol to the Connecticut Environment Committee (approx. 50 attendees) (February 10); participated as a panelist in the winter meeting of the Northeast Aquatic Nuisance Species Panel (approx. 15 attendees) (February 17); and participated in a meeting sponsored by Western Connecticut State University on bringing together data on water quality and invasive species in the Housatonic River Watershed (approx. 15 attendees) (February 18).

**DR. JOSEPH R. McMILLAN** presented a virtual lecture entitled “Efficacy of Larvicide Treatments to Suppress *Culex pipiens* Populations” and was a panelist in a CDC Vector-borne Disease Centers of Excellence seminar series (approx. 200 attendees; approx. 50 students) (February 25).

**MR. JOHN SHEPARD** participated in a Board of Directors meeting of the Northeastern Mosquito Control Association (12 attendees) (February 10).

**DR. SARA NASON** met virtually with Prof. Craig Tobias from University of Connecticut Marine Sciences to discuss collaborative research (February 8, 11); met virtually with Prof. Satish Myneni from Princeton University to discuss potential collaboration (February 16); and attended virtual meetings of the Benchmarking and Publications for Non-Targeted Analysis working group (February 16, 18).

**DR. BLAIRE STEVEN’S** student Ben Teerlink presented his work from Dr. Steven’s laboratory to the Virtual Penn State Geobiology Symposium XXVIII. His talk was entitled “Characterization of a Novel Biological Soil Crust in a Temperate Mid Latitude Region (Southern Connecticut USA)” (55 attendees, approx. 40 were students) (February 26).

## FORESTRY AND HORTICULTURE

**DR. JEFFREY S. WARD** spoke on estimating deer density and reducing deer browse at the Increasing Oak Resiliency in Southern New England Landowner Townhall (107 attendees) (February 2); participated in NESAF 2021 planning committee conference calls (February 2, 16); participated in a ZOOM meeting with DEEP Commissioner Katie Dykes, Senator Christine Cohen, Representative Vincent Candelora, DEEP staff, and foresters to discuss forest management and carbon (21 attendees) (February 3); answered landowner questions on reducing deer browse damage during an oak resiliency ZOOM workshop (21 attendees) (February 6); met with Gabriel Horton (West Point, NY), Olga Vargas (NRCS-NY), and Donald Parizek (NRCS-CT) to discuss tree growth by site characteristics and controlling browse damage (February 8); met with Yale and UConn faculty to discuss the current state of forest carbon knowledge (4 attendees) (February 8); organized, hosted,

and spoke at the Forest Ecosystem Monitoring Cooperative FEMC Connecticut State Partnership (CT SPaRC) organizing meeting (26 attendees) (February 16); participated in the Society of American Foresters national working group officers virtual meeting (February 24); presented updates on forest carbon and resiliency research with DEEP Deputy Commissioner Mason Trumble, UConn and Yale scientists, and DEEP staff (9 attendees) (February 25); participated in a national SAF D2 (silviculture) working group virtual annual meeting (38 attendees) (February 25).

**DR. SUSANNA KERIÖ** attended the FEMC Connecticut State Partnership (CT SPaRC) Organizing Meeting (February 16); and participated in "Chestnut Chat: Historic Importations and Chestnut Cultivar" organized by the American Chestnut Foundation (February 19).

**DR. SCOTT C. WILLIAMS** participated in a conference call for the Editorial Advisory Board for The Wildlife Society's publication, The Wildlife Professional (February 4); gave an invited lecture about the role of white-tailed deer in tick and tick-borne pathogen life cycles for the "Wildlife in Connecticut" speaker series for the Meig's Point Nature Center, Hammonasset Beach State Park (75 attendees) (February 6); participated in a field visit of a piece of potential open space investigating habitat quality and connectivity with municipal officials from the Towns of Guilford and Madison (February 17); and gave an invited lecture about the relationship between Japanese barberry and blacklegged tick abundances for the Mid-Michigan Cooperative Invasive Species Management Area Virtual Municipal Training Event (70 attendees) (February 25).

