Station News

The Connecticut Agricultural Experiment Station
Volume 9 Issue 11 November 2019

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

This Issue

Administration	2
Analytical Chemistry	2
Entomology	3
Environmental Sciences	5
Forestry and Horticulture	6
Plant Pathology and Ecology	7
Valley Laboratory	8
Dept. Research Updates	9
Journal Articles Approved	11

ADMINISTRATION

DR. THEODORE ANDREADIS was interviewed about eastern equine encephalitis virus activity in the state, the curtailing of after-school activities in the affected communities and risk of human infection by Toni Terzi, Fox 61; WSHU Public Radio; and Ellyn Santiago, the Patch (October 1); was interviewed about the rising number of human cases of eastern equine encephalitis in Connecticut and adjoining states by Toni Terzi, Fox 61 (October 2); was interviewed about the current situation with eastern equine encephalitis virus in southeastern CT and the continuing risk of human infection and curtailing of outdoor public events with the onset of colder temperatures by Kristen Johnson, NBC Connecticut 30 and Greg Hladky, Hartford Courant (October 4); was interviewed about the current situation with eastern equine encephalitis virus in the State for Connecticut Today show with Paul Pacelli, WICC 600 (October 4); was interviewed about eastern equine encephalitis virus activity in the state, the curtailing of after school activities and public events in the affected communities and risk of human infection by Kevin Hogan-WFSB and NBC Connecticut 30 (October 8); presided over a quarterly meeting of the Station's Board of Control held at the Valley Laboratory in Windsor (October 16); and participated with representatives from the Entomological Society of America and Leadership from the Northeast Regional Center of Excellence in Vector-Borne Diseases in meetings with Congressional representatives from New York, Connecticut, and New Jersey in Washington DC. The meetings focused on the role of the Regional Centers of Excellence in research, outreach, and prevention of vector-borne disease, and stressed the importance of reauthorizing funding to support these and other state and CDC programs as described in the Ticks: Identify, Control, and Knockout (TICK) Act. On October 31, the Senate Health Committee voted to move forward this bipartisan legislation, which has been renamed the Kay Hagan Tick Act, in honor of the former North Carolina Senator who passed away from complications of tick-borne illness (October 28-29).

ANALYTICAL CHEMISTRY

DR. JASON C. WHITE, along with **DR. WALTER KROL** and **DR. CHUANXIN MA,** participated in a ZOOM meeting for the Nanyang Technological University-Harvard University TH Chan School of Public Health Initiative for Sustainable Nanotechnology (SusNano) (October 1, 17); spoke by phone with collaborators at Carnegie Mellon University regarding a USDA SCRI proposal (October 2); hosted the CAES monthly J1-Visa meeting (October 2); participated in a ZOOM call with co-investigators from LSU and Auckland University as part of a funded joint USDA AFRI grant (October 4); met with a potential undergraduate intern from the University of New Haven Forensics program (October 4); attended the monthly Laboratory Preparedness meeting at the CT Department of Public Health Laboratory in Rocky Hill (October 7); hosted Mr. Hyunho Kang of the University of Minnesota as part of a PhD student laboratory exchange within the Center for Sustainable Nanotechnology (CSN) (October 7-10); hosted the monthly "Nanochem-plant" working group ZOOM call for the CSN (October 8); along with **DR. BRIAN EITZER, DR. WALTER KROL, DR. CHRISTINA ROBB, MS. TERRI ARSENAULT, MR. CRAIG MUSANTE,** and **MS. KITTY PRAPAYOTIN-RIVEROS,** participated in the monthly FDA FERN cCAP WebEx call (October 10); hosted a ZOOM call focused on computational chemistry and nano-enabled agriculture for the CSN (October 11); participated in the quarterly CAES Board of Control meeting (October 16); met with Prof. John Fortner of the Yale University Department of Chemical Engineering to discuss collaborative research (October 18); gave invited lectures at Nanjing Agricultural University (75 participants) and at the Institute of Soil Science, Chinese Academy of Science (25 participants) in Nanjing, China (October 21-25); participated in a ZOOM call with collaborators and the Technology Transfer Office of the University of Minnesota regarding a patent filing based on data on a nano-enabled agricultural application as part of the CSN (October 29); participated in a ZOOM call to discuss collaborative experiments with the University of California Riverside and the University of Minnesota as part of the CSN (October 29), and participated in the weekly CSN ZOOM all-hands call (October 30).