**MR. JOSEPH P. BARSKY** participated in NESAF 2021 planning committee conference calls (February 2, 16)

## PLANT PATHOLOGY AND ECOLOGY

**DR. WADE ELMER** attended via ZOOM the monthly APS Press Conference call (9 attendees) (February 2); participated via WebEx in the UConn Plant Science & Landscape Architecture (PSLA) Department Head search (10 attendees) (February 4); participated via ZOOM with **DRS. JASON WHITE** and **ISHAQ ADISA** in an NIFA grant project on Nano P (6 attendees) (February 19); presented via ZOOM a keynote lecture entitled "Role of Nanoscale Cu in the Suppression of Plant Diseases" at Role of Nanotechnology in Modern Agriculture Division of Plant Pathology, SKUAST-K, Shalimar, Jammu & Kashmir, India (46 attendees) (February 9); attended via ZOOM the NIFA plan of work conference webinar (146 attendees) (February 9), attended via ZOOM a CSN Plant Nano Group meeting (9 attendees) (February 16); the CT Management Advisory Council Meeting (148 attendees) (February 17); attended via ZOOM an APS Foundation Committee meeting (14 attendees) (February 17); participated via WebEx in PSLA interviews for two candidates (12 attendees) (February 18); and with **DRS. JASON WHITE** and **YI WANG**, participated via ZOOM in a NIFA grant project on Nano S (6 attendees) (February 19).

**DR. YONGHAO LI** presented "Spring and Summer Gardening Tips" to members of the Leete's Island Garden Club via ZOOM (22 adults) (February 9); participated in the National Plant Diagnostic Network Online Communication and Web portal Committee Meeting via ZOOM (8 adults) (February 10); presented "Diseases of Trees" as a class of the Connecticut Tree Protective Association Arboriculture 101 Course via ZOOM (54 adults) (February 17); presented "Plant Diseases in the Garden" as a UConn Master Gardener Class via ZOOM (51 adults) (February 19); presented "Selection and Care of Houseplants" for the Southington Library Adult Program via ZOOM (23 adults) (February 24); participated in a Mid-Course Review of the Connecticut Tree Protective Association Arboriculture 101 Course via ZOOM (55 adults) (February 24); and presented "Identifying & Managing Diseases in Greenhouse Tomatoes" at the 14th Annual Agriculture & Food Conference of Southeastern Massachusetts via ZOOM (8 adults) (February 28).

**DR. ROBERT E. MARRA** participated in a Beech Leaf Disease Working Group ZOOM meeting with collaborators from Ohio, West Virginia, Ontario (CA), New York, USDA-ARS, and

the US Forest Service (45 participants) (February 3); participated in an organizational meeting (via ZOOM) of the State Partnership Committee for the Forest Ecosystem Monitoring Cooperative (30 participants) (February 16); participated (via MS Teams) in the State Coordinators Monthly Check-in for the Forest Ecosystem Monitoring Cooperative (20 participants) (February 18); participated (via MS Teams) in the Plant Science Day Planning Committee meeting (30 participants) (February 19); met (via ZOOM) with Dr. Enrico Bonello (Ohio State University) to discuss Beech Leaf Disease research (February 23); and participated (via ZOOM) in the National Invasive Species Awareness Week (NISAW) meeting (100+ participants) (February 25).

**DR. NEIL SCHULTES** participated in the annual BSL3 Laboratory training session (February 23).

## VALLEY LABORATORY

**DR. RICHARD COWLES** presented virtually “The Asian Invasion and Say Nix to Neonics” for the Connecticut Grounds Keepers Association (170 attendees) (February 16); spoke about “Soil Acidification for Phytophthora Root Rot Management” to the Pacific Northwest Christmas Tree Growers Association (100 attendees) (February 19); and spoke to the Pesticide Inspector Regional Training virtual meeting hosted by CT DEEP about “Rational Use of Neonics” and “Prepare for Another Invasion: The Box Tree Moth” (40 attendees) (February 24).

**MS. ROSE HISKES** participated in the Invasive Plants Council WebEx meeting for the Connecticut Invasive Plant Working Group (CIPWG) (February 16); and with **DR. YONGHAO LI**, reviewed tree diseases for the Connecticut Tree Protective Association’s Arboriculture 101 class via ZOOM (53 attendees) (February 24).

**DR. JAMES LAMONDIA** participated in a Connecticut Ag Information Council ZOOM meeting to plan Ag Day at the Capitol (February 1); participated in a Beech Leaf Disease Call (February 3); participated in an SCRI extension team meeting (February 11); spoke about “Management of Boxwood Blight” at a virtual Chesapeake Green Horticultural Symposium (130 attendees) (February 18); with **DR. RICHARD COWLES**, presented “Boxwood Blight and Boxwood Moth, Not the End of the Industry” to the EPA Region 1 Pesticide Inspector Residential Training Program (41 attendees) (February 24).

**DR. DEWEI LI** attended “Forest Pest Management Forum 2021,” a virtual meeting organized by Natural Resources Canada in support of the National Forest Pest Strategy (February 16, 17).

## DEPARTMENTAL RESEARCH UPDATES FEBRUARY 2021

Bian, Jin-Yue, Qing Song, Yu-Lan Fang, Mei-Ling Sun, Ji-Yun Yang, Yun-Wei Ju, **De-Wei Li**, and Lin Huang. 2021. The fungal endophyte *Epicoccum dendrobii* as a potential biocontrol agent against *Colletotrichum gloeosporioides*. *Phytopathology* 111(2):293-303; <https://doi.org/10.1094/PHYTO-05-20-0170-R>.

**Abstract-** Anthracnose caused by *Colletotrichum gloeosporioides* is one of most serious fungal diseases on Chinese fir (*Cunninghamia lanceolata*). Eight fungal endophytes were isolated from a young healthy branch of Chinese fir and screened against the pathogen in vitro. One isolate, designated as SMEL1 and subsequently identified as *Epicoccum dendrobii* based on morphological and phylogenetic analyses, suppressed mycelial growth of *Colletotrichum gloeosporioides* on dual-culture plates. Additionally, *E. dendrobii* metabolites significantly decreased the biomass of *Colletotrichum gloeosporioides*. *E. dendrobii* was able to enter the internal tissues of the host plant via stomatal cells. Metabolites of *E. dendrobii* significantly inhibited conidial germination and appressorium formation, which at least partly explained why the endophyte significantly inhibited lesion development caused by *Colletotrichum gloeosporioides* on various host plants. We further confirmed that some components with antifungal activity could be extracted from *E. dendrobii* using ethyl acetate as an organic solvent. To our knowledge, this is the first report of *E. dendrobii* as a potential biocontrol agent against a fungal phytopathogen.



**Barsky, Joseph P.** 2021. The ecological importance of coarse woody material. CAES Fact Sheet. 4 pp.

**Abstract-** Coarse woody material (CWM) is an important, yet under-appreciated component of forested ecosystems, providing valuable services, such as erosion control, nutrient cycling, and habitat. This informative fact sheet summarizes CWM formation and current research findings while offering real-world examples of its utility in the landscape.

Fielding, E., E. Hansen, C. Folsom-O’Keefe, K. Elkins, **Jeffrey Ward**, J. Milne, S. Treyger, and M. Burger. 2020. Managing forests for trees and birds in Connecticut: A guide to habitat assessments and silvicultural practices. Audubon Connecticut, Sharon CT. 22 pp. <https://ct.audubon.org/guide-to-managing-forests-in-ct>.

**Abstract-** This manual presents basic principles to evaluate forests with bird habitat in mind and ways to use silviculture to manage for bird habitat. Here, silviculture is considered as a way to produce birds as well as timber.

Kang, H., **Wade Elmer**, Y. Shen, P. B. Asunción, **Nubia Zuverza-Mena**, C. Ma, **Jason C. White**, and C. L. Haynes. 2020. Silica nanoparticle dissolution rate controls the suppression of Fusarium wilt of watermelon (*Citrullus lanatus*). *Environ. Sci. Technol.* In press.