DR. BRIAN EITZER was a participant in the North American Chemical Residue Workshop's organizing

committee phone call (October 10), the Food Emergency Response Network national call (October 17), and attended the Tox Rounds seminar on PFAS at the State Department of Health lab in Rocky Hill (October 17).

DR. NUBIA ZUVERZA MENA, along with **DR. SARA NASON,** participated in the "PFAS and Health Disparities meeting" at the Yale School of Public Health, networking for possible collaborations between Yale, the CT DEEP, and CAES (October 2), and was accepted as a Level I researcher by the Mexican Council of Science and Technology (CONACYT), as part of their National System of Researchers (Spanish acronym: SNI) (October 29).

Jason C. White presenting lectures at Nanjing Agricultural University and the Institute of Soil Science of the Chinese Academy of Science in Nanjing, China.

ENTOMOLOGY

DR. KIRBY C. STAFFORD III spoke on ticks and tick-borne diseases at the Posser Public Library in Bloomfield (30 attendees) (October 2); participated in a meeting on the Connecticut Forest Action Plan in Middlefield (22 participants) (October 3); was interviewed by Matt Dwyer, WTIC-AM, about the spotted lanternfly (October 15); interviewed by Kate Rayner, NBC-CT about the spotted lanternfly (October 16); participated in a conference call of the Tick Biology, Ecology and Control subcommittee of the Tick Borne Disease Working Group (October 21); and spoke to the Bristol Garden Club at the Bristol Public Library about ticks, tick-borne disease, and tick management (40 attendees) (October 24).

MS. KATHERINE DUGAS attended and gave a brief update to attendees on the spotted lanternfly at the annual Connecticut Invasive Plant Working Group (CIPWG) meeting in Vernon (61 attendees) (October 24).

MR. MARK H. CREIGHTON spoke to twenty students taking a course on The Ecology of Food, by Dr. Linda Puth from the Yale University Department of Evolutionary Biology at the Yale Farm in New Haven (October 9) and was interviewed by Cate Hewitt from The Connecticut Examiner for a story on "Beekeepers in Southeast Connecticut," published on October 29 (October 2).

DR. MEGAN LINSKE was interviewed by Stephanie Morse, a Cornell MPH program student, on developing a landscape monitoring and evaluation plan for tick control (October 9); co-presented an invited lecture with Dr. Scott Williams at the CT Urban Forest Council Annual Meeting entitled "Tick-borne disease ecology: Concerns for forest and public health alike" (148 attendees) (October 23); conducted a Workshop Committee conference call as Workshop Chairperson for the Northeast Section of the Wildlife Society to develop programs for the Annual Northeast Fish and Wildlife Agencies Conference in 2020 (October 24).

DR. GALE E. RIDGE was interviewed about the brown marmorated stink bug, *Halyomorpha halys* by Mike Agogliati from Channel 3 News (October 1); had a CAES exotic pest insects and worms table at the 19th Bethany Harvest Festival (2,000 attendees) (October 6); traveled to the ABC studio in New York City to record an episode for a new children's game show for Disney called "The Big Fib" (October 10), which is scheduled for release in 2020; The premise of the Big Fib show is to have a child guess the real expert from the fake expert, while introducing child audiences to more unusual professions. The insect information office has been receiving concerned calls by Connecticut citizens about three Asian earthworm species collectively called the crazy snake worms. They are increasingly becoming established in Connecticut with a track record of causing serious ecological harm to infested areas of the Northeastern forest biome; participated in a workshop and fellow collaborative meeting with Dr. Josef Gorres from the University of Vermont as part of "earthworm day" sponsored by the University of Connecticut (70 attendees) (October 19); and presented a talk about bed bugs to the Connecticut Nurses Association in Middletown (19 attendees) (October 30).