**Abstract-** Projected population increases over the next 30 years have elevated the need to develop novel agricultural technologies to dramatically increase crop yield, particularly under conditions of high pathogen pressure. In this study, silica nanoparticles (NPs) with tunable dissolution rates were synthesized and applied to watermelon (*Citrullus lanatus*) to enhance plant growth while mitigating development of the Fusarium wilt disease caused by *Fusarium oxysporum f. sp. niveum*. The hydrolysis rates of the silica particles were controlled by the degree of condensation of or the catalytic activity of aminosilane. The results demonstrate that the plants treated with fast dissolving NPs maintained or increased biomass whereas the particle-free plants had a 34% decrease in biomass. Further, a higher silicon concentration was measured in root parts when the plants were treated with fast dissolving NPs, indicating effective silicic acid delivery. In a follow-up field study over 2.5 months, the fast dissolving NP treatment enhanced fruit yield by 81.5% compared to untreated plants. These findings indicate that the colloidal behavior of designed nanoparticles can be critical to nanoparticle-plant interactions leading to disease suppression and plant health, as part of a novel strategy for nano-enabled agriculture.

Li, C., R. Zhang, C. Ma, H. Shang, D. J. McClements, **Jason C. White**, and B. Xing. 2020. Food-grade titanium dioxide particles decrease the bioaccessibility of vitamin D<sub>3</sub> under simulated gastrointestinal conditions. *J. Agric. Food Chem.* doi.org/10.1021/acs.jafc.0c06644.

**Abstract-** Food-grade titanium dioxide (E171) particles, as a “whiteness” additive, are often co-ingested with lipid-rich foods. Therefore, we explored the impact of E171 on lipid digestion and vitamin D<sub>3</sub> (VD3) bioaccessibility encapsulated within oil-in-water emulsions in a simulated human gastrointestinal tract (GIT) model. VD3 bioaccessibility significantly decreased from 80 to 74% when raising E171 from 0 to 0.5 wt %. The extent of lipid digestion was reduced by E171 addition in a dose-dependent manner. VD3 bioaccessibility was positively correlated with the final amount of free fatty acids (FFAs) produced by lipid digestion (R<sup>2</sup> = 0.95), suggesting that the reduction in VD3 bioaccessibility was due to the inhibition of lipid digestion by E171. Further experiments showed that E171 interacted with lipase and calcium ions, thereby interfering with lipid digestion. The findings of this study enhance our understanding toward the potential impact of E171 on the nutritional attributes of foods for human digestion health.

**Little, Eliza A.H.**, O. T. Harriott, K. I. Akaratovic, J. P. Kiser, C. F. Abadam, **John J. Shepard**, and **Goudarz Molaei**. Host interactions of *Aedes albopictus*, an invasive vector of arboviruses, in Virginia, USA; *PLoS Neglected Tropical Diseases* 2021 Feb 18;15 (2):e0009173. doi:10.1371/journal.pntd.0009173.

**Abstract-** As an invasive mosquito species in the United States, *Aedes albopictus* is a potential vector of arboviruses including dengue, chikungunya, and Zika, and may also be involved in occasional transmission of other arboviruses such as West Nile, Saint Louis encephalitis, eastern equine encephalitis, and La Crosse viruses. *Aedes albopictus* feeds on a wide variety of vertebrate hosts, wild and domestic, as well as humans. In