Left to right is Dr. Ridge (the expert), Andrea Fasano (producer) and Josh (the actor) for "The Big Fib." The actor is holding a Mediterranean Hissing Cockroach.

DR. CLAIRE E. RUTLEDGE taught 'Insects that Eat Trees' for Arboriculture 101, in Wallingford (45 adults) (October 6) and presented a talk entitled "The future of ash in Connecticut" at the Connecticut Urban Forest Council in Plainville (60 adults) (October 23).

DR. VICTORIA L. SMITH participated in a meeting with CT DEEP Division of Forestry, "Prepping for the 2020 Forest Action Plan," held at CFPA Headquarters in Rockfall (22 participants) (October 3); was interviewed by Kaylee Pugliese of the Waterbury Republican-American on the recent report of a spotted lanternfly in Southbury (October 10); was interviewed by Katrina Koerting of the Danbury News-Times newspaper on the recent report of a spotted lanternfly in Southbury (October 15) and participated in a meeting of the Yale Biosafety Committee in New Haven (20 participants) (October 17).

DR. KIMBERLY A. STONER presented a talk, "Whatever Happened to IPM?" at the Protecting Pollinators in Urban Landscapes Conference in Cincinnati, Ohio (85 attendees) (October 8); was interviewed about pollinator habitat by Palia Sognlin of the Yale Daily News (October 11); spoke to the Southington Garden Club on "Planting for the Bees' Needs" (35 attendees) (October 22); and met with representatives of the Connecticut Botanical Society, Dr. Robert Askins of Connecticut College, and Eversource at a utility right-of-way adjacent to the Groton Open Space Association Avery Hill Farm to discuss vegetation management in the rights-of-way for high voltage transmission lines in relation to habitat for pollinators, rare plants, and other organisms of interest (9 participants) (October 23).

MS. TRACY ZARRILLO participated in the BOMBUSS 2.0 conference of scientists sharing methods for bumble bee research, including long-term monitoring, regional surveys, and citizen science, and to set up collaborations with bumble researchers at York University in Ontario, Canada (October 16–18).

ENVIRONMENTAL SCIENCES

DR. JOSEPH PIGNATELLO participated in a conference call with Prof. Sanjai Parikh, University of California, Davis on progress in a collaborative research project (October 3); gave a keynote talk at the International Workshop on Pollutants in Agro-Environments at Nanjing Agricultural University in Nanjing, China (October 12-15) (approx. 200 attendees, approx. 50 students); gave a departmental seminar at the State Key Laboratory of Pollution Control and Resource Reuse, School of the Environment, Nanjing University, Nanjing China (approx. 80 attendees, approx. 60 students) (October 16); and participated in a Council meeting of the Connecticut Academy of Science and Engineering, Rocky Hill (October 30).

DR. PHILIP ARMSTRONG was interviewed by WTIC (October 1), CBS News (October 4), The Republican American (October 4), The Connecticut Post (October 8 and 15), WTIC (October 9), and The Hartford Courant (October 16) about the EEE virus outbreak; and gave a presentation on West Nile virus in Connecticut at the West Nile virus Forecasting Workshop hosted by the New York Department of Health and SUNY Albany in Albany, NY (40 attendees) (October 30).

DR. DOUG BRACKNEY gave an invited talk entitled "Navigating anatomical barriers to infection: An arbovirus tale" at the Rocky Mountain Laboratories in Hamilton, MT (50 attendees) (October 17).

MR. GREGORY BUGBEE with Summer Stebbins met with Guilford First Selectman Joe Mazza, and members of the Friends of Lake Quonnipaug at the Guilford Town Hall to discuss weed management strategies (approx. 10 attendees) (October 8); hosted a soil science class from Southern Connecticut State University and spoke on "Soil testing." (approx. 30 student attendees) (October 28); and hosted 5th grade students from the Elm City Montessori School and demonstrated soil testing (6 student attendees) (October 29).

DR. SARA NASON discussed interdisciplinary collaboration on PFAS grant applications at a meeting at the Yale School of Public Health (October 2); participated in a conference call for the Benchmarks and Publications for Non-Targeted Analysis group (October 2); presented a poster entitled "Hemp phytoremediation of AFFF contamination at the former Loring Air Force Base" and volunteered at a career networking event for students at the 35th Annual International Conference on Soils, Sediments, Water, and Energy held in Amherst, MA (~800 attendees) (October 22-23).

MS. SUMMER STEBBINS gave a talk entitled "Invasive Aquatic Plants in Connecticut" to the Friends of Bolton Lakes at their Annual Fall Forum (approx. 30 attendees) (October 22).

FORESTRY AND HORTICULTURE

DR. JEFFREY S. WARD was interviewed about autumn leaf color by Bob Miller of the Danbury News-Times (October 1); spoke on "Tree and shrub identification" for the Glastonbury Garden Club (14 attendees) (October 3); planted a white oak donated by CTPA on the Prospect Town Green with Mayor Robert Chatfield in celebration of the 100th anniversary of the arborist law insuring quality tree care for Connecticut's residents (October 4); participated in a meeting of the Connecticut Invasive Plant Council in Windsor (October 8); participated in an NESAF 2020 planning committee conference call (October 29).

DR. ABIGAIL A. MAYNARD hosted the Kindergarten from Hamden Hall Country Day School at Lockwood Farm (21 students, 3 teachers, 2 parents) (October 18); spoke on "Composting and Utilization of Compost" at the Redding Garden Club (43 adults) (October 28); spoke on "Composting and Utilization of Compost" to two Sustainability classes at Hamden Hall Country Day School (30 students, 2 teachers) (October 29); inspected the composting operation at Wesleyan University in Middletown (4 students, 1 teacher) (October 31).

DR. SCOTT C. WILLIAMS was interviewed about developing a landscape monitoring and evaluation plan for tick control by Stephanie Morse, a Cornell MPH program student (October 9); co-presented an invited lecture with **DR. MEGAN LINSKE** at the CT Urban Forest Council Annual Meeting entitled "Tick-borne disease ecology: Concerns for forest and public health alike" in Southington (128 attendees) (October 23).

MR. JOSEPH P. BARSKY participated in the quarterly meeting of the Connecticut State Consulting Committee for Agricultural Science and Technology Education in Wallingford (October 22).

MR. MICHAEL R. SHORT staffed the CAES display at The 31st Annual Conference on Urban and Community Forestry in Southington (150 attendees) (October 23).

Mayor Robert Chatfield (r) and Jeffrey Ward planted a white oak donated by CTPA on the Prospect Town Green in celebration of the 100th anniversary of the arborist law insuring quality tree care for Connecticut's residents.

PLANT PATHOLOGY AND ECOLOGY

DR. WASHINGTON DA SILVA participated in a professional development program sponsored by the local city hall in Divinolândia de Minas, Brazil, to encourage the young local students to pursue higher education and presented two seminars entitled "From here to there and where we are heading!" was presented to his High School (Escola Estadual Professor Carvalhais) (100 students) (October 10) and "Research at CAES" to Students Instituto Superior de Educação Elvira Dayrell (200 high school students) (October 12).

DR. WADE ELMER participated with Dr. Jason White in the biweekly Center for Sustainable Nanotechnology (CSN) zoom conference meeting (October 1); presented an "Innovation Report on Nanotechnology" at the biweekly CSN Zoom conference meeting (October 15) (12 attendees); attended "An Evening at the Greenhouse" at Geremia's Greenhouses in Wallingford (October 16); met with Mr. Jack Swat (President, CT Chapter of the American Chestnut Foundation) and Dr. Sandra Anagnostakis at Lockwood Farm to inspect chestnut trees and discuss Chestnut research (October 16); and participated with Dr. Jason White in a Zoom Conference Meeting on "Marketing the Seed Coating Technology" with Larry Micek of the University of Minnesota (October 29).

DR. YONGHAO LI presented "Pruning 101" at the New Hartford Garden Club Business Meeting in New Hartford (21 adults) (October 2).