order to investigate blood feeding patterns of *Ae. albopictus*, engorged specimens were collected from a variety of habitat types using the Centers for Disease Control and Prevention light traps, Biogents Sentinel 2 traps, and modified Reiter gravid traps in south-east Virginia. Sources of blood meals were determined by the analysis of mitochondrial cytochrome b gene sequences amplified in PCR assays. Our aims were to quantify degrees of *Ae. albopictus* interactions with vertebrate hosts as sources of blood meals, investigate arboviral infection status, assess the influence of key socioecological conditions on spatial variability in blood feeding, and investigate temporal differences in blood feeding by season. Analysis of 961 engorged specimens of *Ae. albopictus* sampled between 2017-2019 indicated that 96%, 4%, and less than 1% obtained blood meals from mammalian, reptilian, and avian hosts, respectively. Domestic cats were the most frequently identified (50.5%) hosts followed by Virginia opossums (17.1%), white-tailed deer (12.2%), and humans (7.3%), together representing 87.1% of all identified blood hosts. We found spatial patterns in blood feeding linked to socioecological conditions and seasonal shifts in *Ae. albopictus* blood feeding with implications for understanding human biting and disease risk. In Suffolk, Virginia, in areas of lower human development, the likelihood of human blood feeding increased as median household income increased and human blood feeding was more likely early in the season (May-June) compared to later (July-October). Screening of the head and thorax of engorged *Ae. albopictus* mosquitoes by cell culture and RT-PCR resulted in a single isolate of Potosi virus. Understanding mosquito-host interactions in nature is vital for evaluating vectorial capacity of mosquitoes. These interactions with competent reservoir hosts support transmission, maintenance, and amplification of zoonotic agents of human diseases. Results of our study in conjunction with abundance in urban/suburban settings, virus isolation from field-collected mosquitoes, and vector competence of *Ae. albopictus*, highlight the potential involvement of this species in the transmission of a number of arboviruses such as dengue, chikungunya, and Zika to humans. Limited interaction with avian hosts suggests that *Ae. albopictus* is unlikely to serve as a bridge vector of arboviruses such as West Nile and eastern equine encephalitis in the study region, but that possibility cannot be entirely ruled out.

Si, Yuan-Zhi, Guan-Qun Jin, De-Wei Li, Jian-Wei Sun, and Li-Hua Zhu. 2021. Leaf spot of *Sapindus mukorossi* caused by *Diaporthe biconispora* in China. *Australasian Journal of Plant Pathology* 50:193-202. <https://doi.org/10.1007/s13313-020-00762-0>.

**Abstract-** Leaf spot of soapberry, *Sapindus mukorossi*, is a disease new to China. The disease significantly reduces not only the plant's ornamental value but also its medicinal properties. Identification of pathogens timely assists preventing and controlling this disease. In July 2019, foliage of soapberry on the campus of Nanjing Forestry University, China, was infected by the disease, and the disease incidence was 96%. Symptomatic leaves were collected from three infected trees. After isolating the fungus, its pathogenicity was tested to satisfy Koch's postulates, and the culture was identified based on its morphological features and multi-gene phylogenetic analyses. Isolates WHZ3 and YB1 from the diseased leaves were identified as *Diaporthe biconispora*, and the identification was confirmed using morphological features and multi-gene phylogenetic analyses derived from an internal transcribed spacer (ITS), elongation factor 1-alpha (*EF1-a*), beta-tubulin (*β-tub*), histone H3 (*HIS*), and calmodulin (*CAL*). Koch's postulates proved the fungus to be a pathogen on soapberry. *Diaporthe biconispora* was previously reported as an endophyte in plants of the *Citrus* group, but was shown to be pathogenic to soapberry causing leaf spots.

Wu, T., Y. Liu, K. Yang, L. Zhu, Jason C. White, and D. Lin. 2021. Synergistic remediation of PCB-contaminated soil with nanoparticulate zero-valent iron and alfalfa: Targeted changes in the root metabolite-dependent microbial community. *Environ. Sci.: Nano* DOI: 10.1039/D1EN00077B.

**Abstract-** Phytoremediation is a cost-effective and environmentally sustainable remediation technology for many types of contaminants, but has low efficacy and applicability for persistent organic pollutant- (POP-) contaminated soils. Reactive nanoparticulate zero-valent iron (nZVI) can enhance plant growth and synergistically promote the remediation of POP-contaminated soil. Here, we investigated the efficacy and mechanisms by which nZVI (0, 10, 100, and 1000 mg·kg<sup>-1</sup>) and alfalfa synergistically remediate polychlorinated biphenyl- (PCB-) contaminated agricultural soil. The results show that the co-remediation efficiency of nZVI and alfalfa reach 93.1% and 52.3% in PCB28- and PCB180-