DR. ROBERT MARRA was interviewed by Hearst Connecticut Media reporter Robert Miller about Beech Leaf Disease (October 18); gave a guest lecture on Fungal Mating Systems to Dr. Jon Hulvey's Mycology class at Eastern Connecticut State University (24 students) (October 25); and was interviewed by Science Magazine writer Gabriel Popkin about Beech Leaf Disease (October 31).

Dr. NEIL SCHULTES along with **DR. QUAN ZENG,** presented a "Toolbox Webinar" on "Fire blight IPM using non-antibiotic control methods" for the Northeastern Integrated Pest Management Center. (October 9) (140 attendees); presented a talk entitled "Fire blight IPM using non-antibiotic control methods" at the 81st New England, New York, Canadian Fruit Pest Management Workshop

in Burlington, VT (50 attendees) (October 22-23); presented the first lecture in a three-lecture series on "Genetically Modified Plants in Agriculture" in a Yale Course Sci 031 "Current Topics in Science (8 students) (October 25); presented a talk entitled "Fire blight IPM using non-antibiotic control methods" for the 5th Northeastern Integrated Pest Management Center online conference (49 viewers) (October 30) .

DR. STEPHEN TAERUM presented "Bark beetles of Connecticut: What are they, and what do they do?" to the Yale Green Café at the Marsh Botanical Garden (18 adults, 1 youth) (October 3).

DR. LINDSAY TRIPLETT gave three lectures and led two journal discussions on molecular plant-microbe interactions as co-instructor of the Yale graduate course MCDB680, Advances in Plant Molecular Biology (11 students) (October 4, 11, and 25).

DR. QUAN ZENG along with **DR. NEIL SCHULTES** and Dr. Dan Cooley from University of Massachusetts hosted a webinar on fire blight disease management through the Northeastern IPM Center "IPM Toolbox" series and presented "Fire blight IPM using non-antibiotic materials" (140 attendees) (October 9); participated in the New England, New York, and Canada Fruit Pest Management Workshop in Burlington, VT and presented "Role of the type III secretion system during early events of pathogenesis in fire blight pathogen *Erwinia amylovora* on apple flowers. " (50 attendees) (October 22-23); participated in the Northeastern IPM Center online conference (~60 attendees) (October 30).

Dr. da Silva talking about his research at CAES in his hometown high school.

VALLEY LABORATORY

DR. JATINDER AULAKH attended the general meeting of the Connecticut Invasive Plant Working Group held at the Tolland County Extension Center in Vernon (October 24).

DR. CAROLE CHEAH gave an overview of Connecticut's mile-a-minute biological control program

to Town of Greenwich staff and led a tour of the biological control sites (4 attendees) (September 12); presented a summary of Connecticut's mile-a-minute biological control program to the Conservation Commission, Town of Southbury, and toured the biological control site at George Bennett Park in Southbury (September 10); led a tour and developed management strategies for mile-a-minute weed with members of Terra Firma Gardening of Mystic, at Wamphassuc Point in Stonington (3 attendees) (October 8); and led a tour of mile-a-minute biological control sites and discussed the results at the Naval Submarine Base in Groton (October 2).

DR. RICHARD COWLES spoke about "Bees, trees, and neonicotinoids" to the New England Chapter of the ISA meeting held in Springfield, MA (150 attendees) (October 8); presented "Bee health and neonicotinoids" to a class on pollinator biology at the University of Rhode Island, (12 attendees) (October 10) and lectured on "Emerald ash borer chemical control" at the CT Urban Forest Council's Forest Forum held in Milldale (50 attendees) (October 23).

MS. ROSE HISKES gave a talk on "Flying flowers" to the Waterbury Senior Citizens in Waterbury (22 attendees) (October 10); and organized and co-led a steering committee and general meeting of the Connecticut Invasive Plant Working Group in Vernon (15 and 61 attendees, respectively) (October 24).