contaminated soil, respectively. These values are significantly greater than those of nZVI and phytoremediation strategies alone, and the synergistic effect is induced by the alterations of microecological environment of the alfalfa rhizosphere. Plant root metabolomic analysis and rhizosphere microbial community profiling reveal that nZVI influences amino acid metabolism and that this change in metabolites could be an energy source for reshaping the rhizosphere microbial community towards PCB degradation of. The capabilities of the microbiota to utilize carbon sources are facilitated in nZVI-alfalfa coremediation of PCB-contaminated soil. In addition to significant direct chemical degradation, root exudates were shown to promote the production of hydroxyl radicals in nZVI-bacteria system. This work provides a new strategy using nanomaterial-facilitated phytoremediation to promote the restoration of POP-contaminated soils.

## JOURNAL ARTICLES APPROVED FEBRUARY 2021

**Armstrong, Philip M., and Theodore G. Andreadis.** Ecology and epidemiology of Eastern equine encephalitis in the Northeastern US: A historical perspective. *Journal of Medical Entomology*

**Barsky, Joseph P.** The ecological importance of coarse woody material. *CAES Fact Sheet*

Curtis, B., N. Niemuth, E. Bennett, A. Schmoldt, O. Mueuller, A. Mohaimani, E. D. Laudadio, Y. Shen, **Jason C. White**, R. J. Hamers, and R. D. Klaper. Cross-species comparison of nanomaterial impact identifies unifying mechanisms of interaction across taxonomic classes and sources of interspecies differences. *Nature Nanotechnology*

**Kodati, Srikanth**, E. Allan-Perkins, and **James A. LaMondia**. In vitro study on the effect of temperature, leaf wetness period, and cultivar susceptibility on boxwood blight incidence. *Phytopathology* (Abstract)

Koelmel, J. P., P. Stelben, C. A. McDonough, D. A. Dukes, J. J. Aristizabal-Henao, **Sara L. Nason**, Y. Li, S. Sternberg, E. Lin, M. Beckmann, A. J. Williams, J. Draper, J. Finch, C. Deigl, E. E. Rennie, J. A. Bowden, and K. J. Godri Pollitt. FluoroMatch 2.0 - Making automated and comprehensive non-targeted PFAS annotation a reality. *Analytical and Bioanalytical Chemistry*

**LaMondia, James A., and Brian D. Eitzer.** Timing of fungicide application for control of *Peronospora tabacina*, causal agent of tobacco blue mold, affects efficacy and fungicide residues in Connecticut cigar wrapper tobacco. *Tobacco Science*

Ma, C., Q. Li, W. Jia, H. Shang, J. Zhao, Y. Hao, C. Li, M. Tomko, **Wade Elmer, Jason C. White**, and B. Xing. Role of nanoscale hydroxyapatite in disease suppression of *Fusarium*-infected tomato. *Environmental Science & Technology*

Meselhy, A. G., S. Sharma, Z. Guo, S. Singh, H. Yuan, R. D. Tripathi, B. Xing, **Craig Musante, Jason C. White**, and O. Parkash-Dhankher. Nanoscale sulfur improves plant growth and reduces arsenic toxicity and accumulation in rice (*Oryza sativa* L.) *Environmental Science & Technology*

**Molaei, Goudarz, Eliza Little, Scott Williams, and Kirby Stafford III.** First record of established populations of the invasive pathogen vector and ectoparasite *Haemaphysalis longicornis* (Acari: Ixodidae) in Connecticut, USA. *Journal of Medical Entomology*

**Rutledge, Claire E., R. G. Van Driesche, and J. J. Duan.** Comparative efficacy of three techniques for monitoring the establishment and spread of larval parasitoids recently introduced for biological control of emerald ash borer, *Agrilus planipennis* (Coleoptera: Buprestidae). *Journal of Economic Entomology*

**Williams, Scott C.** Secondary effects of the use of lead ammunition on wildlife. *Connecticut Wildlife*

Wilson, S. N., K. Lopez, S. Coutermash-Ott, D. I. Auguste, D. L. Porier, **Philip M. Armstrong, Theodore G. Andreadis**, G. Eastwood, and A. J. Auguste. Lineage III La Crosse virus strains show reduced pathogenesis in comparison to other lineages in murine models. *Pathogens*