DR. JAMES LAMONDIA spoke about European corn borer as a new hop pest in Connecticut and integrated pest management at the CT Hop Growers Association meeting held in South Glastonbury (25 attendees) (October 8); spoke about nematode management research results at the annual meeting of the Northeast Regional Multistate Nematology Technical Committee (NE-1640) held in Honolulu, HI (15 attendees) (October 16-19); spoke about the history of Connecticut Cigar wrapper leaf: the result of practical research and over 380 years of tobacco production to the Long Hill Garden Club in Trumbull (60 attendees) (October 28); participated in the Connecticut Farm Risk Management Advisory group meeting held in Vernon (October 30); taught a class on identification, biology and management of tree diseases to students in the Connecticut Tree Protective Association's Arboriculture 101 class in Wallingford (30 attendees) (October 30); was interviewed by Gabriel Popkin for Science Magazine about beech leaf disease in Connecticut (October 31); was interviewed by Vicki Mitchell of the Enfield Press about the Enfield Friends of the library program and the Experiment Station and participated in the dedication of a descendant of the Charter Oak by the Friends of the Library, speaking about the Experiment Station and Valley Laboratory research and services in Enfield (30 attendees) (October 31) .

DR. DEWEI LI was interviewed by Enxhi Dylgjeri, a journalist from the Columbia Journalism School, on indoor mold at Staten Island University Hospital (October 29).

DEPARTMENTAL RESEARCH UPDATES OCTOBER 2019

Bindraban, P.S.; Franklin, F.A.; **White, J.C.**; Melse-Boonstra, A.; Koele, N.; Pandey, R.; Dimkpa, C.O.; Rodenburgh, J.; Senthilkumar, K.; Demokritou, P.; Schmidt, S. 2018. Safeguarding human and planetary health demands a fertilizer sector transformation. *Plants, People, Planet* In press.

Abstract- The Great Food Transformation outlines a strategy for delivering sustainable food systems that remain within the planetary boundaries. This strategy requires a significant reduction in yield gaps and food system inefficiencies. Mineral fertilizers will need to play a critical role in delivering sustainable food systems. However, a reduction of nutrient losses from mineral fertilizer use is not achievable through optimized practices with current products. This calls for a transformation of the 250 billion USD fertilizer sector with innovative fertilizers and application technologies (IFAT) that can simultaneously address several daunting interlinked food, agriculture, and environmental problems. The potential benefits of IFAT for ecology and human well-being have remained elusive because success requires transformation of the vast fertilizer sector by means of government policy interventions, societal responses, and signifi-

cant R&D investments.

Cao, Y.; **Ma, C.**; Chen, G.; Zhang, J.; **White, J.C.**; Xing, B. 2019. Copper stress in flooded soil: Impact on enzyme activities, microbial community composition and diversity in the rhizosphere of *Salix integra*. *Sci. Tot. Environ*. In press.

Abstract- Climate change has increased flooding frequency and has led to increased global land degradation as these areas are vulnerable to heavy metal pollution. However, investigations on the impact of contamination by copper (Cu) and other elements under flooding conditions metal speciation and microbial parameters is still limited. In the present study, the impact of Cu (150 and 450 mg kg^{-1}) on metal availability, soil enzyme activity and microbial community composition in soil used for cultivating willow (*Salix integra* Thunb.) seedlings was investigated under flooding conditions for 60 d. Microbial community diversity and composition was analyzed by high-throughput amplicon sequencing using 16S rRNA for bacteria and the internal transcribed spacer (ITS) for fungi. The activity of soil enzymes (invertase, urease and cellulose) were reduced by Cu and flooding stress, whereas the activity of polyphenol oxidase and peroxidase were elevated with increasing the Cu concentrations. Soil flooding decreased the diversity of the bacterial and fungal communities, but had no impact on the composition of the dominant microbial groups or overall structure of the community. Redundancy analysis suggests that Cu and Fe iron significantly impacted the composition of microbial community in the soil rhizosphere. In addition, soil organic matter was another important factor modulating the microbial community structure. Taken together, our findings provide new insight into the responses of soil microbes to Cu-contamination and contribute to our understanding of metal phytotoxicity in soil-woody plant systems under flooded conditions.

Cheah, Carole 2019. Battling Mile-a-minute Weed in Connecticut. ***The Habitat*** 31(2):6-7.

Abstract- The mile-a-minute weed, *Persicaria perfoliata* (MAM) distribution and spread in Connecticut towns is summarized together with an update of the 10-year program of biological control of MAM, funded by USDA APHIS PPQ. The program has released more than 60,000 weevils, *Rhinoncomimus latipes*, in 27 Connecticut towns.

Cheah, Carole A. S-J. & Ellis, Donn a. R. 2019. Spread of Mile-a-minute vine, *Persicaria perfoliata* L. (Polgonaceae) to Connecticut islands in Long Island Sound. ***Rhodora*** 121 NO. 987:219-221; doi:10.3119/19-02.

Abstract- Mile-a-minute weed, *Persicaria perfoliata* (MAM) is a highly invasive weed in Connecticut and the spread of MAM to off shore islands in Connecticut's Long Island Sound, is documented and discussed.

Elmer W, Li D, Yavuz S, Madeiras A, Schultes N. Heuchera root rot, a new disease for *Plectosphaerella cucumerina*. *J Phytopathol*. 2019; 00:1–7. https ://doi.org/10.1111/jph.12867

Abstract- A *Plectosphaerella* sp. was isolated from an undescribed root rot of the herbaceous ornamental *Heuchera sanguine* (Coral Bells) in Massachusetts. Morphological examination and phylogenetic analysis using DNA sequences derived from internal transcribed spacer (*ITS*) of rDNA, large subunit (*LSU*) of rDNA, *calmodulin* (*CaM*), ß-*tubulin 2* (*Tub*) and transcription elongation factor 1 (*Ef-1a)* loci identified the fungus as a member of *Plectosphaerella cucumerina*. A test of Koch's postulates on an isolate of *P. cucumerina* indicated that it was a pathogen causing root rot in *Heuchera* sp. The pathogen caused greatest damage to small transplants (1–4 g) as opposed the larger transplants (9–13 g) and in separate studies was found to infect seedlings of cucumbers, melons and pumpkins. *Plectosphaerella cucumerina* is reported for the first time in *Heuchera* sp. Given the importance of Heuchera to the ornamental industry, and the rapid dissemination that can occur with propagated material in the horticultural trade, caution should be exercised to prevent the spread of *P. cucumerina*.

Eliza A.H. Little and **Goudarz Molaei,*** Passive Tick Surveillance: Exploring Spatiotemporal Associations of *Borrelia burgdorferi* (Spirochaetales: Spirochaetaceae), *Babesia microti* (Piroplasmida: Babesiidae), and *Anaplasma phagocytophilum* (Rickettsiales: Anaplasmataceae) Infection in *Ixodes scapularis* (Acari: Ixodidae), *Vector-Borne and Zoonotic Diseases* 2019. doi: 10.1089/vbz.2019.2509. Published October 3, 2019.

Abstract. *Ixodes scapularis* transmits a group of pathogens, including *Borrelia burgdorferi*, *Babesia microti*, and *Anaplasma phagocytophilum*, the causative agents for Lyme disease, babesiosis, and anaplasmosis, respectively. *I. scapularis* ticks submitted by state residents to the Connecticut Agricultural Experiment Station-Tick Testing Laboratory between 2015 and 2018 were screened using standard PCR and pathogen-specific primers. Infection and coinfection prevalence in *I. scapularis* was estimated to assess differences in infection status by life stage (nymph or adult female), county, and year, as well as whether infection with *B. burgdorferi* changes the likelihood of infection with either *B. microti* or *A. phagocytophilum*. Of the 11,254 *I. scapularis* acquired in Connecticut, 40.7% tested positive for at least one pathogen and the remaining 59.3% were negative. Most *I. scapularis* ticks tested positive for a single pathogen (33.6%), and only 7.2% were infected with more than one pathogen, of which 93.2% were identified with dual infection and 6.8% tested positive for all three pathogens. Adults were more likely than nymphs to be infected or coinfected with these pathogens. Furthermore, we found that ticks were 74% more likely to be infected with *B. microti* and 98% more likely to be infected with *A. phagocytophilum* if infected with *B. burgdorferi* compared with those not infected. We did not find spatial differences in infection or coinfection prevalence, but between 2015 and 2018, the likelihood that a tick was coinfected increased with time. These results from Connecticut, an endemic state for Lyme disease with long-established populations of *I. scapularis*, suggest that the increased likelihood of coinfection prevalence over time may have significant implications for clinical diagnosis, course, severity, and treatment of human disease cases.