Yang, X., V. L. Castroagudín, M. L. Daughtrey, A. Loyd, J. E. Weiland, N. Shishkoff, F. Baysal-Gurel, L. Santamaria, C. Salgado-Salazar, James A. LaMondia, J. A. Crouch, and D. G. Luster. A diagnostic guide for Volutella blight affecting *Buxaceae*. *Plant Health Progress*

ARTICLES OF INTEREST FEBRUARY 2021



CELEBRATING **55** YEARS

**ENVIRONMENTAL**  
Science & Technology

March 2, 2021  
Volume 55  
Number 5  
pubs.acs.org/est

**2020 Reviewer Awards**

**Lifetime Reviewer Award**  
**Jason White**

**Super Reviewer Award**

<b>Brian Chaplin</b>	<b>Xiaohong Guan</b>	<b>Damian Heibling</b>
<b>Juliane Hollender</b>	<b>Z. Jason Ren</b>	<b>Virender Sharma</b>
<b>Guofeng Shen</b>	<b>Davide Vione</b>	<b>Xiangru Zhang</b>

**Excellence in Review**

<b>Jennifer Apell</b>	<b>Chak Chan</b>	<b>Iso Christl</b>
<b>Julian Fairey</b>	<b>Carlos Domingo-Felez</b>	<b>Christian George</b>
<b>Aurea Chiaia-Hernández</b>	<b>Peiyong Hong</b>	<b>Karl Jobst</b>
<b>William Johnson</b>	<b>Susanne Lackner</b>	<b>Jae-Seong Lee</b>
<b>Robert Letcher</b>	<b>Fangbai Li</b>	<b>Sai Liang</b>
<b>Chunyang Liao</b>	<b>Peng Liao</b>	<b>Shihong Lin</b>
<b>Rünzeng Liu</b>	<b>Alvine Mehinto</b>	<b>Hui Peng</b>
<b>Arup Sengupta</b>	<b>Alberto Tiraferri</b>	<b>George Wells</b>
<b>Wolfgang Wilcke</b>	<b>Ngai Yip</b>	<b>Paul Ziemann</b>





# CAES

The Connecticut Agricultural Experiment Station

*Putting Science to Work for Society since 1875*

## The Connecticut Agricultural Experiment Station

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



Main Laboratories, New Haven



Lockwood Farm, Hamden

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

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



Griswold Research Center, Griswold



Valley Laboratory, Windsor

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

Putting Science to  
Work for Society.

## The Connecticut Agricultural Experiment Station

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

Equal employment opportunity means employment of people without consideration of age, ancestry, color, criminal record (in state employment and licensing), gender identity or expression, genetic information, intellectual disability, learning disability, marital status, mental disability (past or present), national origin, physical disability (including blindness), race, religious creed, retaliation for previously opposed discrimination or coercion, sex (pregnancy or sexual harassment), sexual orientation, veteran status, and workplace hazards to reproductive systems unless the provisions of sec. 46a-80(b) or 46a-81(b) of the Connecticut General Statutes are controlling or there are bona fide occupational qualifications excluding persons in one of the above protected classes. To file a complaint of discrimination, contact Dr. Jason White, Director, The Connecticut Agricultural Experiment Station, P.O. Box 1106, New Haven, CT 06504, (203) 974-8440 (voice), or [Jason.White@ct.gov](mailto:Jason.White@ct.gov) (e-mail). CAES is an affirmative action/equal opportunity provider and employer. Persons with disabilities who require alternate means of communication of program information should contact the Chief of Services, Michael Last at (203) 974-8442 (voice), (203) 974-8502 (FAX), or [Michael.Last@ct.gov](mailto:Michael.Last@ct.gov) (e-mail).



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

Volume 11 Issue 3  
March 2021

Station News was prepared and edited by Dr. Jason White, Ms. Vickie Bomba-Lewandoski, Ms. Sandra Carney, and Ms. Brandi Marks.