JOURNAL ARTICLES APPROVED OCTOBER 2019

Adams, A., **James LaMondia**, **Richard Cowles**, B. Nicholson, and T. Mione. Stimulating hatch of tobacco cyst nematode (TCN), *Globodera tabacum tabacum*, by hydroponically obtained weedy *Solanum* spp. root exudates. *Nematropica*

Cao, Y., **Chuanxin Ma**, H. Chen, J. Zhang, **Jason C. White**, G. Chen, and B. Xing. Xylem-based long-distance transport and phloem remobilization of copper in shrub willow (*Salix integra*). *Environment International*

Dimkpa, C. O., J. Andrews, J. Fugice, U. Singh, P. S. Bindraban, **Wade H. Elmer**, J. L. Gardea-Torresdey, and **Jason C. White**. Facile coating of urea with low-dose ZnO nanoparticles promotes wheat performance and enhances Zn uptake under drought stress. *ACS Sustainable Chemistry & Engineering*

Hao, Y., **Chuanxin Ma**, **Jason C. White**, M. Adeel, R. Jiang, Z. Zhao, Y. Rao, Y. Rui, and B. Xing. Carbon-based nanomaterials alter the composition of the fungal endophyte community in rice (*Oryza sativa* L.). *Environmental Science: Nano*

Hu, J., X. Wu, F. Wu, W. Chen, X. Zhang, **Jason C. White**, J. Li, Y. Wan, J. Liu, and X. Wang. TiO_2 nanoparticle exposure on lettuce (*Lactuca sativa* L.): Dose-dependent deterioration of nutritional quality. *Environmental Science: Nano*

Little, Eliza A.H., **Scott C. Williams**, **Kirby C. Stafford III**, **Megan A. Linske**, and **Goudarz Molaei**. Evaluating the effectiveness of an integrated tick management approach on multiple pathogen infection in *Ixodes scapularis* questing nymphs and larvae parasitizing white-footed mice. *Experimental and Applied Acarology*

Maynard, Abigail A. Growing globe artichokes and Belgian endive in Connecticut. *Proceedings of the 2019 New England Vegetable and Fruit Conference*

McGehee, C., R. E. Raudales, **Wade H. Elmer**, and R. McAvoy. Efficacy of biofungicides on suppressing Pythium root rot on lettuce (*Lactuca sativa* L.) seedlings. *Plant Health Progress*

Rocha-Gutierrez, C., D. Chavez-Flores, **Nubia Zuverza-Mena**, A. Duarte, S. Flores, A. E. Zaragoza -Contreras, and B. Rocha-Gutierrez. Development of polylactide/hydroxyapatite osteocomposites using organo-modified hydroxyapatites. *Biomaterials*

Zhang, Z., M. Xia, **Chuanxin Ma**, H. Guo, W. Wu, **Jason C. White**, B. Xing, and L. He. A rapid organic solvent extraction coupled with Surface Enhanced Raman Spectroscopic mapping for ultrasensitive quantification of silver nanoparticles in plant leaves. *Environmental Science: Nano*

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

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

Griswold Research Center
190 Sheldon Road
Griswold, CT 06351-3627

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

Putting Science to Work for Society.

Main Laboratories, New Haven

Lockwood Farm, Hamden

Griswold Research Center, Griswold

Valley Laboratory, Windsor

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

Station News was prepared and edited by Dr. Theodore G. Andreadis, Ms. Vickie Bomba-Lewandoski, Ms. Sandra Carney, and Ms. Brandi Marks.

https://portal.ct.gov/CAES

Volume 9 Issue 11
November 2019